

EB-2022-0200
Enbridge Gas Rebasing Application

**Interrogatories of Environmental Defence re IGUA Evidence on
Business Risk (Dr. Asa Hopkins)**

Interrogatory # M9-ED-1

Reference: Report, Page 21

Question:

- (a) Your report notes that energy transition is not a new issue for Enbridge. Please discuss whether and how this conclusion bolstered by:
 - i. The decarbonization analysis from 2015 prepared for Enbridge and filed in EB-2016-0004 in response to OGA interrogatory #3?¹
 - ii. The request for accelerated depreciation by Union Gas in 2016 in relation to decarbonization uncertainties in EB-2016-0186.²

Interrogatory # M9-ED-2

Reference: Report, Page 36-39 & 53

Question(s):

- (a) Your report recommends analysis of future scenarios and the development of a plan based on that analysis. It also suggests waiting for the provincial government to make policy choices based on its pathways study. How should the scenario analysis and plan address the reality that policy directions often change with elections such that pro-gas or pro-electrification policy choices could change in the future?
- (b) How should the analysis and plan address the possibility that the future for building heat could be determined more by (a) markets and/or (b) federal climate policy, as opposed to provincial climate policy?

Interrogatory # M9-ED-3

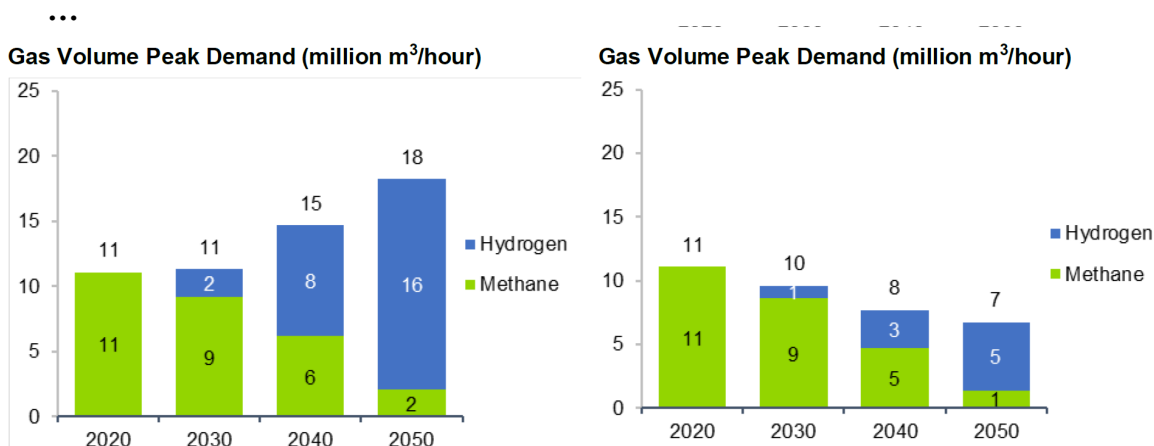
Reference: Report Page 36, Attachment 3

Preamble:

The Guidehouse Report includes the following figure at page 38:

¹ Response to OGA Interrogatory #3: <https://www.rds.oeb.ca/CMWebDrawer/Record/526018/File/document>

² Union Application, p. 2: <https://www.rds.oeb.ca/CMWebDrawer/Record/531574/File/document>

Diversified
Electrification


Question:

- Your evidence calls on Enbridge to conduct a scenario analysis that “would develop a number of plausible future scenarios, assign those scenarios weights based on transparent assumptions about the futures they represent, and model the conduct of a prudently run utility adapting and managing itself in that scenario.” Has Enbridge presented a sufficient range of plausible future scenarios in the Guidehouse report in light of the fact that (a) the so-called electrification scenario involves only a 36% decline in the gas volume peak demand (which drives infrastructure needs) and (b) both scenarios involve significant 100% hydrogen pipelines, including for residential customers? Please discuss.
- Would you agree that Enbridge’s pathways work differs from many other jurisdictions due to the prevalence of hydrogen in all scenarios and/or the absence of a scenario where the large majority of buildings fully electrify?

Interrogatory # M9-ED-4

Reference: Report, Page 36-39 & 53

Preamble:

Chris Neme concludes as follows at pages 39 to 49 of his report:

“Overall, Guidehouse’s assumptions are highly biased in favor of gas and not credible. There are numerous instances in which optimistic leaps of faith are made about equipment and systems necessary to make continued use of gaseous fuels look economically viable while much more conservative assumptions are made about electric alternatives. For example, Guidehouse assumes high penetrations of residential gas heat pumps and 100% hydrogen furnaces and appliances, despite

the fact that these products are not even commercially available today. In contrast, Guidehouse assumes market penetration rates for electric heat pump water heaters in 2040 that are much lower than leading jurisdictions are achieving today through DSM programs. Similarly, Guidehouse assumes that the efficiency of electric heat pumps will degrade 2% per year after installation (based on an outdated study that doesn't apply to current electric heat pump technology) but that gas furnaces and gas heat pumps will experience no such degradation."

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Table 9: Summary of Concerns with Guidehouse's P2NZ Study

Assumption	Concern	Implications
Cost of CO ₂ e Emissions	Guidehouse improperly treats carbon taxes as a societal cost and assumes a much higher cost of emissions for electrification scenario.	Using same cost of emissions reduces electrification scenario costs by ~\$67+ billion . That's more than enough (without any other changes) to make it the lower cost option.
Load Shapes for Electrified End Uses	Guidehouse assumes all building end uses - including water heating, cooking and drying - have the same seasonal and hourly load profiles as space heating.	Winter morning peak demand from electrified building loads likely to be about 40% lower than estimated by Guidehouse.
Heating Equipment Efficiency Degradation after Install	Guidehouse assumes electric heat pump efficiency degrades 2%/year after installation based on reference for very different older generations of heat pumps. No degradation of gas furnace or gas heat pump efficiency assumed, despite the same report suggesting gas furnace efficiency also degrades.	Guidehouse estimates of added electricity consumption for ASHP space heating overstated by 18%. The adverse effect is 0.7 TWh in 2030, 2.6 TWh in 2040 and 3.3 TWh in 2050 more in the Electrified scenario than in the Diversified scenario.
RNG Availability	Guidehouse assumes that the entire "technical potential" for RNG in Ontario would be available, even though the expert report it references suggests it would be feasible to access less than one-quarter of that amount.	Substantially more expensive gaseous resources would have had to be deployed under the "Diversified Scenario" if RNG supply constraints were reasonably set, possibly making the Diversified scenario inconsistent with a net zero emissions objective.
RNG Costs	Guidehouse RNG cost is for landfill gas, but most of the RNG potential it assumed to be available is from other much more expensive sources. The most expensive source of RNG would set the market clearing price for all RNG.	RNG costs likely to be at least 3 times greater than assumed, improving the relative cost of Electrification Scenario by at least \$28 billion . The difference could be much higher because Guidehouse assumes RNG potential four times what its own reference study says is feasible, which would require accessing even more expensive RNG
GHG Emission Reductions from RNG	Guidehouse's analysis does not address the full lifecycle emissions of biomethane. Thus, it overstates the amount of emission reductions RNG provides.	If lifecycle emissions were fully addressed, additional emission reduction measures would have to be deployed to achieve net zero emissions, adding significant cost, especially for the Diversified Scenario, potentially making it inconsistent with net zero emissions objective.
GHG Emission Reductions from Blue H ₂	See evidence of Professors Howarth and Jacobson	If blue hydrogen emissions are greater than assumed, it would make the Diversified scenario more expensive and/or inconsistent with net zero emissions objective.
Electric Demand Response Resources	Guidehouse did not consider or model the potential for demand response to be applied to newly electrified space heating and water heating loads.	Electric system capacity costs from electrification are overstated, but difficult to quantify the magnitude of the overstatement.
Gas Heat Pump Costs	Guidehouse used an informal estimate from a gas heat pump manufacturer rather than a much higher recent Enbridge estimate. Worse, it failed to recognize that the estimate it used was expressed in U.S. rather than Canadian dollars.	Converting to Canadian dollars results in an increase cost of \$3 billion for the Electrification Scenario and \$16 billion for the Diversified Scenario - improving the relative cost of the Electrification Scenario by \$13 billion .
Home Weatherization Savings Life	Guidehouse conservatively assumed that insulation and other building envelop efficiency improvements would last only 20 years. Enbridge assumes a more reasonable 30 years in its DSM planning.	Using a 30 year life reduces the cost of the Electrification Scenario by \$11 billion and the Diversified Scenario by \$5 billion - improving the relative cost of the Electrification Scenario by \$6 billion .
Electric Water Heating Efficiency	Guidehouse assumes only ~10% of gas to electric water heating conversions by 2040 and ~25% by 2050 are to efficient heat pump water heaters. Leading jurisdictions are already achieving market penetration rates higher than that. Other studies assume much higher heat pump water heating rates.	If 75% of all such conversions were to heat pump water heaters, total forecast electric demand would be about 8.2 TWh (about 2%) lower under the Electrification Scenario (and about 3.5 TWh lower under the Diversified Scenario).
Customer Conversion Costs	Guidehouse did not address customer conversion costs - other than costs of heating equipment. Behind-the-meter pipe retrofits, ventilation requirements and utility inspection costs could be substantial.	Likely bias against electrification because costs likely to be higher for conversion to 100% hydrogen than for electrification for residential and commercial customers.
Utility Distribution System Costs	Guidehouse excluded the cost of converting the distribution system to 100% hydrogen and all other incremental gas and electric distribution system costs.	Likely bias against electrification because the costs for 100% hydrogen delivery to residential and commercial customers likely to be much higher than for electrification of those customers. Also, electrification will enable reductions in gas utility costs from fewer customers (e.g., fewer connections, meters, customer service reps, etc.) as well capital and O&M cost savings from pruning parts of the gas distribution system.

Questions:

Question(s):

- (a) Your report recommends development of a scenario analysis and plan relating to decarbonization. In light of the above comments from Chris Neme, would you recommend that these be developed through a process whereby stakeholders have input throughout, or developed entirely by Enbridge?
- (b) Do you agree that there appears to be a pro-gas bias in the Guidehouse report?
- (c) Please discuss procedural mechanisms to avoid a pro-gas bias in the development of a scenario analysis and plan going forward.

Interrogatory # M9-ED-5

Reference: Report, Page 46 & Attachment 4, Pages 3 & 6

Preamble:

- (a) The model in attachment 4 appears to run from 2023, starting with a rate base of under \$15 billion. To help us better understand how waiting can make things worse (per p. 46 of your report), please re-run the model from 2029 onward on the assumption that Enbridge's application for 2024-2028 is approved as filed. In particular, please assume that rate base increases over that period in line with JT4.24, which shows rate base increasing to over \$18 billion by 2028. If a re-run of the model is not possible, please comment on the likely impacts based on your professional opinion.
- (b) Page 3 of Attachment 4 states, "[f]or retiring assets, STM adds 0.5 percent of plant each year by default." Please compare Enbridge's proposed spending with this figure. We ask this for the purposes of assessing the reductions in spending that may be appropriate.

Interrogatory # M9-ED-6

Reference: Report, Page 46 & Attachment 4, Page 6

Preamble:

Page 46 notes: "Waiting makes things worse. The longer the utility waits to change its approach (in a world where building-sector customers and sales are falling toward zero), the larger the rate shock and the larger the potential amount of stranded costs to mitigate."

Question(s):

- (a) In light of the comment that "waiting makes things worse," please comment on the specific no-regret or low-regret steps that could be taken in the 2024-2028 period to mitigate long-term risks relating to decarbonization, including the possibility of falling building-sector sales.
- (b) In addition to other steps you may recommend in (a), please also comment on the following:

- (i) Reduce capital spending: A number of the proceedings described in Attachment 3 resulted in recommendations to reduce capital spending, such as the recommendation in the Massachusetts proceeding to “[m]inimize or avoid gas infrastructure projects to reduce costs that need to be recovered from gas system customers.” This could be adopted for Enbridge over the 2024-2028 timeframe.
- (ii) Reduce rate base: Enbridge’s application would have rate base increasing to over \$18 billion by 2028 (JT4.24). A potential recommendation could be to have rate base decline over 2024-2028, or for it to decline by a certain percent each year.
- (iii) Reduce revenue offsets for contributions in aid of construction (CIAC): The connection costs funded by connecting customers through CIACs are currently offset by the forecast distribution revenue from those customers over 40 years. A reduction is justified because it is no longer a foregone conclusion that a new customer will stay with gas indefinitely. If they leave “early,” existing customers bear the stranded asset costs. A 10-year horizon could be justified on the following factors: (a) fuel switching is most likely as an air conditioner or gas furnace nears the end of its life, (b) early switching is possible to save costs, get government rebates, or reduce emissions, (c) a customer would need to remain with the system long after paying off their connection costs to pay their “fair share” of the remaining capital infrastructure they have benefited from, and (d) erring on the side of a shorter horizon is a more prudent “safe bet.”
- (iv) Cap infill connection costs funded by existing ratepayers: For infill connections (i.e. connections for existing buildings), Enbridge proposes that existing customers cover the cost of the meter and up to 20 m of service line through rates (which comes to about \$6,000 per Ex. 8-3-1 p 13)). That would not be paid off by via the customer’s distribution charges for about 40 years (per JT3.19). The portion covered by rates could be capped at, say, 10 years for the reasons noted above.
- (v) A temporary moratorium on new residential gas connections: A moratorium could be placed on new residential gas connections to eliminate the risk that those costs would be stranded and to eliminate the need for further transmission or distribution growth projects. The moratorium could be reconsidered following the preparation of the scenario analysis and plan proposed in your evidence.
- (vi) Modestly accelerated depreciation for residential pipes: The current depreciation approach assumes there is a 0% (or almost 0%) chance of pipes being underutilized or no longer used and useful before the end of their physical lives. To provide some balance in the interim, and avoid possible future rate shocks, depreciation of residential pipes could be modestly accelerated for the 2024-2028 period.

Interrogatory # M9-ED-7

Reference: Attachments 3 & 4

Question(s):

- (a) Based on your review and involvement in decarbonization proceedings and studies, please comment on the likelihood of a substantial portion of buildings being served by pipelines carrying 100% hydrogen with 100% hydrogen boilers by 2050 in Ontario. Please explain and comment on the factors addressed in Mr. Neme's report on pages 20-22.
- (b) Do you agree that the greatest uncertainty for the future role of gas in buildings is whether it will be feasible and cost-effective for customers to adopt hybrid RNG/electric heating (with RNG used for peak heating needs) instead of fully electric heating?
- (c) Please list which of the steps discussed in M9-ED-6 would support or be consistent with a future with significant levels of hybrid RNG/electric heating?
- (d) Is there a concern that significant levels of hybrid RNG/electric heating could negatively impact industrial customers by negatively impacting the cost and availability of RNG due to it being a scarce resource?
- (e) Enbridge states: "Furthermore, the sensitivity analysis found that decreasing investments in the gas system will result in the inability to achieve net-zero by 2050, with significant residual GHG emissions remaining." (Exhibit 1, Tab 10, Schedule 5, Page 13) Do you agree that Enbridge or Guidehouse have established that decreasing investments in the gas system will result in the inability to achieve net-zero by 2050? Please discuss.