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December 1, 2021

Ontario Energy Board
By electronic filing and e-mail

Attn: Christine E. Long, Registrar and Board Secretary

Dear Ms Long:

Re: EB-2021-0002, EGI 2022-27 DSM – GEC/ED Evidence of Energy Futures Group

Pursuant to P.O. 5 in this matter, please find attached the evidence of Energy Futures Group which is being filed by GEC and ED.

Sincerely,

Cc: All parties

1649 Old Brooke Road, Maberly, Ontario K0H 2B0 e-mail: dpoch@eelaw.ca

Exhibit L.GEC/ED.1

Before the Ontario Energy Board

EB-2021-0002

Enbridge Gas 2023-2027 DSM Plan

Prepared by:

Chris Neme & Stacy Sherwood

Energy Futures Group

Prepared for:

The Green Energy Coalition

Greenpeace Canada
Sierra Club Ontario Chapter

Environmental Defence

December 1, 2021

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I. Introduction

On September 29, 2021, Enbridge Gas Inc (Enbridge) filed its updated multi-year demand side management (DSM) plan for years 2023-2027. As part of its filing, Enbridge is seeking approval from the Ontario Energy Board (OEB) for (1) its proposed DSM Framework effective 2023 and (2) the proposed 2023-2027 multi-year DSM plan. Although the plan is proposed for five years, the Company proposes a mid-point assessment in 2025 to allow for appropriate adjustments.

This report is not a comprehensive assessment or critique of the entirety of Enbridge's Plan. Rather, it focuses primarily on three key strategic issues:

- The reasonableness of Enbridge's proposed savings and budget levels;
- The reasonableness of Enbridge's proposed shareholder incentive mechanism;
- The reasonableness of Enbridge's proposal for programs that should be integrated with other government and/or IESO programs, or that delve into areas of competition between gas and electricity.

Each of these issues is addressed in separate sections of the report. The report also briefly addresses a fourth issue – Enbridge's proposal to use a 4% real discount rate – in a section at the end.

The report is authored by Chris Neme, a Principal with Energy Future Group (EFG), and Stacy Sherwood, a Managing Consultant with EFG. Mr. Neme has worked in the energy efficiency industry for nearly 30 years. He has filed testimony in 25 different OEB dockets, virtually all on gas DSM or related issues, since 1994. He has also filed testimony on energy efficiency and other distributed energy issues in more than 40 other cases before energy regulators in a dozen different jurisdictions, including the neighboring jurisdictions of Quebec, Manitoba, Michigan and Ohio. Mr. Neme currently serves on the OEB's Evaluation Advisory Committee and previously was elected by Ontario stakeholders to serve on the province's Gas Technical Advisory Committee and numerous Enbridge and Union Gas DSM Audit Committees. He also served as an outside reviewer of Ontario's 2019 Achievable Potential Study. Ms. Sherwood recently joined EFG. From 2015 to 2021 she served as the lead energy efficiency consultant for Exeter and Associates; prior to that she worked for six years for the Maryland Public Service Commission overseeing regulation of the Maryland utilities' efficiency programs. Ms. Sherwood has filed testimony in approximately 30 different cases – 10 of them on energy efficiency issues – before energy regulators in four different jurisdictions. Mr. Neme's and Ms. Sherwood's curricula vitae are attached as Exhibits to this report.

II. Savings and Budgets

1. Summary of Key Points

- Consistency with directions from both government and the OEB would require a substantial increase in savings above what Enbridge has proposed in its plan, as well as commensurate increases in budget required to achieve such increases.
- The Ministry of Energy and the OEB have both called for an increase in the amount of savings that Enbridge's gas DSM programs are providing.
- The provincial Environment Plan also anticipates increased savings, suggesting that gas conservation over and above historic levels is expected to account for 18% of the province's greenhouse gas (GHG) emission reductions by 2030.
- Enbridge's proposed plan will actually produce lower average annual savings than the Company achieved between 2017 and 2019.
- Enbridge's proposed plan will also produce lower levels of savings and GHG emission reductions than the baseline level from which the Environment Plan assumed savings would grow. In other words, the Enbridge plan would produce less than 0% of the incremental GHG emission reductions called for in the Environment Plan.
- Enbridge's proposed plan will produce less savings than even the most constrained scenario analyzed in the 2019 Achievable Potential Study – despite spending twice as much as the study's assumed budget constraint.
- Enbridge's proposed plan would produce only about half as much lifetime savings as leading natural gas utilities are both currently achieving and planning to achieve in the future.
- Enbridge could increase 5-year spending by an annual average of between $20 and $100 million (depending on which rate reducing impacts are accounted for) while keeping rate impacts on residential customers at or below the OEB's previous $2/month guidance in 2014 (in inflation adjusted terms). Moreover, the government and OEB directions for substantially increased savings over the status quo, together with the more pressing nature of the climate crisis today, argue for a less constraining perspective on rate impacts.
- Targeting the level of savings necessary to meet the province's Environment Plan goals would be consistent with the factors laid out by the Ministry and OEB, particularly the need to reduce both gas bills and GHG emissions.

2. Policy Context for 2023 to 2027 DSM Plan

Government policy objectives and related policy guidance provide important context for the level of ambition in generating energy savings that should be expected from Enbridge's multi-year DSM Plan, as well as the budgetary resources that should be considered reasonable to expend to meet that ambition. Several different pieces of direction and/or guidance would appear applicable to consideration of reasonable DSM savings and budgets for Enbridge's 2023 to 2027 Plan.

The first such example is guidance provided in a November 27, 2020 letter from Ontario's Associate Minister of Energy and Minister of Environment, Conservation and Parks to the OEB.[1] Among other things, the letter:

[1] https://www.oeb.ca/sites/default/files/ENDM-MECP-letter-to-OEB-20201127.pdf

- notes that the province's 2018 Environment Plan "*commits Ontario to achieving a GHG emissions reduction target of 30 percent below 2005 levels by 2030…and includes an action to 'work with the Ontario Energy Board and natural gas utilities* ***to increase the cost-effective conservation of natural gas*** *to simultaneously reduce emissions and* ***lower energy bills***.'" (emphasis added)
- states that the government "would be ***supportive of increasing cost-effective ratepayer funding of natural gas conservation in Ontario***", while recognizing that the OEB is charged with balancing "*ratepayer interests regarding bill impacts with the level of natural gas savings pursued*." (emphasis added)
- notes that efficiency programs can help customers manage energy costs and "are an important contributor to Ontario's economy;" and
- encourages the OEB to consider aligning eligibility criteria for low income gas DSM programs with eligibility criteria for the province's new Energy Affordability Program.

On December 1, 2020, the OEB responded to this letter with direction to Enbridge on the development of its next multi-year DSM plan. Among other things, that guidance included the following:[2]

- "*Enbridge Gas's DSM plan application should be informed by the results of the 2015-2020 DSM plans, the OEB's Mid-Term Review Report, the 2019 Achievable Potential Study, information received through the post-2020 DSM consultation to date, and the government's policies and commitments in the Environment Plan as they continue to evolve, including as expressed in the November 27, 2020 letter from the Associate Minister of Energy and the Minister of the Environment, Conservation and Parks to the OEB regarding the Ontario government's current policy objectives related to DSM."*

- The primary objective of Enbridge's DSM plan should be to assist its customers "*in making their homes and businesses more efficient in order* ***to help better manage their energy bills***." (emphasis added)

- Enbridge's plan should also reflect the following secondary objectives:

    - Helping to "*lower overall average annual natural gas usage*";
    - Supporting the achievement of Ontario's greenhouse gas emission reductions goals; and
    - Creating "*opportunities to defer and/or avoid future natural gas infrastructure projects*."
- The Board expects Enbridge to propose *"****modest budget increases…in the near-term in order to increase natural gas savings****",* as well as to efforts to *"improve the cost-effectiveness of programs." (emphasis added)*

- *"…the appropriate level of ratepayer funding expended for DSM programs must weigh the cost-effective natural gas savings to be achieved against both short-term and long-term customer bill impacts*."

More recently, the Energy Minister provided additional guidance to the OEB in a November 15, 2021 mandate letter.[3] Among other things, that letter expressed an expectation that:

[2] OEB Letter, December 1, 2020.
[3] https://www.oeb.ca/sites/default/files/mandate-letter-from-the-Minister-of-Energy-20211115-en.pdf

- gas DSM programs and gas Integrated Resource Planning will deliver "***increased natural gas conservation savings***" (emphasis added) and reductions in greenhouse gas emissions; and
- gas DSM programs would "*be implemented in a way that enables customers **to lower energy bills** in the most cost-effective way possible, and help customers make the right choices regardless of whether that is through more efficient gas or electric equipment*." (emphasis added)

While there is undoubtedly room for interpreting the policy guidance in these documents, it is notable that all three documents both (1) focused on the role of energy efficiency in lowering customers energy bills and (2) called for increasing natural gas savings through gas utility DSM programs. With respect to DSM spending levels, both the first government letter and the subsequent OEB guidance suggest support for some level of increase. The OEB's guidance suggests such increases should be "modest…in the near term in order to increase natural gas savings." It does not define either "modest" or "near-term", though with respect to the latter it may be worth noting that the guidance was provided in 2020 and the Enbridge DSM plan extends to 2027.

3. Mandate to Lower Energy Bills

System-wide efficiency programs can lower customers' gas bills in at least four different ways:[4]

1. Reducing costs associated with buying and transporting gas to homes and businesses;
2. Reducing and/or deferring the need for capital investment in the gas transmission and distribution (or storage) systems that could otherwise be needed to serve growing peak demands for gas;[5]
3. Reducing the amount of carbon taxes that have to be paid for emissions associated with burning of natural gas; and
4. Reducing the market price for gas – as demand for gas goes down, the market clearing price will go down.[6]

In addition, because many gas efficiency measures also save electricity and/or water, gas efficiency program also reduce electric and water bills. Furthermore, because some of the power on the electric grid is supplied by gas-burning power plants, the lowering of market prices for gas also results in some amount of lowering of electricity costs.

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[4] Customers who participate in efficiency programs realize all of these benefits in the form of reductions to their gas bills (as well as reductions to their electric and/or water bills). However, non-participants also benefit from two of these effects: the lowering of capital investment in the T&D system and the lowering of market clearing prices for gas (as well as any related reductions in electricity prices).

[5] Most efficiency measures and programs reduce winter peak demands at least to some degree. Because most gas efficiency measures provide savings for 15 years or more, the cumulative effects of several years of efficiency programs on peak demands can be substantial over time. If efficiency programs are promoted widely across the utility's service territory, peak demand reductions will accumulate across all parts of the utility's transmission and distribution (T&D) system. Almost by definition, that means the year in which capacity upgrades to different parts of the T&D system will be needed with efficiency programs will be later than when they would be needed absent such programs. There is economic value in such deferrals of capital investment. Moreover, in some geographic areas reductions in peak demands can be substantial enough to fully offset peak load growth, thereby indefinitely eliminating the need for capital investments.

[6] This is a basic economics concept. While the price effect of lowering demand for gas over time through efficiency investments may be very small, that effect is realized for every remaining m3 of gas sold to all customers.

Reductions in energy bills are partially offset by the cost of the efficiency measures. However, because Ontario (like other jurisdictions) requires efficiency programs to be cost-effective, the net effect must always be a cost savings. For example, Enbridge estimates that its proposed 2023 programs collectively have a benefit-cost ratio of 3.29 to 1. That means that they would produce $3.29 in benefits, the vast majority of which are reductions in gas bills,[7] for every $1.00 invested in efficiency.[8] In total, Enbridge's proposed programs for just 2023 are forecast to produce over $372 million in net benefits. And that is without accounting for all benefits, including the benefit of lowering market prices for gas.

As previously noted, both the government and the OEB have focused on the important role that energy efficiency can play in reducing energy bills. At a high level, there are two ways to increase energy bill savings. One is to shift funding from efficiency programs that save gas less per program dollar to programs that save more per dollar. However, while that can increase total customer bill reductions, it would do so by concentrating savings in a smaller group of customers (mostly larger business from which savings are most easily achieved). The other way to achieve greater energy bill savings is to increase the total amount of energy savings being realized across all customer groups.

4. Enbridge Savings and Spending

A. Savings Trends

Enbridge forecasts that its DSM programs will achieve approximately 106.7 million m^3 of annual natural gas savings in 2023, with savings increasing annually until it reaches 115.4 million m^3 in 2027. Over the five-year plan, Enbridge proposes that is will achieve an annual average reduction in natural gas usage of 111.1 million m^3. As

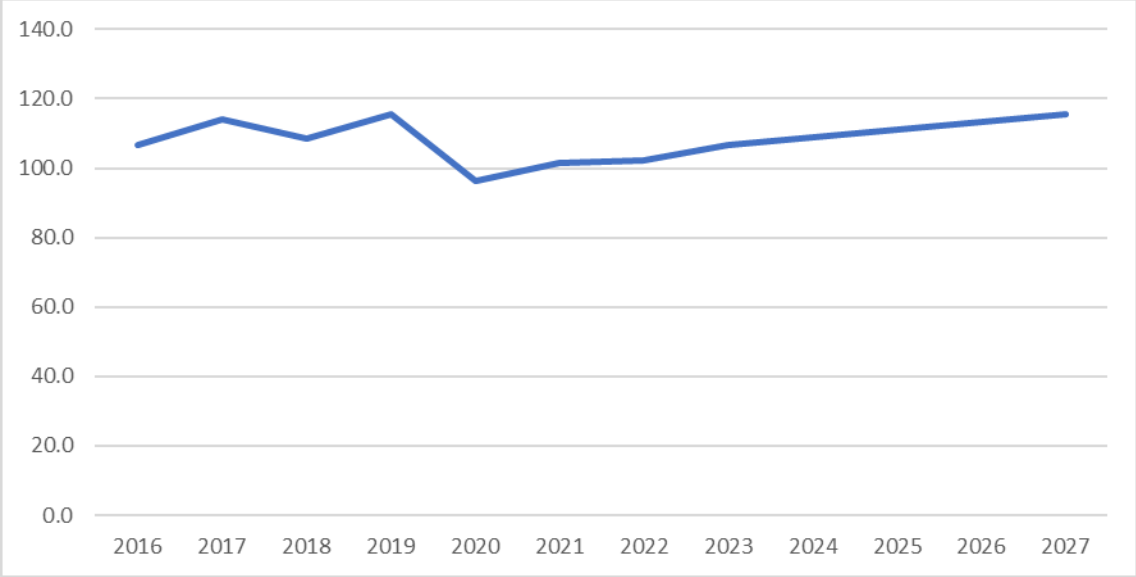
[7] Benefits under the TRC+ test also include electricity savings, water savings and a modest amount of additional non-energy benefits.

[8] It is important to note that under the TRC+ test, costs include not just what the utility efficiency programs spend, but also any additional costs incurred by customers.

Figure 1 shows, that is lower than the average savings captured from 2017-2019 of 112.7 million m^3.[9] Moreover, none of the projected annual savings from 2023 through 2027 is expected to exceed the savings achieved in 2019.

[9] Energy savings and sales from 2020 was not used in the benchmarking of the plan due to the unknown impacts of COVID on the program achievements.

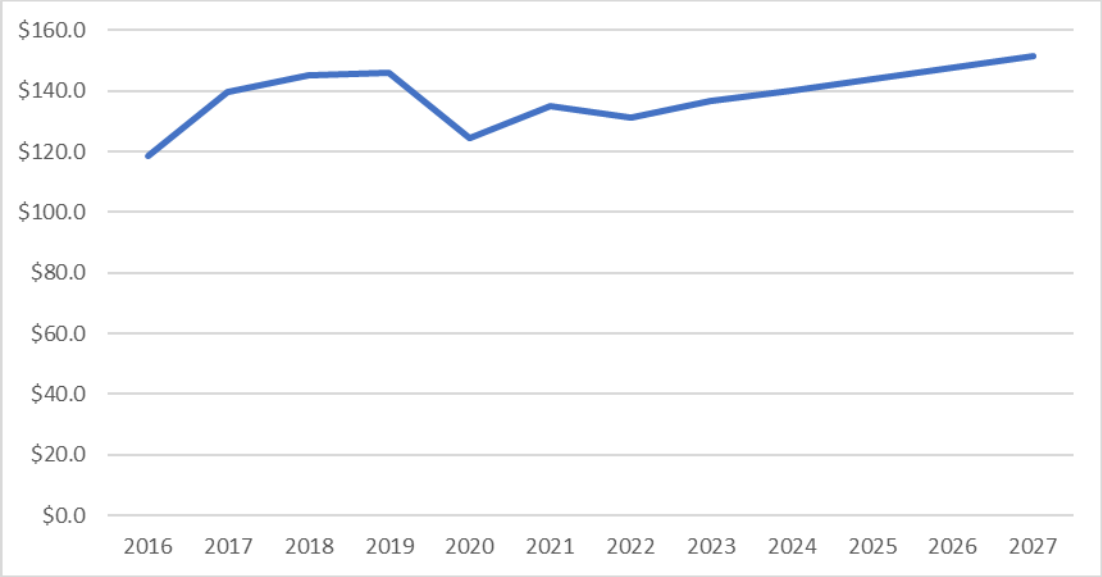
Figure 1: Enbridge Historic and Forecast Annual Gas Savings (Million m3)[10]



B. Spending Trends

Enbridge has proposed to spend $142.3 million on its DSM programs in 2023, increasing to $170.5 million in 2027. As Figure 2 shows, in inflation-adjusted terms, the 2023 spending level is actually lower than the Company's actual DSM spend in 2018 and 2019. The Company's planned spend does not reach the 2019 levels until 2026. The 2027 value is about 4% higher than 2019.

Figure 2: Enbridge Historic and Planned DSM Spending (Millions of 2021 $)[11]



[10] Response to 1.CCC.3 for all but 2021 and 2022 values. 2021 and 2022 savings values from response to 2.ED.8; 2021 and 2022 spending from response to 6.Staff.13.

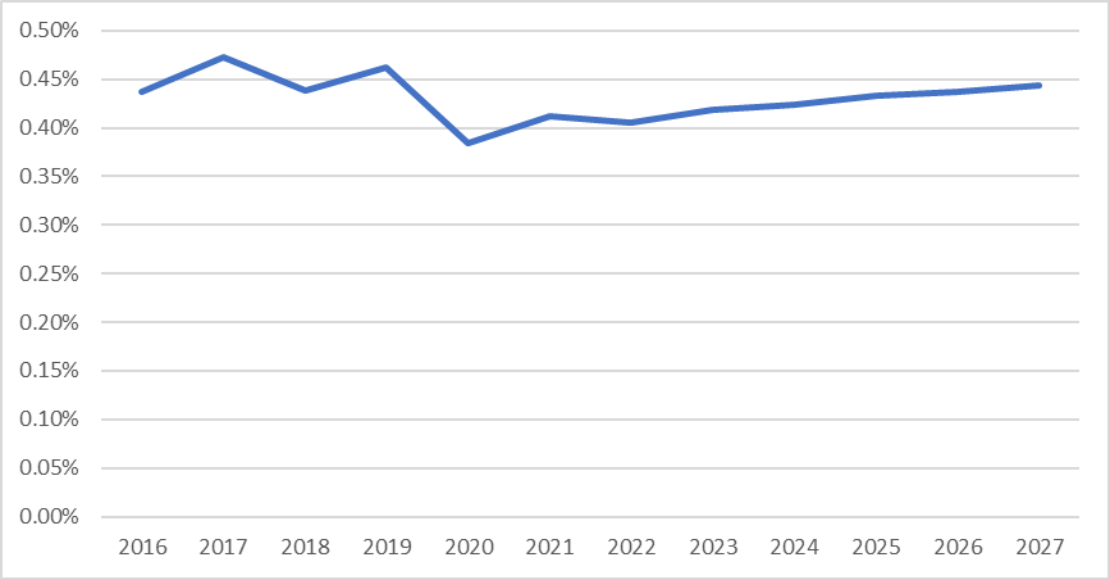
[11] Response to 1.CCC.3 for all but 2022 values. 2022 values from response to 6.Staff.13a. Inflationary adjustments based on Bank of Canada inflation calculator (https://www.bankofcanada.ca/rates/related/inflation-calculator/).

Not only is the overall budget lower than historic spending levels in the first several years of the plan, the level of investment in dedicated low-income programs is also declining. In 2019 and 2020, Enbridge spent 19.5% of its total expenditures on low-income programs. However, for 2023-2027, Enbridge plans to spend 15% to 16% of its total budget on low-income programs. The level of investment in low income programs is discussed further in Section III of this report.

5. Enbridge Savings Relative to Leading Gas Utilities

A common metric for benchmarking savings across multiple utilities is to divide the level of savings achieved or projected by that utility's total eligible sales.[12] Eligible sales are used to normalize the data across utilities of various sizes and regions. As shown in Figure 3, Enbridge's DSM Plan savings are equal to approximately 0.42% of forecast sales in 2023, increasing to 0.44% in 2027. In every year of the plan term savings are lower than the 2017 to 2019 average of 0.46%.

Figure 3: Enbridge Historic and Planned Savings as a Percentage of Eligible Sales[13]



Enbridge's savings rates, both historically and as planned for 2023 to 2027, are substantially lower than those of leading gas DSM utilities. Table 1 shows the actual 2019 net gas savings for the six large gas utilities in Massachusetts, Rhode Island, Michigan and Minnesota. In all six cases, annual savings were greater than 1.0% of eligible sales; in a couple of cases they were as high as 1.3%. In other words, leading gas DSM utilities are achieving annual savings on the order of two and a half to three times as great as Enbridge is planning for 2023 to 2027. The difference between Enbridge and leading gas utilities is a little smaller when measured in lifetime savings than when measured in first year savings because

[12] Eligible sales include usage from customers that are eligible to participate in the DSM programs.
[13] Historic and forecast sales from Attachment 1 to 5.GEC.3, excluding sales to customers in Enbridge rate classes 125, 200 and 300, as well as Union rate classes 25, M9, M10 and T3 (all of which are assumed to not be eligible for DSM programs).

the average measure life of the savings of the other utilities is a generally not as long.[14] However, even from a lifetime savings perspective, leading gas utilities are saving about twice as much gas as Enbridge.

Table 1: Leading Gas Utility's 2019 Gas Savings as % of Eligible Sales[15]

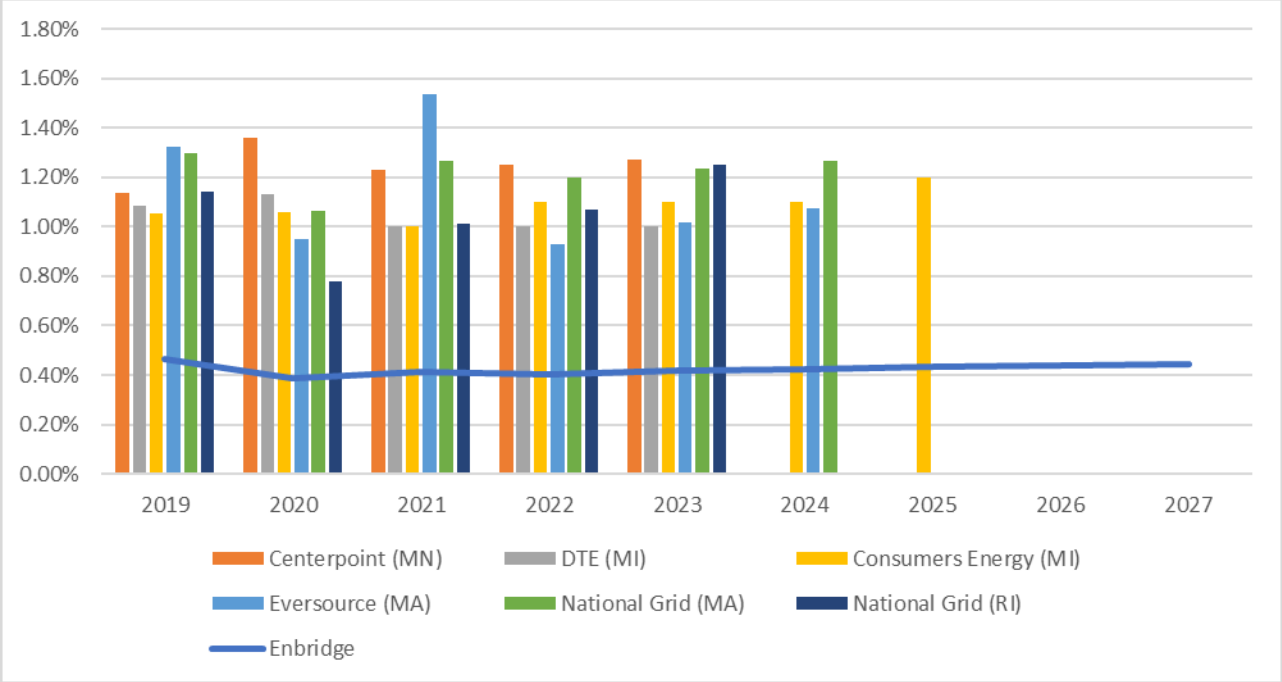
Utility	Jurisdiction	Savings as % of Eligible Sales
Centerpoint	MN	1.14%
DTE	MI	1.08%
Consumers Energy	MI	1.05%
Eversource	MA	1.33%
National Grid	MA	1.30%
National Grid	RI	1.14%

As shown in Figure 4 Leading Gas Utility's Actual and Future Planned Savings as % of Eligible Sales Compared to EnbridgeFigure 4, these utilities' plans suggest they are expecting to continue to achieve roughly similar, or even higher savings levels in the future. The horizontal blue line shows how Enbridge's historic and planned future savings levels compare.

[14] Enbridge is forecasting an average measure life of 16.4 years for 2023 (computed from data provided in Attachment 1 to 5.GEC.7). The average 2019 savings life from the leading gas utilities referenced in this report range from about 10 years to more than 14 years, with an average of about 12 years, or about 25% less than Enbridge is planning.

[15] 2019 savings values presented because of potentially anomalous impacts due to Covid-19 in 2020. **Centerpoint**: 2019 savings data from Centerpoint Energy Natural Gas Conservation Improvement Program 2019 Status Report & Associated Compliance Filings, Docket No. CIP-16-119. EFG converted reported gross savings using 84.6% net-to-gross ratio per ACEEE State Scorecard. Divided savings by average 2017-2019 average weather-normalized sales to non-exempt customers from Centerpoint 2021-2023 Conservation Improvement Plan. **DTE**: 2019 Reconciliation report in Docket U-20708, Exh A-6. **Consumers Energy**: 2019 Reconciliation report filed in Docket U-20702, Ex. A-1 Table 4.3. **Eversource and National Grid MA**: Savings from 2019 Plan Tables https://ma-eeac.org/results-reporting/. **National Grid RI**: Savings from 2019 Energy Efficiency Year-End Report for The Narragansett Electric Company d/b/a National Grid, http://rieermc.ri.gov/wp-content/uploads/2020/05/ngrid_4888-year-end-report-2019-puc-5-15-20.pdf.

Figure 4 Leading Gas Utility's Actual and Future Planned Savings as % of Eligible Sales Compared to Enbridge[16]



In addition, gas utilities in at least one other jurisdiction are planning to ramp up savings to comparable levels, in significant part because of growing concerns regarding climate change and the recognition that increasing energy efficiency levels needs to be a core element of strategies for decarbonizing buildings and industry. For example, in 2018 New Jersey enacted legislation requiring significant ramp up of its utility funded efficiency programs, setting a minimum standard of 0.75% of sales for gas utilities but allowing the Board of Public Utilities (BPU), the state energy regulator, to set higher savings targets. In 2020, the BPU ordered that gas savings ramp up to 1.10% of sales over a five-year period.[17]

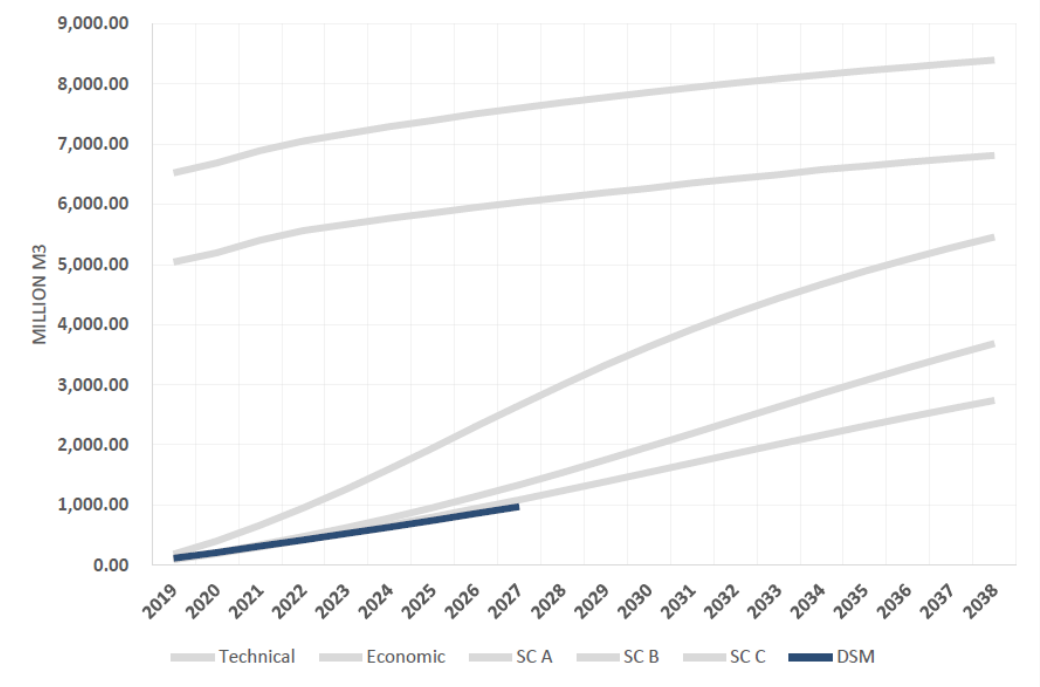
[16] Actual savings in 2019 as documented in Table 1. Post-2019 savings based on the following sources: **Centerpoint**: 2020 Centerpoint Energy Natural Gas Conservation Improvement Program 2020 Status Report and Associated Compliance Filings. Centerpoint Energy's 2021-2023 Natural Gas Conservation Improvement Program Triennial Plan. **DTE**: 2020 Reconciliation filing, testimony of D. Brannan, p. 22; 2021 Plan values from filing in Docket U-20429, Exh. A-4; DTE 2022-2023 Energy Waste Reduction Plan as filed in Docket U-20881, Exh. A-4. **Consumers**: 2020 Reconciliation filing in Docket U-20865, Exh. A-2 and A-3; 2021 Plan values from Approved Settlement Agreement (Attachment D) in Docket U-20372; Consumers Energy 2022-2025 Energy Waste Plan filed in Docket U-20875. **Eversource and National Grid MA**: calculated using 2020 actual savings and forecasted savings for 2021-2024 provided in 2022-2024 Statewide Data Tables – Gas, https://ma-eeac.org/plans-updates/. **National Grid RI**: 2020 data is from the State of Rhode Island Energy Efficiency & Resource Management Council, 2021 EERMC Annual Report to the General Assembly, http://rieermc.ri.gov/wp-content/uploads/2021/05/eermc-2021-annual-report-final-5-13-21.pdf. 2021-2023 data is from 2021-2023 Energy Efficiency Program Plan & 2021 Annual Energy Efficiency Program Plan for National Grid, dated October 15, 2020, http://rieermc.ri.gov/wp-content/uploads/2020/10/3yp-only-2021-ap-and-2021-2023-3yp-combined-filing.pdf.

[17] New Jersey Board of Public Utilities, Order Directing the Utilities to Establish Efficiency and Peak Demand Reduction Programs in Docket Nos. QO19010040, QO19060748 and QO17091004, June 10, 2020, Agenda Item 8D.

6. Enbridge Savings Relative to 2019 Ontario Achievable Potential Study

The 2019 Ontario Achievable Potential Study assessed three levels of gas achievable potential: (A) "constrained potential", where gas DSM budgets were limited to about $80 million per year; (B) "unconstrained potential", where all cost-effective savings potential was pursued; (C) "semi-constrained potential", where the objective was to deliver 415 million m3 of additional annual savings by 2030 than would be achieved under the "constrained potential" scenario.[18] As Figure 5 shows, Enbridge's 2023-2027 planned level of savings are slightly below even the constrained potential forecast by the study – despite the fact that Enbridge is forecasting to spent roughly double (on average, over five years) the potential study's constrained budget level.

Figure 5: Enbridge Forecast Gas Savings Compared to 2019 Achievable Potential Study Forecasts[19]



It should be noted that the Achievable Potential Study concluded that natural gas savings of 14% could be cost-effectively achieved from DSM programs over the 12-year period from 2019 through 2030.[20] That averages out to about 1.2% per year, if all of the savings from all measures installed in all years prior to 2030 are still persisting in 2030. To the extent that some of the savings from measures installed prior to 2030 had short enough lives that they would not still be providing savings in 2030, the incremental annual savings implicit in the Achievable Potential Study would be even greater than 1.2% per year. In any case, the Achievable Potential Study makes clear that the level of savings being achieved

[18] Navigant, *2019 Integrated Ontario Electricity and Natural Gas Achievable Potential Study*, prepared for the IESO and Ontario Energy Board, updated 2019-12-10 (https://www.oeb.ca/sites/default/files/2019_Achievable_Potential_Study_20191218.pdf), p. iii.

[19] Response to 1.ED.1a

[20] Neubauer, Max, Cracking the TEAPOT: Technical, Economic and Achievable Energy Efficiency Potential Studies, ACEEE Report U1407, August 2014, p. 36 (https://www.aceee.org/sites/default/files/publications/researchreports/u1407.pdf).

by leading gas DSM utilities in other jurisdictions are also achievable in Ontario. That is despite the fact that market potential studies are inherently conservative. That is both our personal experience – both generally and with respect to the 2019 Ontario study – as well as perspective of other industry experts. For example, in a meta-analysis of both electric and gas efficiency potential studies, the American Council for an Energy Efficient Economy (ACEEE) concluded that such studies typically use a "generally conservative approach" which means that "…there is likely a great deal of additional cost-effective savings available beyond what is identified."[21]

7. Enbridge Planned Savings Relative to Ontario Environment Plan Goals

As previously noted in Section II of this report, the OEB's December 1, 2020 guidance to Enbridge in the development of its DSM plan stated that the plan should be informed by, among other things, "…the government's policies and commitments in the Environment Plan as they continue to evolve…"[22] The Environment Plan state articulated a goal of reducing Ontario's GHG emissions by 18 million tons of CO2e between by 2030, with 18% of that reduction coming from "natural gas conservation."[23] As Enbridge itself has noted in quoting the 2019 Energy Conservation Progress Report produced by the then Environment Commissioner, the 3.2 million tons of emissions reductions 'are incremental to what would be achieved by existing gas conservation programs continuing at their current level of spending.'[24] The Environment Commissioner's report also stated:

> "MECP advises that the estimate of a 3.2 Mt CO2e emissions reduction from natural gas conservation programs by 2030 is the difference between the 'unconstrained' and 'constrained' lines in the OEB's Achievable Potential Study."[25]

The potential study referenced in this statement is the 2015 study rather than the more recent 2019 study. The 2015 study doesn't provide annual savings values for the 2023 to 2027 time period covered by Enbridge's plan. However, it does provide values for 2020, 2025 and 2030. Extrapolating from those five year increments, we estimate that the 2015 constrained potential was approximately 628 million m3 of annual savings between 2023 and 2027 and the unconstrained potential was approximately 1527 million m3 of annual savings.[26]

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[21] For example, in a meta-analysis of both electric and gas efficiency potential studies, the American Council for an Energy Efficient Economy (ACEEE) concluded that such studies typically use a "generally conservative approach" which means that "…there is likely a great deal of additional cost-effective savings available beyond what is identified."

[22] OEB Letter, Dec. 1, 2020.

[23] Ontario Ministry of Environment, Conservation and Parks, *Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan* (https://prod-environmental-registry.s3.amazonaws.com/2018-11/EnvironmentPlan.pdf).

[24] Response to 2.ED.9(d and e).

[25] Environmental Commissioner of Ontario, *A Healthy, Happy Prosperous Ontario: Why we need more energy conservation*, 2019 Energy Conservation Progress Report, March 2019, p. 65 (https://www.auditor.on.ca/en/content/reporttopics/envreports/env19/2019_EnergyConservationProgressReport.pdf)

[26] The difference between 2020 and 2025 Constrained potential is 494 million m3, or 99 million m3 per year. The difference between 2030 and 2025 Constrained is 829 million m3, or 166 million m3 per year. Three years at 99 million m3 per year plus two years at 166 million m3 per year is equal to 628 million m3 over five years. Similar calculations were performed to estimate that unconstrained level of savings over the same five year period. Data

By comparison, Enbridge is forecasting that it will achieve 555 million m3 from 2023 to 2027. In other words, Enbridge's plan would not even achieve the level of annual savings assumed to be the baseline in the Environment Plan. Thus, not only would the Company's plan not be part of the solution to achieving the 3.2 million tons of incremental CO2e emission reductions from natural gas conservation, it would represent a step backwards – essentially requiring greater than 3.2 million tons of emission reductions from all other gas conservation initiatives. It is hard to see how that could be interpreted as consistent with the expectations of the Environment Plan.

8. Potential Rate Impact Concerns

For Enbridge to increase savings to levels much closer to those of gas industry leaders and/or the requirements of the provincial Environment Plan – while maintaining a portfolio of programs serving all customer groups – would require additional budgetary resources. Enbridge, some stakeholder groups and the OEB have – currently and/or in the past – expressed concern about the potential for undue rate impacts if annual DSM spending were to become too great. That raises at least three questions:

- What are the underlying concerns with respect to rate impacts?
- What is an undue rate impact?
- Are there other ways to mitigate concerns about rate impacts?

A. Reasons for Concern about Rate Impacts

Efficiency program participants typically see their energy bills go down substantially. That is because their energy savings are substantially larger than any net increase in rates caused by efficiency programs. Thus, concerns about rate impacts are really concerns about impacts on those customers who do not participate in efficiency programs. In other words, concerns about rate impacts are typically concerns about equity between participants and non-participants.

It is important to recognize that this issue is not unique to efficiency programs. Consider, for example, cases in which a gas utility needs to make a capital investment to upgrade the capacity of its transmission and/or distribution (T&D) system in response to growing peak demand on part if its service territory. The growth in peak demand is never universally attributable to all customers. In fact, it is almost always driven by a small subset of new customers added to the system and/or existing customers who have increased their consumption. However, all customers – even customers whose peak demands have gone down and even customers not served by the T&D system component being upgraded – typically pay for the upgrades. When regulators approve such capital investments and any rate increases that result, they do so on the grounds that the total system benefits of increased reliability are worth the inequities between "participants" (customers whose peak demands are driving the need for the capital investment) and "non-participants" (customers not contributing to the need). Regulators may also be considering the potential for future upgrades in different locations that be driven by a different set of customers.

from Exhibit ES 3 in ICF, *Natural Gas Conservation Potential Study*, submitted to the Ontario Energy Board, updated July 7, 2016 (https://www.oeb.ca/sites/default/files/uploads/ICF_Report_Gas_Conservation_Potential_Study.pdf).

As explained in some detail in the National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources,[27] regulators can and should consider efficiency programs in the same way. That is, rather than putting in place arbitrary limits on rate increases resulting from efficiency programs, they should be asking whether the system benefits of efficiency programs outweigh any inequities between participants and non-participants. That question should ideally be considered over a long-enough period of time – e.g., 10 years – to account for the fact that the opportunities for investment in efficiency can vary considerably from year to year for different customers.

Further, it is important to recognize that unlike T&D investments, utilities and regulators have some control over the magnitude of non-participants. In fact, one way to reduce concerns about equity between participants and non-participants is to increase DSM spending so that more customers become participants and fewer are non-participants over time.

B. Defining "Undue Rate Impact"

As just explained, interpretations of whether or not rate impacts from DSM programs are "undue" should be contextual. For example, all other things being equal, a 3% rate impact associated with DSM programs that provide $500 million in economic net benefits should be (and likely would be) seen as more acceptable than a 3% rate impact associated with DSM programs that provide only $50 million in economic net benefits. Customer participation rates, the level of assistance provided to the neediest of customers, the level of greenhouse gas emission reductions achieved relative to policy goals and other factors can also reasonably affect perceptions of the level of rate impacts that are acceptable.

The issue of rate impacts – and what level is reasonable given the benefits of DSM programs – is not a new one. Indeed, Enbridge and DSM stakeholders have debated for more than twenty years about what level of rate impact from DSM programs is "undue" for its Ontario service territory. Because the answer to the question is contextual, there is no mathematical formula that can be used to reach conclusions about the level of DSM spending that would cause rate impacts to be "undue".

That said, one potential reference point is the OEB's guidance in the 2015-2020 DSM framework. In that guidance, the Board stated that "…DSM costs (inclusive of both DSM budget amounts and shareholder incentive amounts) should be no greater than approximately $2.00/month" per residential customer. In other words, the Board found – at least in 2014 – rate impacts from that level of DSM spending to be reasonable. The Board went on to state that level of rate impact would add up to about $155 million per year for the combined Enbridge and Union Gas service territories. Adjusted for inflation, spending of $2.00 per month in 2014 would be equivalent to $2.38 in 2023 and $2.57 in 2027. $155 million per year in 2014 dollars would be equivalent to $184 million in 2023 and $200 million in 2027.

As Table 2 (row 5) also shows, on an inflation adjusted basis, Enbridge's proposed DSM spending could be increased by an annual average of $22 million over the five-year plan and be within the OEB's 2014 interpretation of the level of spending at which rate impacts would be reasonable.

[27] See Appendix A in: Woolf, Tim et al., National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources, National Efficiency Screening Project, August 2020 (https://www.nationalenergyscreeningproject.org/wp-content/uploads/2020/08/NSPM-DERs_08-24-2020.pdf).

Table 2: Difference between Enbridge Proposed DSM Spend and 2014 OEB Guidance on Acceptable Rate Impacts

		2023	2024	2025	2026	2027	5-Yr Total
1	Enbridge Plan Budget (millions $)	$142	$149	$156	$163	$171	$780
2	Shareholder Incentive at 100% Target (millions $)	$11	$11	$11	$11	$11	$55
3	Budget w/Shareholder Incentive (millions $)	$153	$160	$167	$174	$182	$835
4	$155M/year converted from 2014 $	$184	$186	$187	$188	$200	$945
5	Increase w/OEB 2014 Guidance of $2/month gross (millions $)	**$31**	**$26**	**$20**	**$14**	**$18**	**$110**

It should also be noted that when the Board established its $2/month guidance in 2014, it did not account for the portion of the benefits of efficiency programs that reduce costs for all customers. For example, in his testimony on Enbridge and Union Gas' 2015-2020 DSM Plans, Mr. Neme estimated that the effect of two such benefits – reduced capital costs for transmission and/or distribution system upgrades, gas market price suppression effects – would offset more than 40% of the $2/month in spending the OEB had supported. We have not recomputed those values in this proceeding. However, as Table 3 (row 8) shows, if they were still as large as 40%, that would allow for budgets of about $100 million per year more than Enbridge has proposed in its plan. It should be noted that in its decision on budget levels for the Enbridge and Union 2015-2020 DSM plans, the OEB did not adjust its $2/month guidance to reflect the "net impact" analysis that Mr. Neme recommended.[28] However, the Board suggested that the gas utilities should "consider a net rate impact approach further" and stated that such analysis "should be presented to the OEB as part of the gas utilities' next multi-year DSM plans."[29] Enbridge has not provided such additional analysis in its 2023-2027 plan filing.

Table 3: Increased DSM Spend Based on 2014 OEB Guidance Adjusted for Downward Rate Pressures of Some DSM Benefits

		2023	2024	2025	2026	2027	5-Yr Total
1	Enbridge Plan Budget (millions $)	$142	$149	$156	$163	$171	$780
2	Shareholder Incentive at 100% Target (millions $)	$11	$11	$11	$11	$11	$55
3	Budget w/Shareholder Incentive (millions $)	$153	$160	$167	$174	$182	$835
4	$155M/year converted from 2014 $	$184	$186	$187	$188	$200	$945
5	Increase w/OEB 2014 Guidance of $2/month gross (millions $)	**$31**	**$26**	**$20**	**$14**	**$18**	**$110**
6	Downward Rate Pressure from Avoided T&D, Price Suppression (millions $)	-$74	-$74	-$75	-$75	-$80	-$378
7	Spend w/OEB 2014 Guidance - $2/mo net of down pressure (millions $)	$258	$261	$262	$263	$279	$1,323
8	Increase w/OEB 2014 Guidance - $2/mo net of down pressure (millions $)	**$105**	**$101**	**$95**	**$89**	**$97**	**$488**

One final point should also be made with regards to the Board's 2014 guidance on DSM spending: the combination of government and OEB emphasis on increasing savings (relative to historic levels) to lower energy bills, together with the more pressing nature of the climate crisis, suggest that rate impacts would have to be higher today to be considered "undue" than was the case in 2014.

C. Other Potential Ways to Mitigate Rate Impact Concerns

In addition to broadening participation in efficiency programs, rate impact concerns could also be addressed by amortizing DSM spending over the life of the expected savings (or some other period of time), instead of incurring the full effect of spending in just one year. The result is that the timing of costs is better aligned with the timing of the benefits, and that near term rate impacts are limited.

[28] OEB, Decision and Order, EB-2015-0029 / EB-2015-0049, p. 59.
[29] Ibid, p. 87.

III. Performance Incentives

1. Summary of Key Points

- Utility performance incentive structures and metrics should be tied to key policy objectives for DSM.
- Performance incentives should be designed to encourage and reward utility excellence in achieving those policy objectives.
- Enbridge's proposed annual scorecards suffer from several shortcomings:
    - The proposal for annual savings, instead of the historic focus on lifetime savings, undermines the fundamental objectives of efficiency programs to lower customer bills and reduce emissions.
    - The inclusion of participation metrics for the Building Beyond Codes programs is inappropriate given the need for future building codes to consider whether to promote electric heating and water heating and Enbridge's vested interest in the outcome of such decisions. Incentive dollars allocated to this metric should be instead allocated to savings metrics.
    - The inclusion of both savings and participation metrics for the Energy Performance program is inappropriate since this program should stand on its own merits, in terms of energy savings and/or other benefits provided, relative to other programs that could serve the same customers. Incentive dollars allocated to this metric should be allocated instead to savings metrics.
    - The proposed performance bands of 50% to 150% are too wide. At the low end, they would start to reward shareholder for what could only be considered poor levels of performance. At the high end, they allow for maximum incentives at levels generally unachievable within budgetary limitations. Performance bands of 75% to 125% would be more appropriate.
- Enbridge's proposed shared savings mechanism, in which it would earn increasing percentages of TRC+ economic net benefits, is also flawed and should be scrapped, with shareholder incentive dollars allocated instead to savings metrics. Its biggest shortcomings are:
    - The Company could begin to earn shareholder incentives once it has achieved just 27% of its planned net benefits in 2023 – and at even lower percentages in subsequent years.
    - The value of economic net benefits can go up or down for reasons beyond Enbridge's control. In particular, the magnitude of economic net benefits are highly sensitive to avoided gas costs and carbon tax rates – both of which can change.
    - The shareholder incentive in 2027 would be about $2 million higher than in 2023 for achieving exactly the same level of savings. This is a function of avoided costs increasing over time.
    - An economic net benefits metric will increase incentives to shift budgets from residential and small business customers to larger business customers from which greater savings can be achieved less expensively. While that will result in greater savings, it will also undermine goals of equitable access for all customers to efficiency programs.
    - A TRC+ economic net benefits metric would not advance any policy objective that lifetime savings metrics would not already address more simply – and with less potential

controversy and contention (net benefits metrics require scrutiny not only of energy savings, but also of assumed measure cost assumptions and avoided cost assumptions).

- Enbridge's proposed Low Carbon Transition metric should be modified to exclude gas heat pumps (see Section IV).
- Enbridge's Long-Term GHG Reduction performance metric should be rejected, with incentive dollars allocated to savings metrics. As proposed, this metric is really just a savings metric, and a flawed one at that because it focuses on gross (rather that net of free rider effects) savings.
- The Board should consider adopting an adjustment that formulaically ties the maximum shareholder incentive to the level of gas savings achieved. This would mitigate against the current perverse incentive for Enbridge to propose plans with relatively low savings targets that are easy to beat.

2. Purpose of and Principles for Shareholder Incentives

A. Purpose

Utility shareholder incentive mechanisms are typically designed to serve two purposes: (1) to put cost-effective demand-side investments on a more level playing field, in terms of utility profitability, with supply-side investments;[30] and (2) to encourage and reward excellence in utility design and management of its efficiency programs.

B. Guiding Principles

Given those purposes, coupled with our experience with shareholder incentive mechanisms in numerous jurisdictions (including Ontario) as well as the insights of other experts,[31] we suggest that the following principles should guide decisions around the structure and design of Enbridge's shareholder incentive mechanism:

- **The value of the maximum shareholder incentive should be related to the level of energy savings proposed**. The magnitude of foregone profits from supply-side investments is directly related to the level of energy savings achieved. Also, the level of effort and financial investment necessary to achieve deeper levels of savings is greater than what is required for modest levels of savings. The size of shareholder incentives should reflect those realities.
- **Performance should be measured (and rewarded) relative to success in achieving the policy goals and objectives for DSM in Ontario**. We discuss what we understand to be Ontario's policy objectives below.
- **Multiple performance metrics should be included to the extent necessary to ensure that the utility is forced to balance consideration of objectives that could compete with each other**. An example might be a goal of maximizing energy savings – which by itself would tend to lead to a focus on those efficiency measures and programs that provide the greatest "bang for the buck" – and a goal of equitably addressing all customers and/or reducing low income energy burdens –

[30] Ontario's lost revenue adjustments mechanism (LRAM) compensates Enbridge for lost revenue. However, it does not address the fact that utility shareholders make less money as a result of lower capital investments on which they would otherwise earn a rate of return.

[31] For example, see Vermont Energy Investment Corporate et al., Independent Study of Energy Policy Issues, Final Report, prepared for the New Hampshire Public Utilities Commission, September 30, 2011 (https://www.puc.nh.gov/sustainable%20energy/Reports/New%20Hampshire%20Independent%20Study%20of%20Energy%20Policy%20Issues%20Final%20Report_9-30-2011.pdf).

which would require investment in savings that are more expensive to acquire. In a jurisdiction with both of these policy objectives, more than one performance metric would be necessary to ensure both objectives are considered and adequately addressed.

- **The number of performance metrics should be limited to what is necessary to ensure all policy objectives are addressed**. This is the "flip side" of the previous principle. Metrics that are highly correlated with each other add complexity without providing much (if any) benefit.
- **There should be a preference for performance metrics that are comparatively easier to measure**. Metrics must be sufficiently indicative of progress towards policy goals. However, it may be preferable to adopt a metric that is slightly less indicative of such progress than an alternative, but is significantly less difficult and/or less controversial to measure with reasonable accuracy.
- **Weights assigned to different performance metrics should reflect their importance relative to policy goals**. A metric or metrics that measure progress on a primary policy goal should receive greater weight than metrics that measure progress on secondary goals.
- **For any given metric, shareholder incentives should be at stake only in the range of performance around which there is some significant uncertainty.** No incentive should be paid to shareholders for performance that is so far below a goal as to be high unlikely and/or could only be considered poor performance. Conversely, the level of performance required for the maximum incentive should not be so high as to be essentially out of reach given budgetary or other constraints.

C. Ontario DSM Policy Objectives Relevant to Shareholder Incentive Design

As also discussed in Section II(1) of this report, the OEB has articulated the following objectives for Enbridge's future DSM programs:

> **Primary Objective**
>
> "…assisting customers in making their homes and businesses more efficient in order to help better manage their energy bills."
>
> **Secondary Objectives**
>
> - helping customers to "lower overall average natural gas usage";
> - "play(ing) a role in meeting Ontario's greenhouse gas reduction goals; and
> - "creat(ing) opportunities to defer and/or avoid future natural gas infrastructure projects."[32]

Though not directly stated, we assume that when the OEB stated its primary objective is "assisting customers in making their homes and businesses more efficient" it meant all customers, rather than just those customer groups most easily and/or most inexpensively served. That suggests that an implicit objective is to ensure that the portfolio of efficiency programs is sufficiently broad to enable all types of customers to participate and benefit from help with efficiency investments.

[32] OEB Letter: December 1, 2020

As also previously discussed, since the Board provided this guidance, the Minister in his November 15, 2021 mandate letter to the Board emphasized that gas DSM programs will deliver "increased natural gas conservation savings" and "reductions in greenhouse gas emissions".[33]

3. Overview of Enbridge's Proposed Shareholder Incentive Structure

Enbridge has proposed that it be able to earn as much as $21 to $23 million per year in shareholder incentives for its efficiency programs, with the amount actually earned a function of its success relative to a number of different performance metrics. Different weights are assigned to different metrics. For example, as shown in Table 4, approximately 57% of the total amount of shareholder incentive dollars that could be earned over the five-year plan is associated with meeting various targets for annual gas savings produced by Enbridge's efficiency programs. Most of the potential shareholder earnings would be tied to annual metrics, with associated annual payments. However, 7% of total potential shareholder incentives are associated with multi-year metrics and therefore could be earned only after applicable multi-year periods have ended. Importantly, many of the shareholder incentive sub-components are further divided. For example, the Low Income annual gas savings metric has two sub-components: one associated with single family buildings and other associated with multi-family buildings. All told, 21 different performance metrics have been proposed. For each scorecard Enbridge would begin earning shareholder incentives once it surpassed 50% of a performance target and would earn the maximum incentive once it reached 150% of the target, with incentive levels linearly interpolated within such "performance bands".

Table 4: Summary of Enbridge Proposed Shareholder Incentive Mechanism

Incentive Component	Sub-Components	Weight (5-Yrs)	Assessment Frequency
Scorecards: Annual *Net* Gas Savings	Residential Low Income Commercial Industrial Large Volume Energy Performance Program	57%	Annual
Scorecards: Participation Goals	Energy Peformance Program Beyond Building Code Program	5%	Annual
Economic Net Benefits (under TRC+ Test)	n.a.	31%	Annual
Low Carbon Transition (hybrid electric/gas & gas-only heat pumps)	Residential installations Residential contractors trained Commercial installations Commercial Engineers trained	2%	after Year 2 & after Year 5
Long-Term GHG Reduction (Sum of Annual *Gross* Gas Savings)	n.a.	5%	After Year 5

4. Scorecard Performance Metrics

Several features of the annual scorecard proposal merit discussion:

[33] https://www.oeb.ca/sites/default/files/mandate-letter-from-the-Minister-of-Energy-20211115-en.pdf

- The shift to annual savings – i.e., the amount of savings achieved in just the first year of efficiency measures installed – from the historic Ontario focus on lifetime savings;
- The allocation of the incentive dollars between annual gas savings and participation goals for more "market transformation" oriented programs;
- The allocation of incentive dollars between sectors for annual savings metrics;
- The proposal for a separate incentive allocation for the Energy Performance Program; and
- The proposal for performance bands between 50% and 150% of planned targets.

A. Shift to Annual Savings Metrics

For the past decade, Enbridge's primary shareholder incentive performance metric has been the amount of lifetime (often called "cumulative" in Ontario) net gas savings that its efficiency programs have produced. Thus, the Company's proposal to base most of its potential shareholder incentive earnings potential from 2023 to 2027 on *annual* savings (also sometimes called 1st year savings) is a significant change.

The historic focus on lifetime savings provided an incentive for the Company to prioritize longer-lived savings. The new proposal to focus on first year savings removes that incentive. Indeed, under an annual savings metric the Company would be indifferent between efficiency measures that save 100 m3 of gas for one to five years and different measures that saved 100 m3 of gas for 20 or 25 years. That is problematic.

Enbridge has offered three reasons for its shift to first year savings: (1) that it is a metric that is better understood by its customers and potential business partners; (2) that it makes it easier to explore "potential coordinated or collaborative program delivery…with municipalities or the IESO"; and (3) that its proposal for an additional metric based on economic net benefits provides an incentive to focus on longer-lived measures.[34] These are all flawed arguments.

First, neither customers nor potential business partners will know – *or want to know, or need to know* – how Enbridge's shareholder incentives are structured. The way that shareholder incentives are structured should not have any bearing on how Enbridge communicates with its customers or business partners about the merits of investing in energy efficiency or the selling of energy efficient products. If it is important to use annual savings to educate a customer on the benefits of efficiency, the Company can do that regardless of how its performance incentive mechanism is structured. Furthermore, rebate levels and the way that they are designed – whether as an up-front discount, a payment per annual m3 saved or whatever other form may be considered – should be based primarily on what is necessary to overcome market barriers to customer investment in efficiency measures. To the extent that the size of the rebate that Enbridge may be willing to offer could be partially affected by the structure of its performance metric, it would be much better for that influence to be based on lifetime savings than on first year savings because lifetime savings is a much better proxy for the value of efficiency benefits.

Similarly, there is no reason why a lifetime savings metric would make it harder to coordinate or collaborate with other parties on program design or delivery. The nature of collaboration does not need to be affected by the way Enbridge's performance metrics are designed. For example, if as part of a joint program the IESO wanted Enbridge to pay for every first year m3 of gas savings produced, the Company

[34] Response to 9.Staff.20

could either (1) negotiate for such payments to be based on lifetime m3 saved instead; or (2) agree to pay per first year m3 saved, with the magnitude of the payment the Company is willing to make informed by the Company's understanding of the likely average measure life – and therefore the lifetime savings – associated with such first year m3 savings. The alternative of caring about first year savings would be a worse outcome for Enbridge's ratepayers and the environment.

Enbridge's suggestion that its proposed new net benefits metric will ensure adequate focus on long-lived savings is also problematic. For starters, this argument undermines the Company's other two arguments. If a lifetime savings goal is too hard to convey to customers and potential business partners, surely a net benefits metric would be impossible to explain. And if a lifetime savings metric made it more difficult to negotiate joint program delivery with municipalities or the IESO, then surely a net benefits metric would make it even more difficult. In addition, while it is true that net benefits take lifetime savings into account, there may be short-lived measures and/or programs that provide comparable or greater net benefits per dollar than longer-lived measures. In other words, there is imperfect alignment between a net benefits metric and a lifetime savings metric. It is also worth noting that Enbridge has proposed a lot less weight be put on its net benefits metric than on its first year savings metrics.

The bottom line is that a lifetime savings metric is much better aligned with energy efficiency program goals than a first-year savings metric. This conclusion is documented in a report that our firm, Energy Futures Group, prepared with Optimal Energy for the Michigan Public Service Commission in 2013.[35] Since that report was completed, Michigan has modified the principal shareholder performance incentive metric used in the state – for both electric and gas utilities – to focus on lifetime savings.
Allocation of Shareholder Incentives between Gas Savings and Participation Goals

As shown in Table 4, more than 90% of the shareholder incentive dollars that Enbridge has proposed be attached to annual "scorecards" are associated with gas savings; a little less than 10% would be associated with what might be called market transformation metrics – primarily Enbridge's proposed residential and commercial "Building Beyond Code" new construction programs. As discussed in Section IV of this report, it is now inappropriate for Enbridge to be investing in market transformation programs designed to affect future building codes. Given the policy imperatives of reducing greenhouse gas emissions, the province should be considering whether future codes should allow for any gas heating, water heating, cooking and other gas end uses. Because Enbridge has an obvious vested interest in the outcome of such decisions, it should not be in the business of running programs designed to influence future building codes – and it should certainly not be able to earn shareholder incentives for any such programs. As discussed in Section IV, we recommend that the Company's Building Beyond Code program be scrapped and that the budget allocated to it be reallocated to direct energy savings programs. That would also mean that the performance incentive dollars Enbridge proposed for the Beyond Building Code program be reallocated to savings metrics.

[35] Optimal Energy and Energy Futures Group, *Final Report: Alternative Michigan Energy Savings Goals to Promote Longer Term Savings and Address Small Utility Challenges*, prepared for the Michigan Public Service Commission, September 13, 2013 (https://www.michigan.gov/documents/mpsc/final_phase1_report_600393_7.pdf).

B. Allocation of Incentives between Sectors

As shown in Table 5, Enbridge has separate gas savings metrics for Residential (non-low income), Low Income, Commercial, Industrial (excluding large volume), and Large Volume sectors, as well as for its proposed Energy Performance program. The metrics are further subdivided for both the Low Income (single family and multi-family) and Commercial (large and small) sectors. Enbridge has proposed that equal weight – 24% in each case – be placed on the amount of savings produced by the Residential, Low Income, Commercial and Industrial sectors, with 3.3% allocated to Large Volume customers and 0.5% from the Energy Performance program.[36] The metric weight allocated to each sector is different than the portions of the DSM budget allocated to each sector and the amount of savings each of the sectors are expected to contribute to the DSM portfolio.

Table 5: Enbridge Proposed Weighting of Scorecard Savings Metrics[37]

Sector	2023 Budget (millions $)	2023 Savings Target (millions m3)	Scorecard Weight	Energy Savings Weight
Residential Savings	$40.8	14.8	22.0%	24.0%
Low Income Savings	$23.0	7.9	22.0%	24.0%
Commercial Savings	$25.3	24.4	22.0%	24.0%
Industrial Savings	$17.8	50.4	22.0%	24.0%
Large Volume Savings	$2.8	9.3	3.0%	3.3%
Energy Performance Program Savings	$0.6	0.1	0.5%	0.5%
Participation Metrics	$8.4	n.a.	8.5%	0.0%
Total	$118.7	106.7	100.0%	100.0%

The Company's proposal to have separate savings metrics for five different customer groups plus a sixth for one particular program is definitely unusual and probably unique. Indeed, we are unaware of any utility with savings and/or economic benefits metrics for which shareholder incentives can be earned that are subdivided to this degree. Typically, there are just one (i.e., total program portfolio savings) to three savings metrics. For jurisdictions employing more than one savings and/or economic benefits metric, a common reason is to include a low income metric to ensure concerns regarding equity are addressed.[38] Sometimes there are also separate metrics for Residential savings and non-Residential savings.

That said, the proposal to have separate metrics by sector can be defended on the grounds that it supports equitable treatment of all customer groups served by the Company. Through that equity lens, it could also be argued that it is reasonable to assign equal weight to savings performance in the

[36] Metric weights do not quite add up to 100.0% because of rounding.

[37] Exh D, Tab 1, Sch. 1 p. 24 for budget values; Exh D, Tab 1, Sch 2, p. 7 for scorecard weights; Exh D, Tab 1, Schedule 3, p. 4 for 100% savings targets. Note that for the Energy Performance Program Enbridge has proposed only a participation metric for 2023, with both participation and savings metrics in all subsequent years. Thus, the 0.5% for energy savings shown in this table (i.e., one half of the 1.0% total annual scorecard allocation) applies only after 2023. The 0.1 million m3 savings shown for the Energy Performance Program is for 2024 rather than for 2023 (there is no savings estimate for 2023), but is provided in this table to enable comparison with other sectors.

[38] For example, both of Michigan's large gas utilities, DTE and Consumers Energy, have a primary performance incentive metric that is based on portfolio lifetime savings, with secondary metrics tied to low income spending levels and either low income savings or installation rates for major measures in their low income programs.

Residential, Low Income, Commercial and Industrial sectors as the budgets for each of those sectors, though different, are the same order of magnitude. It is also reasonable to have a much smaller allocation to the metric for Large Volume customers, both because the level of budget allocated to such customers is an order of magnitude smaller than the budget allocated to other customer groups and because the program design for serving them – in which the customers largely make decisions on how to use program funds rather than deciding whether to participate in a utility-designed program – is fundamentally different than for the other sectors.

C. Allocation of Shareholder Incentives to Energy Performance Program

The Energy Performance Program metrics – both the savings metric and the participation metric – are perplexing. Though the program is being targeted (at least initially) to schools, those customers can also be served by other programs. In other words, the Energy Performance Program is simply a different delivery path for achieving energy savings. Given that, it is difficult to understand why it merits its own performance metrics. The savings generated should instead just be part of the Commercial sector savings goals. Just as with any other new program the Company could offer, if the Energy Performance program approach proves effective at generating participation and savings, it would enhance Enbridge's performance relative to its Commercial sector goals. If it is not effective at generating participation and savings, it will hurt Enbridge's performance relative to those goals.

It is worth noting that under its proposal the Company can earn nearly twenty times as much shareholder incentive per unit of energy savings produced by the Energy Performance program as it can per unit of energy savings produced by its other commercial sector programs[39] – and at a cost that is nearly ten times higher per unit of savings produced.[40] Put another way, if left in place, the Energy Performance program metrics would obviously create a perverse incentive to focus disproportionate attention on what is expected to be a relatively lower performing program. Thus, the Energy Performance program metrics should be eliminated, with the shareholder incentive proposed for them reallocated to other savings metrics.

[39] For 2023, Enbridge estimates that Commercial efficiency programs other than the Energy Performance Program will produce 24.4 million new annual m3 savings (Exh. D, Tab 1, Sch. 3, p. 4) for which it would earn $1.459 million in shareholder incentives (Exh. D, Tab 1, Sch. 2, p. 7) – or $0.06 in incentives per first year m3 saved. In contrast, for 2024 (the first year for which there would be a savings metric for the Energy Performance program), Enbridge estimates its Energy performance Program would produce 0.06 million m3 in new annual savings (Exh. D, Tab 1, Sch. 3, p. 7) for which it could earn $0.067 million in shareholder incentives (Exh D, Tab 1, Sch. 2, p. 8) – or $1.08 per first year m3 saved. This comparison is between 2023 values for Commercial programs and 2024 values for the Energy Performance program, but the small inflationary increase in 2024 incentive payments is a tiny part of the enormous difference in incentive dollars per m3 saved. Note also that this comparison is based on the Company's proposed first year savings metrics. It appears likely that a comparison on lifetime savings will show an even larger difference.

[40] For 2023, Enbridge has budgeted $25.3 million for Commercial programs other than the Energy Performance Program (Exh D, Tab 1, Sch. 1 p. 11) to produce 24.4 million in first year m3 savings (Exh D, Tab 1, Schedule 3, p. 4), or $1.04 per first year m3 saved. In contrast, for 2024 the Company has budgeted $1.2 million for its Energy Performance Program (Exh D, Tab 1, Sch. 1 p. 12) to produce 0.06 million in savings, or $9.84 per first year m3 saved (Exh D, Tab 1, Schedule 3, p. 4). This comparison is between 2023 values for Commercial programs and 2024 values for the Energy Performance program, but the small inflationary increase in 2024 budgets is a tiny part of the enormous difference in planned spending per m3 saved. Note also that this comparison is based on the Company's proposed first year savings estimates. It appears likely that a comparison on lifetime savings will show an even larger difference.

D. Performance Bands of 50% to 150% of Savings Goals

Enbridge's proposal to begin earning shareholder incentives once it has surpassed 50% of a planned goal and not receive the maximum incentive until it has achieved 150% of the planned goal is problematic – at both ends. At the lower end, 50% is far too low a threshold for earning any shareholder incentive related to savings goals.[41] Achieving only half of planned savings levels would be a miserable failure. The notion that the utility should be allowed to earn shareholder incentives at performance levels that can only be considered failures is antithetical to the notion that shareholder incentives should encourage and be rewards for excellent performance. In most jurisdictions, such thresholds are typically set at 70% to 85% of target.[42]

Conversely, not allowing the utility to earn its maximum incentive until it has achieved 150% of goals, especially when spending is constrained to 115% of budget, essentially ensures that it is impossible to earn the full incentive.

In short, at least for savings goals for which there is a long track record of historic performance to reference, performance bands would be better set as 75% to 125% of goal.

5. Economic Net Benefits Metric

A. Enbridge's Proposal

As shown in Table 4 above, Enbridge has proposed that 31% of its maximum shareholder incentive be tied to the economic net benefits that its DSM programs produce (as measured under the TRC+ test).

[41] 50% could be a reasonable threshold for performance metrics related to new endeavors for which there is significant uncertainty and little to no track record on which to base goals.

[42] Vermont Energy Investment Corporate et al., Independent Study of Energy Policy Issues, Final Report, prepared for the New Hampshire Public Utilities Commission, September 30, 2011 (https://www.puc.nh.gov/sustainable%20energy/Reports/New%20Hampshire%20Independent%20Study%20of%20Energy%20Policy%20Issues%20Final%20Report_9-30-2011.pdf).

Table 6 shows the shared savings scheduled proposed by the Company, including the magnitude of shared savings the Company would earn at the low and high ends of each increment of $100 million of net benefits – absent a cap on shared savings. The Company has proposed that its net benefits incentive be capped; for 2023, the cap would be $6.63 million.[43] The Company would have to achieve net benefits of approximately $535 million to earn its maximum possible shared savings incentive of $6.63 million.

[43] Exh. D, Tab 1, Sch. 2, p. 3.

Table 6: Enbridge Proposed Shared Savings Schedule[44]

Net Benefits Range	% of Net Benefits Shared	Shared Savings Earned w/o Cap (Millions $)	
		at Bottom of Range	at Top of Range
$0 to $100 Million	0.00%	$0.00	$0.00
$100 to $200 Million	1.00%	$0.00	$1.00
$200 to $300 Million	1.25%	$1.00	$2.25
$300 to $400 Million	1.50%	$2.25	$3.75
$400 to $500 Million	2.00%	$3.75	$5.75
$500 to $600 Million	2.50%	$5.75	$8.25

There are several reasons to be concerned with this proposal, each of which is discussed below.

B. The Threshold for Earning Shared Savings is Too Low

The Company has estimated that its 2023 DSM programs will produce $372.3 in net benefits, translating to $3.33 million in shareholder incentive.[45] Thus, under its proposed shared savings schedule, it would begin to earn some shareholder incentive once it achieved just 27% of its estimated plan benefits for 2023.[46] It would earn its maximum shared savings incentive at 144% of its estimated plan benefits for 2023.[47]

It should be noted that those performance bands will be different for different years of Enbridge's plan because Enbridge's avoided costs – both the value of avoided gas system costs and the value of avoided carbon emissions – are forecast to increase substantially over time. In fact, the net present value of the benefits achieved in 2027 will be worth approximately 22% more than for the same level of savings achieved in 2023.[48] As Table 7 shows, a 22% increase in the economic benefits would likely translate to about a 28% increase in ***net*** benefits.[49] Thus, assuming the same level of savings in 2027 as forecast for

[44] Based on Exh. D, Tab 1, Sch. 2 p. 12. Note that the $8.25 incentive shown for net benefits of $600 million is without a cap. However, Enbridge has proposed that the maximum shared savings incentive be $6.63 million in 2023, increasing to $7.18 million in 2027. Thus, in all years, the maximum would be earned at levels of net benefits between $500 and $600 million.

[45] See Exh D, Tab 1, Sch. 2, p. 13 for the shared savings incentive cap. Net benefits required to earn maximum shared savings incentive computed

[46] Shared savings begin to be earned after $100 million in net benefits have been achieved. That threshold is 27% of the Company's planned net benefits of $372.26 million for 2023.

[47] $535 million in net benefits, the point at which the 2023 cap of $6.63 million in shared savings would be earned, is 144% of planned net benefits of $372.26 million.

[48] Calculation based on an average 16 year measure life (computed from data provided in Attachment to 5.GEC.7), using avoided costs provided in Attachments to 5.ED.16. The increase is 21.5% for weather-sensitive loads and 23.3% for non-weather-sensitive loads in the Union rate zones and 21.2% for weather-sensitive loads and 22.1% for non-weather sensitive loads in Enbridge rate zones.

[49] 2023 values for NPV of benefits, costs and net benefits from Exh. D, Tab 1, Sch. 4 p. 2. NPV of benefits in 2027 increased by 22% over 2023 values based on analysis of avoided costs described above. NPV of costs in 2027 increased assuming 2% inflation per year relative to 2023. NPV of net benefits in 2027 is the difference between NPV of benefits and NPV of costs.

2023, Enbridge would begin to earn shared savings at just 21% of planned savings in 2027 and earn its maximum shared savings at just 112% of planned savings for 2027.

Table 7: Expected Change in Economic Net Benefits from 2023 to 2027

Year	NPV Benefits (millions)	NPV Costs (millions)	NPV Net Benefits (millions)	Shared Savings (millions)
2023	$534.90	$162.70	$372.20	$3.33
2027	$652.58	$176.11	$476.47	$5.28
Increase	22%	8%	28%	59%

As previously stated, a primary purpose of shareholder incentive mechanisms should be to encourage and reward utilities for excellence in performance in design and delivery of efficiency programs. The notion that Enbridge should be able to begin to earn any shareholder incentives for achieving just one-quarter of its planned benefits is antithetical to that purpose.

C. The Value of Net Benefits Can Go Up or Down for Reasons Beyond Utility Control

Another problem with shared savings mechanisms is that the magnitude of the shareholder incentive can increase or decrease substantially for reasons beyond the utility's control. In particular, if avoided gas costs or the value of carbon emission reductions (as tied to the federal carbon tax) go up or down, the magnitude of the shared savings accruing to utility shareholders will go up or down. Indeed, as also shown in Table 7, even under the same set of avoided cost assumptions the magnitude of Enbridge's shared savings incentive would be 59% – or nearly $2 million – higher in 2027 than in 2023 for achieving exactly the same amount of savings. That is because the Company forecasts that both gas avoided costs and carbon taxes will increase substantially over time.

D. Net Benefits Metrics Could Undermine Some Savings Metrics

Economic net benefit metrics, by definition, encourage utilities to focus efforts on those efficiency measures and programs that provide the greatest economic net benefits per dollar of spending. To be sure, achieving substantial economic net benefits is a good thing. The question is whether they should be a primary driver behind utility shareholder incentives or whether they should instead be minimum requirements for earning shareholder incentives. For example, in Michigan, utility shareholder incentives in recent years have been tied to achievement of lifetime savings and low income spending and savings; however, the incentives are capped by the amount of economic net benefits achieved.[50]

There are several disadvantages to using net benefits as performance metrics rather than as just minimum requirements and/or as mechanisms for potentially constraining shareholder incentives. The first, as described above, is that net benefits can change substantially as avoided costs change – for reasons having nothing to do with utility performance. Second, economic net benefits metrics can undermine other metrics designed to encourage equitable treatment of different customer groups. For example, as shown in Table 8, if Enbridge's 2023 programs perform exactly as planned, but in

[50] By statute (PA 342), shareholder incentives for gas utilities achieving at least 1.0% annual savings can be as high as the lesser of 20% of efficiency program spending or 30% of economic net benefits. At the statutory minimum annual savings level of 0.75%, shareholder incentives can be as high as the lesser of 15% of efficiency program spending or 25% of economic net benefits.

implementing its programs the Company shifted just 10% of its Residential program budget to its Industrial programs,[51] the effect would be to increase its shareholder incentive by over $1 million. While there is some incentive for shifting budgets inherent in Enbridge's proposed savings metrics,[52] those incentives are significantly increased by the Company's proposed shared savings mechanism. Indeed, most of the $1 million increase from shifting 10% of the planned Residential program budget to Industrial program spending would be due to the proposed shared savings mechanism. Finally, economic net benefits metrics can increase incentives to focus on easier, lower cost measures that may provide near term savings but contribute less to the longer-term energy transformation that is needed to dramatically reduce greenhouse gas emissions. For example, within the residential sector, a net benefits metric will increase incentives to more aggressively promote sales of smart thermostats, which are highly cost-effective (in part, but only because they provide both gas and electricity savings) but are more likely to be adopted in the market in the future without efficiency programs than air sealing, insulation upgrades and other building envelop measures.

Table 8: Shareholder Incentive Impact of 10% Residential Budget Shift to Industrial Programs in 2023

Net Benefit Impacts of Shifting 10% of Residential Budget to Industrial

	2023 Enbridge Proposed Portfolio					Res Budget Shift to Industrial				
Program	Budget	TRC+ Benefits	TRC Costs	Net Benefits	TRC+ Ratio	Spend	TRC+ Benefits	TRC Costs	Net Benefits	TRC+ Ratio
Residential	$40.8	$125.7	$66.3	$59.5	1.90	$36.7	$113.1	$59.6	$53.5	1.90
Commercial	$25.3	$133.5	$30.6	$103.0	4.37	$25.3	$133.5	$30.6	$103.0	4.37
Industrial	$17.8	$210.1	$15.9	$194.2	13.17	$21.9	$258.2	$19.6	$238.6	13.17
Low Income	$23.0	$52.7	$20.1	$32.6	2.62	$23.0	$52.7	$20.1	$32.6	2.62
Large Volume	$2.8	$12.9	$4.6	$8.3	2.79	$2.8	$12.9	$4.6	$8.3	2.79
Energy Performance	$1.2	$0.0	$0.6	-$0.6	0.00	$1.2	$0.0	$0.6	-$0.6	0.00
Building Beyond Code	$8.4	$0.0	$5.6	-$5.6	0.00	$8.4	$0.0	$5.6	-$5.6	0.00
Low Carbon Transition	$4.6	$0.0	$0.6	-$0.6	0.00	$4.6	$0.0	$0.6	-$0.6	0.00
Program Subtotal	$123.9	$534.9	$144.3	$390.6	3.71	$123.9	$570.5	$141.3	$429.1	4.04
Portfolio Costs	$18.4	$0.0	$18.4	-$18.4	0.00	$18.4	$0.0	$18.4	-$18.4	0.00
Portfolio total	$142.3	$534.9	$162.7	**$372.3**	3.29	$142.3	$570.5	$159.7	**$410.8**	3.57

Shareholder Incentive Impacts of Shifting 10% of Residential Budget to Industrial

Annual Metrics	Plan as Proposed	Res Budget Shift to Industrial	Change
Residential Savings	$1.46	$1.17	($0.29)
Industrial Savings	$1.46	$2.13	$0.67
Other Scorecards	$3.71	$3.71	$0.00
Shared Savings	$3.33	$3.96	$0.63
Total	$9.96	$10.97	$1.01

[51] A 10% shift in the 2023 residential budget would result in a 23% increase in industrial spending relative to the proposed 2023 budget. Under Enbridge's proposed DSM framework, this level of shift would not require notification of the OEB or stakeholders (Exh. C, Tab 1, Sch 1, p. 15)

[52] This is because industrial savings, for example, are less costly to acquire than residential savings. Having separate sectoral savings metrics reduces the incentive to shift spending to the lowest cost sector (relative to just having a single savings metric), it does not eliminate such incentives.

E. Increased Complexity Relative to Energy Savings Metrics

The current annual process of estimating the lifetime energy savings that Enbridge's programs have achieved involves a non-trivial commitment of resources and effort. In a nutshell, evaluation studies and auditing efforts are required to achieve reasonably accurate estimates of both the annual savings that each efficiency measure promoted by Enbridge produced, as well as the number of years into the future that those savings are expected to last. A TRC+ net benefits metric would require similar levels of scrutiny of several additional variables: electricity savings, water savings, efficiency measure costs and avoided costs. To be sure, all of these variables are currently considered as part of the annual processing of auditing Enbridge's efficiency programs so that estimates of the cost-effectiveness of those programs can be reported. However, the level of scrutiny required for that purpose is very different than the level of scrutiny that would likely be expected when the contentious issue of shareholder incentives is at stake.

If Enbridge's efficiency programs are estimated to have a benefit-cost ratio of 3 to 1, it does not matter that much if the estimate is accurate within a range of 2.5 to 3.5 to one if the only purpose of the cost-effectiveness assessment is to ensure there is sufficient value for the DSM dollars being spent. However, if that 15-20% swing in cost-effectiveness could mean $1 million or more in shareholder incentive, the level of accuracy will become much more important and contentious.

F. Summary

While there could be some value to the net benefits metric proposed by Enbridge – particularly that it would measure the economic benefit of energy savings which is almost always of concern or interest for regulators and customers – the disadvantages appear to significantly outweigh that value. Economic net benefits will be correlated with savings for which there are separate performance metrics – particularly if Enbridge's proposed annual savings metric is changed to a lifetime savings metric. They will also be highly dependent on avoided cost assumptions that will change over time and significantly broaden the range of variables and assumptions that require careful scrutiny to ensure shareholder incentive payments are reasonable. They could also undermine interests in equitably acquiring savings across all customer groups. Finally, under Enbridge's proposed shared savings structure, it would be able to start earning incentives at unreasonably poor levels of performance.

For these reasons we recommend that this metric not be adopted, with the weight Enbridge proposed be assigned to it spread across other metrics. If the Board was inclined to adopt a shared savings metric, we recommend that (A) the metric be based on the Utility Cost Test net benefits, which would eliminate the need to assess often difficult to estimate assumptions about participant measure costs and focus more on gas system benefits; (B) a mechanism (e.g., formulaic adjustments to the shared savings tiers) be put in place to avoid either penalizing the company for avoided costs going down or giving it windfall profits for avoided costs going up; and (C) increasing the level of net benefits at which the Company can earn any shared savings to a point consistent with something akin to achieving 75% of its savings goals. For 2023, that would be something like $275 in TRC+ net benefits.

6. Low Carbon Transition Metric

As shown in Table 4 above, Enbridge is proposing that 5% of the shareholder incentive for which it is eligible over its 2023 to 2027 plan period be attached to achievement of what it calls a Low Carbon Transition Scorecard. The proposed scorecard has four metrics – two focused on numbers of heat pumps installed (residential sector and commercial sector) and two focused on numbers of contractors

(residential) or engineers (commercial) trained on heat pump technology. The focus of the Low Carbon Transition program is on (1) hybrid heat pumps – i.e., electric heat pumps installed in concert with a gas furnace; and (2) gas-fired heat pumps.

There may be merit to near-term investment in hybrid heat pumps, provided they are cold climate models. However, as discussed further in Section IV of this report, it is inappropriate to invest in gas-fired heat pump technology, let alone to tie a shareholder incentive payment to Enbridge's success in promoting the technology. Thus, the performance metrics for the Low Carbon Transition Program should focus solely on training for and installations of cold climate hybrid heat pumps.

7. Long-Term GHG Reduction Metric

As shown in Table 4 above, Enbridge is proposing that 5% of the shareholder incentive for which it is eligible over its 2023 to 2027 plan period be attached to achievement of what it calls a Long-Term GHG Reduction goal. Enbridge proposes that the goal be measured in "gross savings" (i.e., without adjusting for free rider or spillover effects) and be equal to its 2023 planned level of gross savings multiplied by five (for the number of years in the plan) and then increased by 15% (what the Company calls a "stretch"). Unlike with its other metrics, the Company would earn no incentive if it fell short of this goal and the full 5% incentive if it met or exceeded the goal.[53]

This proposal is highly problematic for a several reasons. First, because it focuses on gross savings rather than net savings, it isn't actually a measure of GHG emissions reductions resulting from Enbridge's programs. All gross savings – and therefore all related emissions reductions – that were produced by free riders would, by definition, have occurred without Enbridge's programs. Second, because it is a summing of first year savings rather than lifetime savings, it fails to quantify the full lifecycle GHG emission reductions resulting from the Company's programs. Third, because it simply sums first year savings, it could even overstate the amount of annual emission reductions being realized after 2027. For example, any savings from measures with a 3-year life that were installed in 2023 would not still be persisting in 2028. However, they would still be counted under Enbridge's proposal. Fourth, the 15% "stretch" factor is deceiving because it does not account for the fact that the Company is proposing budgets that increase by 4.6% per year.[54] In other words, the Company would not need to do much more than achieve its 100% targets for each year to earn the incentive available from this proposed metric. Finally, the proposal to make this an "all or nothing" metric – where the Company either earns it in its entirely for meeting or exceeding the goal, but earns nothing if it falls short – could create perverse incentives. For example, if the Company knows in early to mid-2027 that it will be close to meeting this five-year goal, there will be a strong incentive to pursue free rider projects because the $5 million payoff would be far greater than the incremental effect that pursuing more difficult or expensive non-free rider savings would have on other 2027 performance metrics. Put simply, this proposed metric would not cause the Company to do anything it wouldn't plan to do anyway to achieve real net energy savings under the other performance metrics. To the extent that it may cause any change in behavior, it would be detrimental rather than positive.

[53] Exh D, Tab 1, Sch 2, p. 15.

[54] While part of that annual budgetary increase is to account for inflation, Enbridge's proposed Target Adjustment Mechanism for setting post-2023 savings goals assumes a 2% productivity improvement per year – essentially offsetting expected inflation.

That said, the concept of a longer-term performance metric is a good one. However, such a metric should only be adopted if it actually drives the Company to do something different – in a positive way – than it would without the metric. One possible example would be a metric that compares average, weather-normalized residential energy consumption in 2027 to 2022. Another might be a metric that focused on lowering the energy intensity of business customers' use of gas (per unit of GDP). Reasonable goals might be to achieve average residential consumption levels that are 5% lower than those currently forecast and/or improvements in the energy intensity of business customers to levels 5% better than currently forecast.[55] Those kinds of metrics would ensure that Enbridge focuses on the quality of the delivery of its programs. They would also reward spillover effects that may not be fully captured in current EM&V practices, providing an incentive for the Company to increase emphasis on programs likely to have such effects. Finally, they would provide an incentive to keenly focus on the effectiveness of customer education and other initiatives for which the Company does not currently count savings.

8. Size of Potential Shareholder Incentive

In this proceeding, the Board has invited Enbridge to propose a DSM policy framework at the same time that it is proposing its DSM plan. One challenge that creates is there is no opportunity to consider whether the size of the maximum shareholder incentive should vary relative to proposed levels of savings – or at least there is no way to consider that question in a way that would influence the level of savings that the Company proposed.

As a result, Enbridge has no incentive when developing a plan to propose levels of savings that would be more challenging to achieve. In fact, it has a perverse incentive to propose levels of savings – and other metrics – that are relatively easy to achieve. That may explain, in part, why the level of savings in its current DSM plan proposal are lower than its historic achievements despite proposed increases in budget.

Some jurisdictions have begun to tie shareholder incentives to levels of savings achieved – and articulating those ties in advance of utility plan filings so that utilities have incentives to be more ambitious in their plans. For example, in Michigan, gas utilities cannot receive ***any*** shareholder incentive unless they achieve at least 0.75% first year savings, with actual earnings tied to both lifetime savings and performance relative to additional low income program metrics. If they achieve 0.75% annual savings, Michigan gas utilities can earn up to 15% of total efficiency program spending or 25% of net economic benefits, whichever is lower; if their annual savings reach 1.00% of sales, they can earn up to 20% of total efficiency program spending or 30% of net economic benefits, whichever is lower.

It is worth noting that this new incentive mechanism was adopted in legislation that was signed into law in December of 2016. Prior to that, shareholder incentives were capped at 15% of spending for achieving just 0.75% annual gas savings. Within months of the new law going into effect, Consumers Energy filed a new efficiency program plan that would result in a substantial increase in savings – to levels above the 1.00% savings necessary to earn the maximum allowable incentive.[56]

[55] Business goals could potentially be focused on a subset of customers, such as commercial customers, or even just small commercial customers.
[56] Consumers Plan filing in Docket U-18261, Exh, A-13.

The OEB should consider whether the size of Enbridge's maximum shareholder incentive should be tied formulaically to the magnitude of savings – ideally lifetime savings – that it proposes in its plan (though actual incentive payments would obviously need to be tied to success relative to those plan goals). Such a formula should be established independent of what the Company proposed plan would achieve. That way, Enbridge has an incentive to actually propose higher levels of savings. This kind of approach could be put in place for the mid-term review as well as the next multi-year plan. It could even be adopted now if the Board agrees with our critique of the Company's proposed savings goals and instructs the Company to increase them.

IV. Portfolio and Program Design

1. Summary of Key Points

- Enbridge's proposed residential Whole Home program should be harmonized with the new federal Greener Homes Program, using an identical design, supporting the same efficiency measures (or at least the subset that save gas), and simply offering increased rebates for individual measures where appropriate and increasing the federal rebate cap per home.
- Enbridge's proposed residential Whole Home program should not offer rebates for gas heating or water heating equipment. These are not cost-effective measures. Eliminating such gas equipment rebates would also better align the Enbridge program with the federal program.
- Enbridge's proposed low income program budget is lower (in inflation-adjusted terms) than in recent years, and lower as a percent of total program spending than most leading gas DSM portfolios. It should be increased to the point where it represents at least 20% of total DSM program spending.
- Enbridge's proposed Building Beyond Codes new construction programs should be removed from its portfolio, with budget reallocated to other programs or to a third party with the appropriate expertise and no profit bias toward one fuel. New construction decisions by builders and future codes should be considered from a fuel agnostic perspective.
- Enbridge's proposal to support the development of gas heat pumps, as part of its Low Carbon Transition program, should be rejected. Residential gas heat pumps are not commercially available today, are highly unlikely to materially impact gas sales for the foreseeable future, may conflict with future electrification goals, and are far from cost-effective as an efficiency measure. Budget resources would be much better spent on measures that can provide comparable levels of savings today – and cost-effectively.

2. Introduction

In this section we discuss several concerns regarding Enbridge's proposed portfolio of gas DSM programs. Note that we have not performed an exhaustive critical review of all the proposed programs, as we understood that Board Staff has retained Optimal Energy, in part, to review Enbridge's proposed programs. Instead, we have focused on a select handful of issues, with particular emphasis on programs requiring (or that should have) coordination with federal government, IESO, and/or other efforts, as well as proposed Enbridge programs that delve into competition or potential competition between gas and electricity and may therefore be better left to be designed and administered by a single entity that is more fuel-agnostic.

3. Residential Whole Home Program

A. Summary Enbridge Program Proposal

Enbridge has proposed a Whole Home retrofit program with a budget of $30.6 million in 2023, growing to $33.3 million by 2027. As described in the Company's filing, the program would require customers to obtain an initial home energy assessment, install at least two major measures, and receive a final home energy assessment after measures were installed. The Company would provide prescriptive rebates for a wide range of measures addressing air sealing, adding insulation to different parts of the home (attics, walls and basement walls), installing Energy Star windows, installing efficient gas heating equipment (96% AFUE furnaces or 90% AFUE boilers) and installing efficient gas water heaters. The program would also provide bonus rebates for customers who install more than two measures. This program addresses

an extremely important market opportunity for gas energy savings. However, we have significant questions about it.

B. Harmonizing Enbridge's Program with the Federal Greener Homes Program

There is obvious overlap between what the Company has proposed and the new federal Greener Homes program which would also provide financial incentives for air sealing, insulation upgrades, and efficient windows. Enbridge has acknowledged the importance of the federal program and has stated that it is in discussions with NRCan on "a possible partnership model for Ontario." However, the timeline for any agreement "is unknown at this time."[57] Enbridge has also stated that it does not anticipate material changes to its proposed program budget as a result of the federal program because "the principles under which discussion have started was 'to not displace or duplicate provincial programs'."[58] We find that latter statement to be troubling because it appears to imply that the federal program should adapt to or work around the Enbridge program, rather than the other way around. We do not see how it would be practical for the federal program to bend to the needs of every different provincial program. It would be far better for Enbridge (and other programs in other jurisdictions) to modify its program to leverage the federal program. The advantage of this approach is that is simplifies communications and marketing messages to customers and trade allies.

One option would be for Enbridge to deliver a matching rebate program,[59] allowing its customers to receive both Enbridge and federal incentives. That would enable customers to either receive more funds for individual measures – to the extent they would be appropriate given the federal incentive offering, incremental measure costs and severity of market barriers – and/or to invest in more measures than they could through just the federal program because of its $5000 rebate cap. Another option could be for Enbridge to contract delivery of added incentives for its Ontario customers to the federal government. That could provide similar benefits while minimizing administrative costs and further streamlining customer participation (e.g., one set of paperwork).

C. Ending Incentives for Gas-Consuming Equipment

As proposed, Enbridge's program would offer financial incentives for gas heating and gas water heating equipment. It should be noted at the outset that the federal Greener Homes program provides rebates for efficient electric heat pumps and heat pump water heaters, but does not provide any incentives for any gas consuming equipment.[60] One possible reason could be that the federal government believes it is important to begin advancing electrification. Another may be that the cost cannot be justified by the savings.

For example, with a federal efficiency standard for new gas furnaces already at 95% AFUE, we estimate that Enbridge's proposed $250 rebate for a 96% AFUE furnace would only save 18 m3 per year.[61] Based

[57] Response to 10.Staff.31
[58] Ibid.
[59] Though it would add complication, the Enbridge incentive offers could also be matching for some measures that save gas and less than matching for others for which barriers to customer investment may be less challenging.
[60] There is an exception for homes in northern or off-grid communities (https://www.nrcan.gc.ca/energy-efficiency/homes/canada-greener-homes-grant/start-your-energy-efficient-retrofits/23443#G3).
[61] Enbridge estimates that a Toronto home with a 95% efficient gas furnace would consume 2127 m3/year for space heating and water heating. Assuming that 80% of that gas consumption is for space heating, a 1 percentage point improvement in furnace AFUE will provide 18 m3 in annual savings.

on Enbridge's avoided costs for the EGD rate zone, that level of annual savings is worth only about $110 in avoided gas costs and avoided carbon emissions over the average 18-year life of a furnace – far less benefit than the Company is proposing to pay in rebates. The $250 rebate is also greater than the estimated incremental cost of a 97% AFUE furnace (even though it would be provided for just a 96% efficient model).[62]

Energy Star water heaters are similarly not cost-effective. The 2020 Ontario Gas Technical Resource Manual estimates that an Energy Star tank water heating will provide 68.3 m3 of savings for 16 years at an incremental cost of $545. Analysis using Enbridge rate zone avoided costs suggests that such a water heater installed in 2023 would provide only $360 in avoided gas and avoided carbon tax benefits. That translates to a TRC+ benefit-cost ratio of 0.66.

In short, given both climate policy concerns and the state of the current market for furnaces, we would recommend that Enbridge's proposed gas-equipment rebates be removed from its proposed program. Removal of both gas furnace and gas water heater rebates would also facilitate alignment with the federal program. Budgetary resources freed up by this modification could be used to insulate and seal up more homes. We do not know how many gas furnaces, boilers or water heaters Enbridge was implicitly estimating that its future Whole Home retrofit program would rebate. However, as recently as 2020 the Company rebated over 13,000 furnaces through its home retrofit program. If similar levels of furnace rebate applications were to be expected in future years, eliminating such rebates would free up about $3.25 million for investment in more cost-effective building envelop measures.[63]

4. Low Income Program

Low income programs are of great importance, as they help to improve the efficiency and health and safety of a home, as well as lower bills for households with limited (if any) disposable income. Enbridge offers two paths under its low income program, Home Winterproofing and Affordable Housing Multi-Residential (AHMR). These paths are designed to provide income-qualified residents in single family and low-rise social housing with fully funded weatherization and health and safety measures, as well as customer education. The Home Winterproofing program provides the residence with a free-energy assessment; direct install measures, such as showerheads, thermostats, and pipe wrap; weatherization services, including air sealing, and insulation upgrades; and health and safety measures, such as carbon monoxide detectors. AHMR is targeted towards social and assisted house and eligible private multi-residential buildings. This pathway provides a holistic approach to address efficiency deficiencies in multi-residential buildings through energy assessments, direct install measures, and both prescriptive and custom measures.

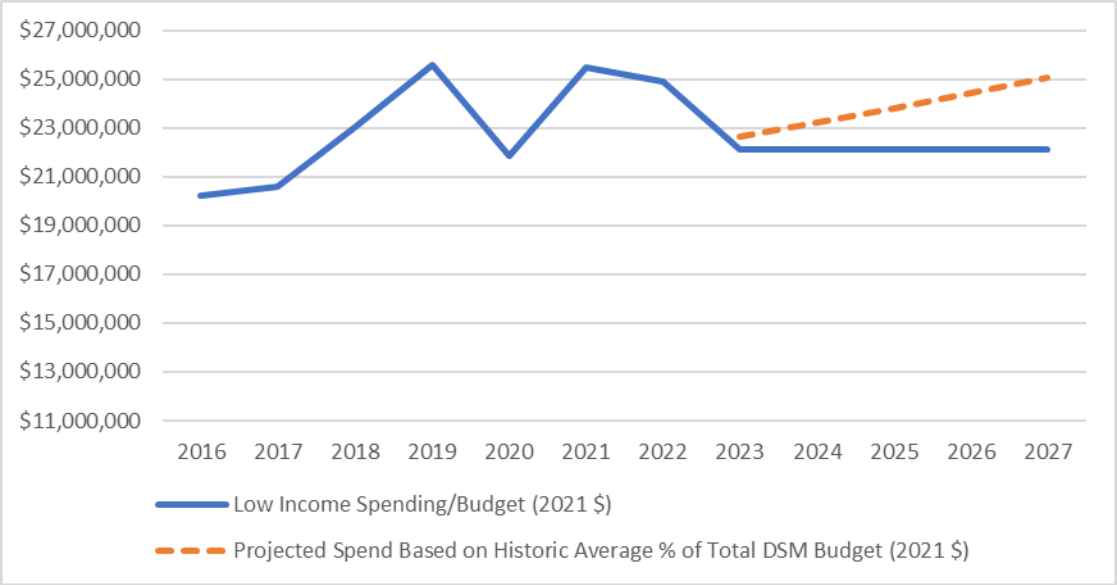
Enbridge's proposed annual low income programs budget ranges from $22.9 million in 2023 to $24.8 million in 2027 (i.e., about $22 million each year in real 2021 dollars). Figure 6 shows that the planned

[62] Ontario Natural Gas Demand Side Management Technical Resource Manual, Version 5.0, November 12, 2020 (https://www.oeb.ca/sites/default/files/OEB-Natural-Gas-DSM-TRM-V5.0-20201112.pdf).

[63] Note that the Enbridge furnace rebate offer for most of the 2020 calendar year was $500. Thus, it is likely that furnace rebate participation would be lower under the $250 rebate level proposed by the Company for 2023 through 2027. However, the elimination of boiler and water heater rebates would also create additional funds for sealing and insulating additional homes.

annual low income spending is lower than the levels expended by Enbridge in recent years, with the exception of 2016 and 2017.

Figure 6 Enbridge Historic, Planned and Projected Spending on the Dedicated Low Income Program (2021 $)



As Table 9 shows, Enbridge's 2019 low income spending was 19.1% of its total program spending. While respectable, that was below levels of all but one of the leading as DSM utilities we have analyzed. Moreover, the Company's plan for 2023 to 2027 would have low income spending at only 17.5% of total program spending.

Table 9: Leading Gas Utilities and Enbridge 2019 Low Income Spending as % of Total 2019 DSM Program Spending

Utility	Jurisdiction	2019 Low Income Spend as % of Total Program Spend
Centerpoint	Minnesota	16.6%
DTE	Michigan	24.8%
Consumers Energy	Michigan	23.6%
Eversource	Massachusetts	19.4%
National Grid	Massachusetts	25.4%
National Grid	Rhode Island	23.4%
Enbridge	Ontario	19.1%

Increasing low income spending to levels commensurate with industry leaders would help ensure that critical market barriers to efficiency are addressed, that equity is enhanced, and that rate impacts are mitigated for those least able to afford them. Thus, we recommend that Enbridge increase its low income spending to at least 20% of its total annual program spending. Doing so would increase its low income budget (in nominal dollars) from $23.0 million to $24.8 million in 2023 and from $24.9 million to $30.1 million in 2027. Any increase in low income program spending should be focused on envelope weatherization measures only and not gas equipment measures. Gas equipment measures in low income households should only be replaced when is existing equipment has failed or is about to fail.

Limiting the level of new gas fired equipment in low income housing will lower the likelihood that low income households will be the ones footing a disproportionate share of future natural gas distribution bills as the energy industry addresses climate concerns through electrification.

5. Building Beyond Code Program

Enbridge is proposing to spend $8.4 million in 2023 and $9.5 million in 2024 – about 7% of its DSM program spending in both years – on its Building Beyond Code programs (residential and commercial).[64] Those programs are designed to influence future Ontario building code requirements. They would rely on a mix of strategies for meeting that objective, including technical assistance, training, marketing support and financial incentives to builders. The Company notes that part of the context for these programs is the "Pan-Canadian Framework of achieving Net Zero Energy Ready (NZER) construction as a code requirement by 2030."[65]

As previously discussed in Section III of this report, we question whether it is appropriate for Enbridge to continue to offer programs targeting new construction markets. Any efficiency program addressing new construction markets needs to be able to approach the question of both what future codes should be and what options builders should consider from a fuel neutral perspective that reflects an understanding of the economic trade-offs – both to customers and to the electric and gas systems – of different fuel choices. The Company has acknowledged that it doesn't understand the peak demand impacts of heat pumps on the electric grid,[66] so it does not have the knowledge necessary to assess trade-offs between gas and electric choices that will be required when future codes are established. Moreover, Enbridge's proposed program is decidedly not fuel neutral. Indeed, the Company's plan specifically states that its new construction support – including financial incentives – are available only for buildings planning to use natural gas for space heating and/or water heating.[67] Such incentives and other support will necessarily – and inappropriately – influence builder fuel choices. This is not surprising. Enbridge, as a profit-oriented private firm, has a vested interest in the outcome of decisions regarding both the requirements of future provincial energy codes and the fuel choices of individual builders and for individual construction projects. It is inappropriate for DSM funds to be used to support such vested interests.

Given the policy imperatives of reducing both customer energy bills and greenhouse gas emissions, the province should be considering whether future building codes should allow for *any* fossil fuel heating, water heating, cooking and other gas end uses – i.e., whether new buildings should be all-electric. A primary objective underlying a net zero energy ready code is that new buildings have the ability to become zero GHG emitting. That is not feasible for buildings relying on fossil gas and there is no evidence to suggest that it is possible – let alone at costs comparable to electricity – to displace anything close to all existing fossil gas use in Ontario with biofuel alternatives. Even if future Ontario building codes do not prohibit gas use, they could be designed in a way that influenced fuel choice. To the extent that fossil fuel options are not prohibited, individual builders will be considering whether to use gas or electric heating and water heating systems.

[64] Exh. D, Tab 1, Sch. 1, p. 9.
[65] Exh. E, Tab 2, Sch. 2, p. 1
[66] Response to 10.ED.35.
[67] Exh. E, Tab 2, Sch. 2, pp, 14 and 20.

The bottom line is that all of the advice, marketing support, incentives and other activities provided under this program should be delivered from a fuel-agnostic perspective. If that is not the case, participants could be encouraged and incentivized to adopt sub-optimal solutions to their energy needs, resulting in higher energy costs for Ontarians. Thus, this program should be either removed from Enbridge's portfolio, with budget reallocated to other programs or to a third party with the appropriate expertise and no profit bias toward one fuel.

6. Low Carbon Transition Program

Enbridge's Low Carbon Transition program is designed to promote both hybrid heating solutions (e.g., an electric heat pump meeting heating needs down to a certain outdoor temperature, then switching to a gas furnace) and natural gas heat pumps.

The proposed investment in natural gas heat pumps is concerning. Gas heat pumps have been under development since at least the 1990s, but have not been commercially available for residential applications because of a number of performance, cost and customer acceptance reasons. Enbridge estimates that they will not be available for residential applications in Ontario until 2024.[68] Even if all goes well with the first products brought to market, it will likely take a decade or more before the product gains even a modest market share of the equipment replacement market. Moreover, it would not be surprising if all does not go well. For example, the first electric heat pump water heaters introduced to the market failed to perform as expected. It took several years for products that met expectations to evolve. All that is to say that gas heat pumps are highly unlikely to make a material difference in GHG emissions reductions by 2030, and perhaps not even by 2035 or 2040.

Moreover, there is a significant possibility that climate policy will need to encourage customers to electrify space and water heating. In that context, there is very little value to investing in the development of a new gas heating technology.

Finally, the Company's own analysis suggests a gas heat pump would only provide $3452 in gas bill savings over its 15-year life for a residential customer in Toronto (relative to a high efficiency gas furnace and water heater) – far less than the $7750 in capital cost increase.[69] Enbridge's analysis appears to have been based on customer economics – i.e., based on retail gas rates rather than avoided costs – in 2022. We conducted a cost-effectiveness assessment of gas heat pumps using avoided costs[70] and found that even for a gas heat pump installed in 2030, when both avoided gas costs and carbon taxes would be higher than in the early 2020s, the measure would have a TRC+ benefit-cost ratio of about 0.45. In other words, this is not a cost-effective efficiency measure.

Since gas heat pumps are neither cost-effective nor likely to make any meaningful contribution to 2030 GHG emission reduction goals, it is inappropriate to devote current DSM budget to promoting them. The budget would be much better spent on known technologies that provide gas savings today and would still provide benefits – in terms of reduced electric grid costs – if buildings are electrified in the future.

[68] Exh. E, Tab 3, Sch. 1, p. 4.

[69] Response to 10.Staff.77 suggests an increased in capital cost of $7750 and NPV of net benefits of -$4298, suggesting gas bill savings of $3452.

[70] We used the same incremental cost assumption as used by Enbridge ($7750), the same annual gas savings (564 m3), and Enbridge's avoided costs and discount rate assumptions (Attachment 1 to 5.ED.16).

Enbridge's proposed investment in gas heat pumps is indicative of a general problem with the Company running ratepayer-funded market transformation programs focused on gas consuming technologies in an era in which there are serious questions about the relative merits of gas versus electricity as the optimal fuel for meeting customers energy needs affordably while reducing GHG emissions.

V. Discount Rate for Benefit-Cost Analysis

1. Summary of Key Points

- Industry best practices suggest Enbridge's proposed 4.0% real discount rate is too high and should be adjusted downward.
- The discount rate used for DSM cost-effectiveness analyses should be based on provincial policy objectives.
- Ontario's policy goals suggest a societal discount rate should be used, rather than the 4.0% real rate used by Enbridge for its 2023 to 2027 plan.
- Real societal discount rates range from <0% to 3%. Though there is no one "correct" answer to what the societal discount rate should be, a useful and commonly used reference are implicit real rates of return from government bonds. Canadian real return bond yields have averaged about 0.5% over the past several years. That would be a reasonable real discount rate to use for DSM analyses.
- Using unreasonably high discount rates will have the effect of skewing DSM investment decisions away from measures and programs with long-lasting savings.

2. Industry Best Practices in Setting Discount Rates

As discussed in both the 2017 *National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources*[71] (NSPM for EE) and the 2020 *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources* (NSPM for DERs),[72] the discount rate used to assess cost-effectiveness of DSM programs should reflect the jurisdiction's policy objectives. Both Manuals also state that the discount rate should reflect the extent to which the risk mitigating benefits of efficiency programs – such as the value of reduced exposure to future fuel price volatility and flexibility to underpin and support a range of potential climate policies for reducing greenhouse gases[73] – are otherwise captured in cost-effectiveness analyses.

As discussed in Section II of this report, both the OEB and the Government (in its Environment Plan and various directives to the OEB) have made clear that reducing greenhouse gas emissions is an important objective of Ontario's gas DSM programs. The province has also historically demonstrated interest in including other (non-gas) fuel savings, water savings, and other participant impacts (including a proxy for non-energy benefits), as well as other environmental benefits, in its cost-effectiveness analyses of gas DSM programs. Collectively, those policy objectives suggest a largely "societal" perspective in assessing the economic merits of gas DSM. In addition, there is no mechanism in Ontario's current benefit-cost analysis framework for capturing the risk-mitigating benefits of efficiency. Those two realities, in turn,

[71] Woolf, Tim et al., *National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources*, National Efficiency Screening Project, Spring 2017 (https://www.nationalenergyscreeningproject.org/wp-content/uploads/2017/05/NSPM_May-2017_final.pdf).
[72] Woolf, Tim et al., National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources, National Efficiency Screening Project, August 2020 (https://www.nationalenergyscreeningproject.org/wp-content/uploads/2020/08/NSPM-DERs_08-24-2020.pdf).
[73] For example, upgrades to insulation levels in a home will provide value by reducing emissions and lower costs, regardless of whether the home remains on the gas system and is exposed to higher costs associated with biogas or if it converts to electric heat.

suggests that the discount rate used to assess cost-effectiveness of Ontario gas DSM programs should be a societal discount rate.

3. An Appropriate Discount Rate for Ontario Gas DSM

In its filing, Enbridge has used a real 4.0% discount rate, which when combined with a 2.0% inflation rate assumption equates to a 6.08% nominal discount rate.[74] That is consistent with the Board's 2014 guidance for the 2015-2020 plan cycle. However, as discussed below, it is materially higher than a societal discount rate. Given the increased policy focus on climate policy and greenhouse gas emission reductions in recent years, it would be reasonable and appropriate for the OEB to require cost-effectiveness analyses for the 2023 to 2027 DSM plan to use a societal discount rate.

As both the NSPM for EE and the NSPM for DERs state, societal discount rates can range from <0% to 3% in real terms. For example, in developing an estimate of social cost of carbon, the state of New York concluded that a 2.0% real discount rate should be the primary rate used.[75] Although Vermont has historically used a 3.0% real discount rate for cost-effectiveness analyses, the state Public Service Department[76] has recently recommended that it be reduced to 2.0%.[77] Several jurisdictions base their real societal discount rate on long-term U.S. Treasury Bond yields. For example, the Illinois utilities, which use a cost-effectiveness test very similar to the Ontario TRC+ test, are currently using a real discount rate of 0.42% based on a ten-year average (January 2010 through December 2019) of 10-year Treasury Bond rates.[78] The most recent New England avoided cost study,[79] which the New England states typically use for inputs to their DSM cost-effectiveness assessments, also uses U.S. Treasury Bond yields for discounting. However, it references 30-Year Treasury Bond yields which suggest a real discount rate of 0.81%. As Figure 7 shows, Canadian real return bond yields have averaged something like 0.4% or 0.5% over the past five years.

[74] Exh. E, Tab 5, Sch. 1, p. 1.
[75] New York Department of Environmental Conservation, *Establishing a Value of Carbon: Guidelines for Use by State Agencies*, June 2021 (https://www.dec.ny.gov/docs/administration_pdf/vocguidrev.pdf).
[76] The Vermont Public Service Department serves the same functions as other states' Energy offices and Ratepayer Advocate offices.
[77] Personal communication with TJ Poor, Director of Efficiency & Energy Resources, Vermont Public Service Department, November 29, 2021.
[78] 2022 Illinois Technical reference Manual for Energy Efficiency, Version 10.0, Volume 1: Overview and User Guide, September 24, 2021, pp. 53-54 (https://ilsag.s3.amazonaws.com/IL-TRM_Effective_010122_v10.0_Vol_1_Overview_09242021-1.pdf).
[79] Synapse Energy Economics, Avoided Energy Supply Components in New England: 2021 Report, amended May 14, 2021 (https://www.synapse-energy.com/sites/default/files/AESC%202021_20-068.pdf).

Figure 7: Bank of Canada Real Return Bond Yields[80]

While there is no single "correct" societal discount rate, long-term bond yields provide a reasonable and documentable reference. Based on both U.S. and Canadian bond yields, it would be appropriate for the OEB to require use of a real discount rate of about 0.5%.

An inappropriately high discount rate has a number of negative impacts. First, it inaccurately skews the selection of measures away from those with more lasting benefits that stretch far into the future. The result will be that too few longer-lived measures would be identified through the prioritization process. Second, it inaccurately undercounts the benefits of DSM. On the margin, this will mean that some measures are inaccurately identified as not being cost-effective. It also reduces the overall calculation of net-benefits.

[80] https://www.bankofcanada.ca/rates/interest-rates/canadian-bonds/

Chris Neme
Principal

ENERGY FUTURES GROUP

Professional Summary

Chris specializes in analysis of markets for energy efficiency, demand response, renewable energy and strategic electrification measures, as well as the design and evaluation of programs and policies to promote them. During his 25+ years in the industry, he has worked for energy regulators, utilities, government agencies and advocacy organizations in 30+ states, 7 Canadian provinces and several European countries. He has filed expert witness testimony in 60+ cases before regulatory commissions in 13 different jurisdictions; he has also testified before several state legislatures. Chris has authored numerous reports and papers on clean energy policies and programs, including the National Standard Practice Manual for Benefit Cost Analysis of Distributed Energy Resources (2020), the predecessor NSPM for energy efficiency (2017), and several reports on electric non-wires and gas non-pipe alternatives.

Experience

2010-present: Principal, Energy Futures Group, Hinesburg, VT

1999-2010: Director of Planning & Evaluation, Vermont Energy Investment Corp., Burlington, VT

1993-1999: Senior Analyst, Vermont Energy Investment Corp., Burlington, VT

1992-1993: Energy Consultant, Lawrence Berkeley National Laboratory, Gaborone, Botswana

1986-1991: Senior Policy Analyst, Center for Clean Air Policy, Washington, DC

Education

M.P.P., University of Michigan, 1986

B.A.., Political Science, University of Michigan, 1985

Selected Projects

- Natural Resources Defense Council (Illinois, Michigan and Ohio). Critically review efficiency, demand response, electrification, distribution system investment and integrated resource plans filed by IL, MI and OH utilities. Draft/defend regulatory testimony on critiques. Represent NRDC in regular stakeholder-utility engagement processes. Represent NRDC in collaborative development of non-wires solution pilots. Support development of Illinois clean energy legislation. (2010 to present)
- E4TheFuture. Co-authored National Standard Practice Manual Benefit Cost-Analysis of Distributed Energy Resources (2020) and NSPM for efficiency (2017). Present the NSPM to audiences across the U.S. and Canada; helping several to assess how to use it to refine current practices. (2016-present)
- Connecticut Energy Efficiency Board. Part of team providing on-going review and input on utility efficiency program planning and related policy issues. Lead role in providing input on New England Avoided Energy Supply Cost study and cost-effectiveness screening policy issues. (2019-present)

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- Ontario Energy Board. Serve on provincial gas DSM Evaluation Advisory Committee, providing input on evaluation plans, evaluation studies, proposals submitted in response to evaluation RFPs, and annual assessments of utilities' gas savings claims. Also serve on advisory committees on gas and electric efficiency potential studies and carbon price forecasts. (2015-present)
- Green Energy Coalition (Ontario). Represent coalition of environmental groups in regulatory proceedings, utility negotiations and stakeholder meetings on DSM policies, utility proposed DSM Plans, integrated resource planning and rules governing non-pipe alternatives. (1993 to present)
- Energy Action Network (Vermont). Co-authoring a white paper on the concept of a "Clean Heat Standard" – a form of RPS imposing obligations on Vermont Gas and wholesale suppliers of fuel oil and propane to reduce greenhouse gas emissions from burning fossil fuels in homes and businesses – to address the state's Global Warming Solutions Act requirements (e.g., 40% reduction by 2030). Co-leading related voluntary working group providing input on policy design. (2020-present)
- Sierra Club (Massachusetts). Supporting Sierra Club's participation in a year-long stakeholder-utility engagement process on the future of the gas industry in the context of state decarbonization goals. Reviewing technical study of options for decarbonizing the gas industry. (2021)
- Sierra Club (Maryland). Providing support on drafting of testimony (by Optimal Energy) on cost-effectiveness and other rules governing expansion of gas infrastructure.
- New Jersey Board of Public Utilities. Served on management team responsible for statewide delivery of New Jersey Clean Energy Programs. Led strategic planning; support regulatory filings, cost-effectiveness analysis & evaluation work. (2015 to 2020). Served on management team for start-up of residential and renewables programs for predecessor project. (2006-2010)
- Regulatory Assistance Project - U.S. Lead author on strategic reports on program options for decarbonizing Vermont buildings, achieving 30% electricity savings in 10 years, using efficiency to defer T&D system investments, & bidding efficiency into capacity markets. (2010 to 2020)
- Citizens Action Coalition of Indiana. Critically reviewed how energy efficiency resources were modeled in utility IRPs, as well as the design of energy efficiency program portfolios. (2018 to 2020)
- Consumers Association of Canada (Manitoba) and Winnipeg Harvest. Critically reviewed and filed regulatory testimony on Efficiency Manitoba's first three-year plan (2020-2023), with particular emphasis on the extent to which the plan supported advanced heat pump technology as both an electric efficiency measure and a key to future building electrification. (2019-2020).
- Efficiency Vermont. Provided technical support in review of avoided cost assumptions, as well as related policies on cost-effectiveness analyses of efficiency resources (2019).
- Earth Justice and Southern Alliance for Clean Energy. Helped critically review Florida utilities' efficiency potential studies and proposed 2020-2024 energy efficiency savings targets. (2019)
- New Hampshire Office of the Consumer Advocate. Drafted expert witness testimony on the merits of utilities adding a pilot non-wires solution project to their efficiency program plans. (2018)
- Regulatory Assistance Project - Europe. Provided support on efficiency policies and programs in the UK, Germany, and other countries. Reviewed draft EU policies on Energy Savings Obligations and EM&V protocols. Drafted policy brief on efficiency feed-in-tariffs. (2009 to 2018)

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- Green Mountain Power (Vermont). Supported development and implementation of GMP's first compliance plan for Vermont RPS Tier 3 requirement to reduce customers' direct consumption of fossil fuels, with significant emphasis on strategic electrification strategies. Also developed 10-year forecast of sales that could result from three different levels of policy/program promotion of residential electric space heating, electric water heating and electric vehicles. (2016 to 2018)
- Alberta Energy Efficiency Alliance. Drafted white paper how treatment of "efficiency as a resource" could be institutionalized in Alberta. The paper followed several presentations to government agencies and others on behalf of the Pembina Institute. (2017 to 2018)
- Southern Environmental Law Center. Assessed reasonableness of Duke Energy's historic efficiency program savings claims, as well as the design of their efficiency program portfolios for 2019. Filed expert witness testimony on findings in North Carolina dockets (2018).
- Toronto Atmospheric Fund. Helped draft an assessment of efficiency potential from retrofitting of cold climate heat pumps into electrically heated multi-family buildings (2017).
- Northeast Energy Efficiency Partnerships. Helped manage Regional EM&V forum project estimating savings for emerging technologies, including field study of cold climate heat pumps. Led assessment of best practices on use of efficiency to defer T&D investment. (2009 to 2015)
- Ontario Power Authority. Managed jurisdictional scans on leveraging building efficiency labeling/disclosure requirements and non-energy benefits in cost-effectiveness screening. Supported staff workshop on the role efficiency can play in deferring T&D investments. Presented on efficiency trends for Advisory Council on Energy Efficiency. (2012-2015)
- Vermont Public Interest Research Group. Conducted comparative analysis of the economic and environmental impacts of fuel-switching from oil/propane heating to either natural gas or efficient, cold climate electric heat pumps. Filed regulatory testimony on findings. (2014-2015)
- National Association of Regulatory Utility Commissioners (NARUC). Assessed alternatives to 1st year savings goals to eliminate disincentives to invest in longer-lived savings. (2013)
- California Investor-Owned Utility. Senior advisor on EFG project to analyze 10 leading U.S. utility portfolios to determine if there are differences in the cost of saved energy related to utility spending in specific non-incentive categories, including administration, marketing, and EM&V. (2013)
- Ohio Public Utilities Commission. Senior Advisor to a project to develop a web-based Technical Reference Manual (TRM). The TRM includes deemed savings assumptions, deemed calculated savings algorithms and custom savings protocols. It was designed to serve as the basis for all electric and gas efficiency program savings claims in the state. (2009 to 2010)
- Vermont Electric Power Company. Led residential portion of efficiency potential study to assess alternatives to new transmission line. Testified before Public Service Board. (2001-2003)
- Efficiency Vermont. Served on Sr. Management team. Supported initial project start-up. Oversaw residential planning, input to regulators on evaluation, input to regional EM&V forum, development of M&V plan and other aspects of bidding efficiency into New England's Forward Capacity Market (FCM), and development and updating of nation's first TRM. (2000 to 2010)

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Stacy Sherwood
Managing Consultant

ENERGY FUTURES GROUP

Professional Summary

Stacy Sherwood brings over a decade of experience in the energy industry, specializing in energy efficiency (EE), demand response (DR), automated metering infrastructure (AMI), cost recovery, and renewable energy. Stacy has testified or provided comments before the public service commissions of Louisiana and Maryland and the public utilities commissions of Pennsylvania and Rhode Island on AMI, EE, and reasonableness of revenue increases. Throughout her career, Stacy has evaluated various electric and natural gas EE and DR plans; potential studies; evaluation, measurement, and verification reports; and riders for cost recovery. In particular, she has specialized in the design of low-income EE programs in Arkansas, Maryland, and Pennsylvania.

Experience

2021-present: Managing Consultant, Energy Futures Group, Hinesburg, VT

2015-2021: Senior Analyst, Exeter Associates, Inc., Columbia, MD

2013-2015: Assistant Director of Energy, Analysis, and Planning Division, Maryland Public Service Commission, Baltimore, MD

2011-2013: Regulatory Economist II, Maryland Public Service Commission, Baltimore, MD

2009-2011: Regulatory Economist I, Maryland Public Service Commission, Baltimore, MD

Education

B.A., Business Administration, Economics, Accounting/Economics, McDaniel College, 2009

Select Projects

- Connecticut Energy Efficiency Board. Co-lead oversight of the state's electric and gas residential energy efficiency programs. Work closely with the state's utilities to develop, implement, and evaluate cost-effective program designs and goals for the Three-Year Conservation and Load Management Plan.
- Louisiana Public Service Commission. Filed testimonies evaluating the reasonableness of automated metering infrastructure implementation plans by Concordia Electric Cooperative, Inc., Southwest Louisiana Electric Membership Corporation, and Point Coupee Electric Membership Corporation. (2020-2021)
- Pennsylvania Office of Consumer Advocate. Reviewed and commented on potential studies utilized to develop energy efficiency and demand response targets for Phase III and IV of the Act 129 Energy Efficiency and Conservation (EE&C) Program. Provided written testimony on utility EE&C five-year plans. (2015-2021)

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- Arkansas Attorney General's Consumer Utility Rate Advocacy Division. Drafted a dedicated limited income EE program strawman implemented on a pilot basis by the electric and natural gas utilities. (2018-2020)
- Arkansas Attorney General's Consumer Utility Rate Advocacy Division. Participated in Parties Working Collaboratively (PWC) group regarding the electric and natural gas EE programs. Provided comments on three-year plans, annual progress reports, and evaluation, measurement, and verification reports. (2017-2021)
- U.S. Air Force Civil Engineer Center. Evaluated the feasibility of geothermal energy production at Edwards Air Force Base. (2015-2016)
- Maryland Public Service Commission Staff. Developed templates and directed work groups related to the implementation of the electric and natural gas EmPOWER Maryland EE and DR programs. Evaluated the semi-annual reports and three-year plans filed by the utilities and submitted comments regarding plan recommendations before the Maryland Public Service Commission. (2009-2015)

Select Publications

- Author on Chapter 2.5 Environmental Justice, Final Report Concerning the Maryland Renewable Portfolio Standard as Required by Chapter 393 of the Acts of The Maryland General Assembly of 2017, https://dnr.maryland.gov/pprp/Documents/FinalRPSReportDecember2019.pdf.
- Lead Author, Power Plant Research Program, Maryland Department of Natural Resources
  - Electricity in Maryland – Fact Book, 2019
  - Electricity in Maryland – Fact Book, 2016

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FORM A

Proceeding:…EB-2021-0002…

ACKNOWLEDGMENT OF EXPERT'S DUTY

1. My name is .....Chris Neme.....(*name)*. I live at .....Shelburne..... (*city)*, in the .....State..... (*province/state*) of .....Vermont..... .

2. I have been engaged by or on behalf of .....GEC and ED..... (*name of party/parties)* to provide evidence in relation to the above-noted proceeding before the Ontario Energy Board.

3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
   (a) to provide opinion evidence that is fair, objective and non-partisan;
   (b) to provide opinion evidence that is related only to matters that are within my area of expertise; and
   (c) to provide such additional assistance as the Board may reasonably require, to determine a matter in issue.

4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date .....December 1, 2021.....

Chris Neme

_____

Signature

FORM A

Proceeding: EB-2021-0002

ACKNOWLEDGMENT OF EXPERT'S DUTY

1. My name is Stacy L Sherwood (*name*). I live at Halethorpe (*city*), in the Maryland (*province/state*) of United States of America.

2. I have been engaged by or on behalf of The Green Energy Coalition and Environmental Defence (*name of party/parties*) to provide evidence in relation to the above-noted proceeding before the Ontario Energy Board.

3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
   (a) to provide opinion evidence that is fair, objective and non-partisan;
   (b) to provide opinion evidence that is related only to matters that are within my area of expertise; and
   (c) to provide such additional assistance as the Board may reasonably require, to determine a matter in issue.

4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date December 1, 2021

Stacy L Sherwood

Signature