EB-2022-0111
Bobcaygeon Community Expansion Project

Interrogatories of Environmental Defence

Note: Many of the questions below are relevant to multiple issues, not only the issue indicated.

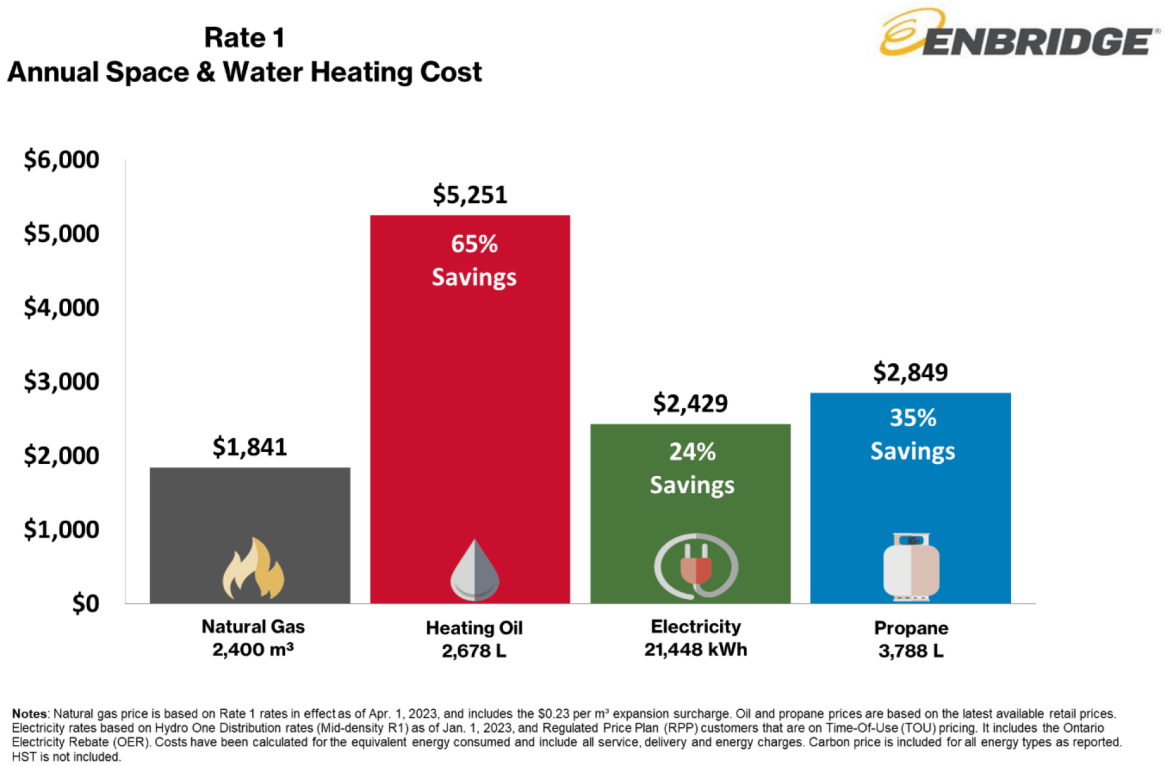
Interrogatory # 1.0-ED-1

Reference: Exhibit B, Tab 1, Schedule 1, Page 4 & 5

Preamble:

Enbridge provides the following estimates of cost savings:

Figure 1: Annual Energy Costs & Savings Versus Natural Gas, Including SES



Notes: Natural gas price is based on Rate 1 rates in effect as of Apr. 1, 2023, and includes the $0.23 per m³ expansion surcharge. Oil and propane prices are based on the latest available retail prices. Electricity rates based on Hydro One Distribution rates (Mid-density R1) as of Jan. 1, 2023, and Regulated Price Plan (RPP) customers that are on Time-Of-Use (TOU) pricing. It includes the Ontario Electricity Rebate (OER). Costs have been calculated for the equivalent energy consumed and include all service, delivery and energy charges. Carbon price is included for all energy types as reported. HST is not included.

Question(s):

(a) Please reproduce Figure 1 and Table 1 adding a separate column for heating with electric air source heat pumps. Please provide a table listing all the calculations and assumptions underlying the cost estimate for electric air source heat pumps.
(b) Please reproduce Figure 1 and Table 1 adding details for the annual costs for a cold-climate heat pump generated using the Guidehouse spreadsheet filed in the Hidden Valley Community Expansion Case, updated to incorporate the latest rates and the gas monthly customer charges.
(c) Please provide all the underlying calculations and assumptions underlying Figure 1 and Table 1, including the underlying spreadsheet with live formulas. Please include all assumptions, including, but not limited to, the assumed price on carbon.
(d) If an excel spreadsheet is used to assess the relative cost-effectiveness of the various heating options, please provide that live excel spreadsheet with the variables set consistent with output in Figure 1. A model that Enbridge used in the past can be found at EB-2019-0188, Exhibit I.ED.7, Attachment 1, but we do not have a version that has been updated and set with the variables used in this case.

Interrogatory # 1.0-ED-2

Reference: Exhibit B, Tab 1, Schedule 1

Preamble:

Enbridge states that the City of Kawartha Lakes supports the project.

Question(s):

(a) Please provide all communications to and from the City of Kawartha Lakes regarding the project, including all communications to the City of Kawartha Lakes describing the benefits (e.g. letters, presentations, etc.).
(b) Please provide a list of all meetings with staff and elected officials from the City of Kawartha Lakes and the meeting notes and materials for each.

Interrogatory # 1.0-ED-3

Reference: Exhibit B, Tab 1, Schedule 1

Question(s):

(a) Please provide all communications to and from the Township of Cavan-Monaghan regarding the project, including all communications to the Township describing the benefits (e.g. letters, presentations, etc.).
(b) Please provide a list of all meetings with staff and elected officials from the Township of Cavan-Monaghan and the meeting notes and materials for each.
(c) Please provide a copy of the “Final Guidelines for Potential Projects to Expand Access to Natural Gas Distribution” and the related section 35 letter from the Minister.

(d) The OEB Guidelines referred to above state that applicants must: "Provide letter(s) from the Band Council(s) and/or local government, as applicable, stating support for the project, including details of any commitment to financial support." Was a support letter requested from the Township of Cavan-Monaghan?
(e) If a support letter was not sought from the Township, please explain why, including with reference to any documentary support for Enbridge's contention that the Township does not count as a "local government" within the meaning of the Guidelines

Interrogatory # 1.0-ED-4

Reference: Exhibit B, Tab 1, Schedule 1

Preamble:

Enbridge states that the City of Kawartha Lakes supports the project.

Question(s):

(a) Please complete the following table to confirm which of the following facts Enbridge communicated to the City of the Kawartha Lakes (and for any that were communicated, please provide the communication including a pinpoint reference to where that fact is contained):

Information Communicated to the City of the Kawartha Lakes		
Fact	**Whether communicated to the city (Y/N)**	**If no, why not; if yes, where & when**
(i) That the federal government is offering $5,000 rebates for customers to switch to high-efficiency electric heat pumps, which are not available for gas furnaces.[1]		
(ii) That the federal government is offering an *additional* $5,000 in rebates for customers to switch from oil to high-efficiency electric heat pumps if they earn a median income or lower (e.g. $122,000 after-tax income for a family of 4 in Ontario) through the Oil to Heat Pump Affordability Program.[2]		

[1] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.
[2] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.

(iii) That the federal government is now providing up to $40,000 in interest free loans, which can be put towards conversions to electric heat pumps, and not gas equipment, through the Greener Homes Loan.[3] (Note: The survey script does include a vague reference to heat pump rebates.[4] However, that is a far cry from actually indicating the high level of rebates that are available. In addition, the script fails to note that the rebates *and interest free loans* can make a heat pump installation less expensive than a gas furnace coupled with a traditional air conditioner.)		
(iv) That heat pumps could save a customer approximately $1,200 in annual heating costs versus a gas furnace for a house with a moderate heat load (or whatever Enbridge's estimated savings are).[5]		
(v) That Enbridge will levy an extra line charge based on the distance of the building from the road.		
(vi) That heat pumps result in lower annual energy costs compared to traditional gas equipment for home heating		
(vii) That heat pumps significantly reduce summer cooling costs.		
(viii) That natural gas is a potent greenhouse gas and its combustion generates approximately 1/3rd of Ontario's greenhouse gas emissions.[6]		

[3] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.
[4] EB-2022-0249, Exhibit I.ED.5, Attachment 1, Page 52.
[5] EB-2022-0249, Exhibit I.ED.16, Attachment 7, Ottawa, 4 Ton Heating Load, "Cost savings" row, averaged; EB-2022-0249, Exhibit I.ED.5.
[6] EB-2022-0249, Exhibit I.ED.5.

(ix)	That heat pumps result in far less greenhouse gas emissions than gas furnaces.[7]		

Interrogatory # 2.0-ED-5

Reference: Exhibit D

Question(s):

(a) Please provide a table showing individually for the supply lateral, reinforcement pipeline, and the mains that are included in the ancillary facilities: (i) the design hour capacity, (ii) the forecast design hour demand if the full customer attachment/revenue forecast materializes, (iii) the design hour capacity if Enbridge were to use the next smallest sized pipe, and (iv) the cost savings from using the next smallest size pipe.
(b) Individually for the supply lateral, reinforcement pipeline, and the mains that are included in the ancillary facilities, please indicate whether Enbridge could downsize the pipe, *or part of the pipe*, and still meet the demand underlying the revenue forecast. Please provide a full explanation, including a quantification of the savings from downsizing.

Interrogatory # 3.0-ED-6

Reference: Exhibit B, Tab 1, Schedule 1, Page 8

Questions:

(a) Table 2 shows the projected customer additions. Please confirm if the years indicated are calendar years. If not, please explain.
(b) Please provide a copy of table 2 with "Year 1, Year 2…" replaced with the actual years.
(c) Please provide a side-by-side showing table 2 before and after the evidence update.
(d) Why has the number of new construction units declined in table 2 from 2,237 to 1,807 due to the update?

Interrogatory # 3.0-ED-7

Reference: Exhibit B, Tab 1, Schedule 1, Attachment 3 (LURA Survey Results) and Attachment 4 (Forum Survey Results)

Questions:

(a) Which survey results does Enbridge believe are the most representative and accurate as between LURA and Forum?
(b) Why did Enbridge believe it was necessary to run a second survey by Forum Research after completing the LURA survey.

[7] *Ibid*.

(c) Please provide a table showing the outcomes of the two surveys (i.e. # and % of customers likely to connect) and the percentage change as between the two.
(d) Please list and describe the reasons for the difference in results between the two surveys.

Interrogatory # 3.0-ED-8

Reference: Exhibit B, Tab 1, Schedule 1, Attachment 3 (LURA Survey Results)

Questions:

(a) Please provide a table showing, of the respondents likely to connect to natural gas (incl. somewhat and very likely), how many and what percent have each of the following space heating systems (# and %): electric baseboard, electric heat pump, electric other, propane, oil, wood, and other.
(b) Please provide a table showing, for each of the respondents likely to connect to natural gas (incl. somewhat and very likely) that use oil heating, what is the size of their household and what is their household income (confirming whether that be before or after tax income).
(c) Please provide the fully granular results from the surveys in a live excel spreadsheet. Please include descriptive column headings (not simply reference to survey question numbers). Please include a key or data label table if necessary to understand the responses.
(d) Please provide the fully granular survey materials, including any letters sent to residents, door-to-door survey materials, online survey questions, and CATI survey questions.
(e) CATI survey question materials can be difficult to understand in their "raw" form. Please provide a question mapping document and any other available materials to help the reader understand which questions are asked and when.

Interrogatory # 3.0-ED-9

Reference: Exhibit B, Tab 1, Schedule 1, Attachment 4 (Forum Survey Results)

Questions:

(a) Please provide a table showing, of the respondents likely to connect to natural gas (incl. likely, very likely, and extremely likely), how many and what percent have each of the following space heating systems (# and %): electric baseboard, electric heat pump, electric other, propane, oil, wood, and other.
(b) Please provide a table showing, for each of the respondents likely to connect to natural gas (incl. likely, very likely, and extremely likely) that use oil heating, what is the size of their household and what is their household income (confirming whether that be before or after tax income).
(c) Please provide the fully granular results from the surveys in a live excel spreadsheet. Please include descriptive column headings (not simply reference to survey question numbers). Please include a key or data label table if necessary to understand the responses.

(d) Please provide the fully granular survey materials, including any letters sent to residents, door-to-door survey materials, online survey questions, and CATI survey questions.
(e) CATI survey question materials can be difficult to understand in their "raw" form. Please provide a question mapping document and any other available materials to help the reader understand which questions are asked and when.
(f) Please indicate the number of respondents with air conditioning. If that question was not asked, please provide an average number based on Ontario's housing stock or Enbridge's equipment surveys.
(g) Please provide the approximate average age for customers' propane furnaces. Please provide this figure for all respondents with a propane furnace and for the subset of customers likely to connect to the gas system (incl. likely, somewhat likely, and extremely likely).

Interrogatory # 3.0-ED-10

Reference: Exhibit B, Tab 1, Schedule 1, Attachment 4 (Forum Research Report)

Questions:

(a) Please provide a detailed list of any difference in the Forum survey questions as between the survey run in Bobcaygeon and those run in Selwyn and Hidden Valley, including different introductory information provided to respondents.
(b) For each difference between the surveys that did not arise from energy price differences as between the locations, please explain the reason for the different wording used in Bobcaygeon.

Interrogatory # 3.0-ED-11

Reference: Exhibit B, Tab 1, Schedule 1, Attachment 4 (Forum Research Report)

Preamble:

These questions are for Forum Research.

Questions:

(a) Please provide all excerpts from all materials provided to residents that provide details on the comparative cost-effectiveness of heating with electric air source heat pumps versus gas.
(b) Please individually indicate whether respondents were informed of the following facts. If yes, please provide the precise text used in the materials or survey script:
    (i) That the federal government is offering $5,000 rebates for customers to switch to high-efficiency electric heat pumps, which are not available for gas furnaces.
    (ii) That the federal government is offering an additional $5,000 in rebates for customers to switch from oil to high-efficiency electric heat pumps if they

earn a median income or lower (e.g. $122,000 after-tax income for a family of 4 in Ontario) through the Oil to Heat Pump Affordability Program.

(iii) That the federal government is now providing up to $40,000 in interest free loans, which can be put towards conversions to electric heat pumps, and not gas equipment, through the Greener Homes Loan. (Note: The survey script does include a vague reference to heat pump rebates. However, that is a far cry from actually indicating the high level of rebates that are available. In addition, the script fails to note that the rebates and interest free loans can make a heat pump installation less expensive than a gas furnace coupled with a traditional air conditioner.)

(iv) That heat pumps could save a customer approximately $1,200 in annual heating costs versus a gas furnace for a house with a moderate heat load (or whatever Enbridge's estimated savings are).

(v) That Enbridge will levy an extra line charge based on the distance of the building from the road.

(vi) That heat pumps result in lower annual energy costs compared to traditional gas equipment for home heating

(vii) That heat pumps significantly reduce summer cooling costs.

(viii) That natural gas is a potent greenhouse gas and its combustion generates approximately 1/3rd of Ontario's greenhouse gas emissions.

(ix) That heat pumps result in far less greenhouse gas emissions than gas furnaces.

Interrogatory # 3.0-ED-12

Reference: Exhibit B, Tab 1, Schedule 1

Questions:

(a) Please complete the following table showing the typical or average costs for a home to convert to natural gas space heating from different existing heating systems, including all costs, such as ductwork required for conversions from electric baseboards. Please include both Enbridge's best estimates and the figures provided to customers in the LURA and Forum surveys.

Cost of Converting to Natural Gas Space Heating			
Existing Equipment	Enbridge best estimate	Figure used in LURA survey	Figure used in Forum survey
Electric baseboards (no ductwork)			
Electric forced-air furnace			
Electric heat pump			
Oil furnace			
Propane furnace			

Interrogatory # 3.0-ED-13

Reference: Exhibit B, Tab 1, Schedule 1

Questions:

(a) Please reproduce the customer attachment forecast broken down by the current customer primary heating system/fuel. Please make and state assumption as necessary (e.g. Enbridge may estimate the fuel type of connecting customers based on the proportions of customers with that fuel type indicating an interest in converting to gas in the surveys). Please provide the underlying calculations. We are most interested in the overall totals after 10 years, but please also provide the annual breakdown if possible.

Interrogatory # 3.0-ED-14

Reference: Exhibit E

Questions:

(a) Please provide a copy of the most recent eight quarterly reports for schedule 2 community expansion projects that Enbridge is required to prepare and submit pursuant to s. 10.1(1) or O. Reg. 24/19.
(b) If there are any discrepancies between the information in the quarterly reports pertaining to the Bobcaygeon project and the information in this application, please detail those in a table with a reconciliation of the differences.

Interrogatory # 3.0-ED-15

Reference: Exhibit E, Tab 1, Schedule 1, Page 1

Questions:

(a) Please provide a table providing a table with a full reconciliation as between the estimated project costs in Table 1 and the amount estimated in the Company's original project proposal to the Government of Ontario (2019/2020) for funding under Phase 2 of the NGEP (EB-2019-0255).
(b) Please provide the complete copy of the above-referenced project proposal.
(c) Please provide the 40-year DCF table underling the project proposal to the Government of Ontario (2019/2020) for funding under Phase 2 of the NGEP (EB-2019-0255).

Interrogatory # 3.0-ED-16

Reference: Exhibit E, Tab 1, Schedule 1, Page 1

Questions:

(a) Please reproduce Table 1 with an added column showing the totals, including both pipeline costs and ancillary costs.
(b) Please provide Enbridge's definition of "ancillary costs" as that term is used in Table 1. Please provide a full explanation.
(c) Please compare the concept of "ancillary costs" with allocated overhead, including a reconciliation of the concepts in a table if there is partial overlap.

Interrogatory # 3.0-ED-17

Reference: Exhibit E, Tab 1, Schedule 1, Page 1

Question:

(a) Please provide a table of figures showing, without rounding: the gross capital cost, the gross O&M costs over 40 years, the NPV of the O&M costs over 40 years, the subsidy, the gross revenue over 40 years, and the NPV of the revenue over 40 years

Interrogatory # 3.0-ED-18

Reference: Exhibit E, Tab 1, Schedule 1, Page 1

Question:

(a) Please complete the following table:

Capital Costs Per Customer	
Forecast gas customers (total)	
Total capital costs	
Capital costs per customer	

(b) Please complete the following table:

Capital and Operating Costs Per Customer	
Forecast gas customers (total)	
Total capital costs and gross O&M costs over 40 years	
Capital and O&M costs per customer	

(c) Please complete the following table:

Capital and Operating Costs Per Customer (Excl. Costs Covered by the Subsidy)	
Forecast gas customers (total)	
Total capital costs and gross O&M costs minus the subsidy from existing customers	
Capital and O&M costs per customer (excl. subsidy)	

Interrogatory # 3.0-ED-19

Reference: Exhibit E, Tab 1, Schedule 1, Page 1

Questions:

(a) If there are significant revenue shortfalls or cost overruns in years 1 though 10 that Enbridge is unable to recoup from increasing the system expansion surcharge, does Enbridge undertake not to seek to recoup the amounts from existing Enbridge customers?
(b) If there are significant revenue shortfalls or cost overruns in years 11 though 40 that Enbridge is unable to recoup from increasing the system expansion surcharge, does Enbridge undertake not to seek to recoup the amounts from existing Enbridge customers?

Interrogatory # 3.0-ED-20

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Preamble:

Questions:

(a) Please reproduce the DCF table with an illustrative scenario where customer attachments each year are 50% of those forecast. Enbridge does not need to agree this scenario is likely – it is intended to illustrate the cost impacts.
(b) With respect to the response to (a), please provide (i) the revenue deficiency over the first 10 years (both gross and NPV) and the (ii) the revenue deficiency over the remaining 30 years (both gross and NPV).

Interrogatory # 3.0-ED-21

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Questions:

(a) Please complete the following table showing the outcomes in various scenarios in terms of the profitability index, NPV, and gross revenue deficiency. Enbridge does not need to agree these scenarios are likely.

Cost Impact of Different Customer Attachment / Revenue Scenarios					
	Profitability index	NPV	Revenue deficiency (years 1-10)	Revenue deficiency (years 11-40)	Revenue deficiency (years 1-40)
Volumes plateau in year 5 and do not increase					

After year 10, 10 customers exit the system each year (net)					
Volumes are 20% less than forecast each year					

Interrogatory # 3.0-ED-22

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Questions:

(a) Please provide a full breakdown of the incremental capital costs shown in the DCF table, including a breakdown showing the connection costs included in the incremental capital.
(b) Please explain how the incremental capital figures in the DCF table were determined and provide all underlying figures and assumptions.
(c) Please indicate which of the following costs are included in the incremental capital costs shown in the DCF table:
    (i) The full cost of service lines, meters, regulators, and other capital needed to connect additional conversion customers (i.e. infills);
    (ii) The cost of service lines, meters, regulators, and other capital needed to connect additional conversion customers (i.e. infills), minus the extra length charges (ELC) that will be required by infill customers;
    (iii) The full cost of mains that are required in new developments that form part of the connection/revenue forecast;
    (iv) The full cost of mains that are required in new developments that form part of the connection/revenue forecast, minus contributions in aid of construction that will be required by developers;
    (v) Incremental overheads; and
    (vi) Normalized system reinforcement costs.

Interrogatory # 3.0-ED-30

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Preamble:

> These questions relate to the costs of individual customer attachments (i.e. dedicated service line and meter), the portion of those costs that will be borne via up-front payments by customers considering a switch to gas, and how this might impact the number of attachments as customers consider gas versus heat pumps.

Questions:

(a) Please confirm that the Extra Length Charge applies in community expansion areas. If not, please explain, including an explanation as to when that changed, why that changed, and whether approval was sought from the OEB for that change.

(b) Please provide the details of the existing Extra Length Charge.
(c) Please confirm that the existing Extra Length Charge is insufficient to meet the 40-year revenue horizon maximum in EBO 188.
(d) What Extra Length Charge is Enbridge proposing to institute in 2024 in its current rates case?
(e) Please confirm how many intervenors in Enbridge's rates case have requested in their submissions (i) a higher Extra Length Charge than proposed by Enbridge and (ii) a lower extra length charge than proposed by Enbridge.
(f) Please provide a rough estimate of the Extra Length Charge that would be applicable to the buildings in the project area on average, at the high end, and at the low end.
(g) Please provide a table showing, for all the buildings in the project area, the *approximate* length of service line that will be required. If Enbridge does not have that information, please obtain it on an approximate basis using mapping tools. The list does not need to use addresses. Please use simplifying assumptions if Enbridge wishes to do so (e.g. that the service line will run in a straight line from the edge of the shoulder to the nearest point on the house). [Note that this should not be onerous, and Environmental Defence would complete the task if it was permitted to submit evidence. We tested this task with Google Maps, and we were able to record measurements of approximately 5 buildings per minute.]
(h) Please add to the table from (g): the approximate Extra Length Charge that would apply for that building (pre-tax) and the total including tax (if tax is applied), for the existing ELC and the proposed ELC.
(i) Please explain how Enbridge determines the length for the purpose of calculating the Extra Length Charge. For instance, is the length measured from the actual gas main, or from some other point (e.g. the edge of the road or the edge of the shoulder)? For customers on the opposite side of the road as the main, do they or Enbridge cover the incremental costs of getting the service line underneath the road?

Interrogatory # 3.0-ED-23

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Preamble:

EBO 188 Appendix B Guidelines state:

> 2. STANDARD TEST FOR FINANCIAL FEASIBILITY
>
> The standard test for determining the financial feasibility at both the project and the portfolio level will be a DCF analysis, as set out below.
>
> 2.1 DCF Calculation and Common Elements
> …
> For capital costs, the common elements will be as follows:

(a) an estimate of all costs directly associated with the attachment of the forecast customer additions, including costs of distribution mains, services, customer stations, distribution stations, land and land rights;

(b) an estimate of incremental overheads applicable to distribution expansion at the portfolio level; and

(c) an estimate of the normalized system reinforcement costs.

Questions:

(a) Please provide a table showing for each year and as a total: (i) the incremental overheads and (ii) the normalized system reinforcement costs.
(b) Please reproduce the DCF table with rows breaking out the incremental capital costs as between direct costs, incremental overheads, and normalized system reinforcement costs. If any of those costs are not included, please reproduce the DCF table including those costs.

Interrogatory # 3.0-ED-24

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Questions:

(a) For this project, what is the forecast average all-in cost to connect a new residential customer to the gas system, including the cost of the meter, regulator, the pipe serving that specific customer, and the installation costs? Please differentiate between conversions and new build customers if possible.
(b) Please provide a table showing, for each year, the forecast customer attachments, the estimated average cost to attach a customer (e.g. the meter, the pipe serving that customer only, labour, etc.), the estimated cost that will be covered by rates, and the estimated cost that will be covered by the customers directly.
(c) Please reproduce the DCF table with a row showing the customer attachment costs (i.e. the meter, the pipe serving that customer only, labour, etc.) for each year broken out from other costs. If those costs are not included, please reproduce the DCF table including those costs.
(d) What are the average incremental operational costs for Enbridge per average residential customer (e.g. billing, etc). Please provide a breakdown of these costs.
(e) Are the costs in (c) included in the DCF table?

Interrogatory # 3.0-ED-25

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Questions:

(a) What is the forecast average all-in cost to connect a new residential customer to the gas system, including the cost of the meter, regulator, the pipe serving that specific customer, and the installation costs? Please differentiate between conversions and new build customers if possible. Please provide figures for Enbridge as a whole, the Enbridge rate zones, and the Union rate zones, as available. Please also include a breakdown between direct costs, incremental overheads, and normalized system reinforcement costs.
(b) How much up-front capital can the revenue from an individual customer support while maintaining a PI of 1.

Interrogatory # 3.0-ED-26

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Questions:

(a) Please provide a table showing the full calculations and assumptions used to generate the revenue forecast from the customer attachment forecast. Please include, among other things, the annual customer attachments, annual customer totals, the use per customer, and the revenue generated per customer.
(b) If the customer attachment forecast underlying the DCF table differs from the one set out in Exhibit B, Tab 1, Schedule 1, Page 6, please explain and provide a reconciliation table.
(c) Does Enbridge agree that the number of customer attachments could be impacted by the relative cost-effectiveness of converting to gas versus converting to high-efficiency cold climate air source heat pumps? If not, please explain.
(d) Does Enbridge agree that the number of customer attachments could be impacted by customer perceptions of the relative cost-effectiveness of converting to gas versus converting to high-efficiency cold climate air source heat pumps? If not, please explain.

Interrogatory # 3.0-ED-27

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Questions:

(a) Please provide Enbridge's best estimate of the relative cost-effectiveness of an average customer in the project area converting to an air-source cold climate heat pump versus gas. Please generate (i) the lifetime difference in total capital costs and operational costs (NPV) based on customer prices over the equipment lifetime and (ii) the difference in average annual operational costs over the equipment lifetime. Please include all material customer-facing costs and benefits, including energy costs, carbon costs, the Greener Homes Grant incentives for heat pumps, and the gains from more efficient summer cooling of an air source heat pump versus a traditional air conditioner. Please provide all calculations and assumptions. Please make assumptions and state caveats as necessary.
(b) Please re-run the cost comparison spreadsheet underlying (a) with the following assumptions:

(i) Customer-facing gas and electricity prices for the project ara are based on either: (A) the average price over the past 12 months inflated by 2% annually going forward or (B) the current prices inflated by 2% annually going forward;
(ii) A carbon price forecast consistent with the IESO 2050 Pathways to Decarbonization Report, namely: that the carbon price "[c]ontinues rising by $15/tonne from 2030-2035, and thereafter increases with the rate of inflation."
(iii) The installed cost and performance (COP/HSPF & SEER) of the cold climate air source heat pump is based on the Moovair Central heat pumps;[8]
(iv) The average SEER of an air conditioner is 13 (per EB-2021-0002, Exhibit I.10h.STAFF77);
(v) Two scenarios for water heating: (A) the customer keeps their existing electric water heater and (B) the customer purchases a Rheem hybrid high-efficiency heat pump water heater;
(vi) The customer's air conditioner is at 50% of its useful lifetime and its future replacement costs are avoided if the customer installs a heat pump; and
(vii) The customer will incur the average Extra Length Charge if they switch to gas.

(c) Fall each scenario, please provide the lifetime NPV and the first-year annual operating costs for both options.
(d) Please provide the live spreadsheets containing these calculations.
(e) Please confirm that Moovair is a heat pump developed and sold by The Master Group, which is the largest independent HVAC-R distributor in Canada.[9] [To explain why we suggest using that model as a concrete example.]
(f) Do the average-use figures assumed in Enbridge's revenue forecast correspond to customers with gas for space heating only or also gas for other uses, such as water heating?
(g) Please confirm that there are over 430 models of centrally-ducted heat pumps on the Greener Homes Grant eligible equipment list with an HSPF (Region 5) of 10 or higher and that the top-rated Carrier 3-ton units have an HSPF (Region 5) of 11.3.
(h) Please confirm that there are over 270 models of centrally-ducted heat pumps rated for 30,000 BTUs or higher on the Greener Homes Grant eligible equipment list with an HSPF (Region 5) of 10 or higher.
(i) Please provide the conversion rate between region 4 and 5 HSPF figures and between HSPF and COP.
(j) Please provide a table for the duration of the customer attachment horizon with rows for:
(i) The number of forecast attachments;
(ii) The average capital cost per attachment (e.g. dedicated service line and meter);
(iii) The amount of the attachment costs in (ii) covered by rates on average;
(iv) The amount of the attachment costs in (ii) covered by the customer on average;
(v) The total attachment costs (dedicated service line and meter) for each year; and
(vi) A reconciliation of (v) with the incremental capital figures in the DCF table in E-1-1 Attachment 2.

Interrogatory # 3.0-ED-28

[8] The specs for the Moovair central can be found here: https://moovair.ca/central-moov-2022/.
[9] https://moovair.ca/why-moovair/

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Questions:

(a) Please provide file a copy of EB-2022-0249, Exhibit I.ED.16, Attachment 2 and the associated live excel spreadsheet.
(b) Is Enbridge asking Guidehouse to continue with the work described in (a)? If yes, please describe the next steps.
(c) For what purpose did Enbridge ask Guidehouse to prepare the analysis discussed in (a).

Interrogatory # 3.0-ED-29

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Questions:

(a) Please provide a table showing all the assumptions regarding heat pump capital costs and efficiency levels outlined in Exhibit I.10h.EGI.STAFF.77 in EB-2021-0002.
(b) Please provide the implicit cost and efficiency for a cold climate heat pump underlying the Total Resource Cost figures for Enbridge's DSM programs.
(c) Please provide a table showing the cost of a cold climate heat pump per the US Energy Information Administration's *Buildings Sector Appliance and Equipment Costs and Efficiencies*.[10] Please convert the costs to Canadian dollars.
(d) Please provide a copy of all studies or reports with details on the installed cost of a cold climate heat pump in Ontario and/or Canada.
(e) For (d) please confer with Enbridge's DSM team in responding to the question and confirm that you have done so.
(f) Please provide a copy of the most up-to-date analysis by the Canadian Climate Institute on the cost-effectiveness of heat pumps.
(g) Please comment on the following analysis by Ralph Torrie on the heating savings from heat pumps - https://www.corporateknights.com/issues/2023-06-best-50-issue/calculate-the-savings-from-electrifying-your-home/.

Interrogatory # 3.0-ED-30

Reference: Exhibit E, Tab 1, Schedule 1, Attachment 2

Questions:

(a) Please confirm that home owners are eligible for up to $5,000 grants and $40,000 in interest free loans from the federal government for qualifying cold climate air source heat pump installations.
(b) Please provide any studies or analysis that Enbridge has completed on the impact of the above-references $5,000 grant and interest free loans for air source heat pumps on the likely number of customers attaching to the proposed pipeline.

[10] https://www.eia.gov/analysis/studies/buildings/equipcosts/

(c) Please provide any studies or analysis that Enbridge has completed on the impact of current high gas prices on the likely number of customers attaching to the proposed pipeline.

Interrogatory # 3.0-ED-31

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) Please confirm that Canada's 2030 Emissions Reduction Plan includes a projection for carbon emissions associated with buildings to decline by 41% by 2030 from 2019 levels (to 53 CO2e from 91 CO2e) and that it plans for a 22% reduction by 2026 from 2019 levels (to 71 CO2e from 91 CO2e). [11] If not, please explain.
(b) Please confirm that Canada's 2030 Emissions Reduction Plan has formal legal status under s. 9 of the *Canadian Net-Zero Emissions Accountability Act* in relation to the legally binding targets under that *Act*.[12] If not, please explain.
(c) Please confirm that Canada has committed to net-zero emissions from electricity generation by 2035. If not, please explain.

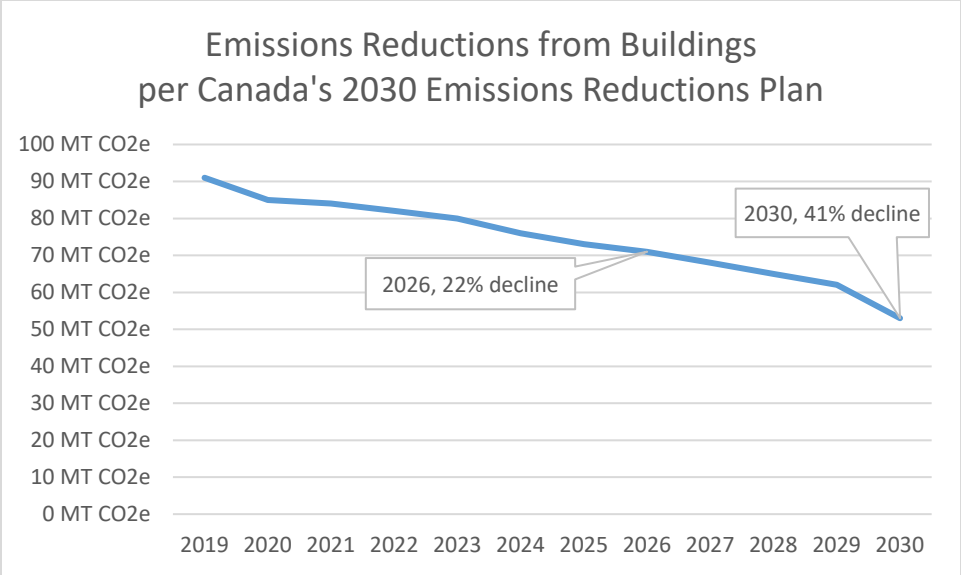
Interrogatory # 3.0-ED-32

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) Please confirm that the following chart accurately depicts a projection of emissions reductions from buildings per Canada's 2030 Emissions Reduction Plan.[13] If not, please prepare a chart that Enbridge believes is accurate:

[11] https://www.canada.ca/en/environment-climate-change/news/2022/03/2030-emissions-reduction-plan--canadas-next-steps-for-clean-air-and-a-strong-economy.html
[12] *Canadian Net-Zero Emissions Accountability Act*, s. 9.
[13] For the underlying numbers, see here: *2030 Emissions Reduction Plan – Canada's Next Steps for Clean Air and a Strong Economy* (link).



(b) Does Enbridge agree that Canada's 2030 Emissions Reduction Plan is likely to impact the customer attachment forecast through future policies that cause some customers to choose electric heat pumps over gas? If not, please explain.

Interrogatory # 3.0-ED-33

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) Please provide a list of grants and loans available to customers in the proposed project area to install cold climate air source heat pumps.
(b) Please confirm whether each of the following statements is true. If not, please explain why:
   i. The federal government is now providing $5,000 incentives for customers to switch to high-efficiency electric heat pumps as part of its Greener Homes Grant;[14]
   ii. The federal government is now providing an *additional* $5,000 in incentives for customers to switch from oil to high-efficiency electric heat pumps if they earn a median income or lower (e.g. $122,000 after-tax income for a family of 4 in Ontario) through the Oil to Heat Pump Affordability Program;[15] and
   iii. The federal government is now providing up to $40,000 in interest free loans, which can be put towards conversions to electric heat pumps, and not gas equipment, through the Greener Homes Loan.[16]

[14] https://natural-resources.canada.ca/energy-efficiency/homes/canada-greener-homes-initiative/canada-greener-homes-grant/canada-greener-homes-grant/23441
[15] https://natural-resources.canada.ca/energy-efficiency/homes/canada-greener-homes-initiative/oil-heat-pump-affordability-program-part-the-canada-greener-homes-initiative/24775.
[16] https://natural-resources.canada.ca/energy-efficiency/homes/canada-greener-homes-initiative/canada-greener-homes-loan/24286

(c) Further to (b)(ii) above, please provide a table showing the median income for Ontario that serves as the eligibility threshold for the Oil to Heat Pump Affordability Program?
(d) Please provide an estimate of the number and percent of residents in the project area that would be eligible for Oil to Heat Pump Affordability Program. This could be done, for example, based on statistics for the percent households at or below the eligibility threshold in the area or region.
(e) Please compare the cost of converting from oil to (i) gas versus (ii) an electric cold climate heat pump, accounting for two rebates noted above.

Interrogatory # 3.0-ED-34

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) Please confirm how much additional annual subsidy individuals and families qualified under the Ontario Electricity Support Program can receive if they heat their home with electricity?
(b) Please provide an estimate of the number and percent of residents in the project area that would be eligible for the Ontario Electricity Support Program. This could be done, for example, based on statistics for the percent of households receiving social assistance.

Interrogatory # 3.0-ED-35

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) Does Enbridge agree that government policies or market forces related to decarbonization *could* impact the customer attachment or revenue forecasts? If not, please justify the response.
(b) What are the lifetime volumes of gas (m3) and carbon emissions (CO2e) corresponding to the 40-year customer attachment and revenue forecasts in relation only to emissions from end-use combustion?
(c) What are the lifetime carbon emissions (CO2e) corresponding to the 40-year customer attachment and revenue forecasts in relation only to upstream emissions (i.e. extraction and transportation)?
(d) In EB-2020-0066, Exhibit JT1.714, Enbridge estimated 14 gCO2e/MJ related to upstream extraction, processing, transportation and distribution of gas.[17] Does Enbridge still believe this is the best estimate of upstream emissions? If not, please provide Enbridge's best estimate of upstream emissions.

[17] See page 398: http://www.rds.oeb.ca/HPECMWebDrawer/Record/680679/File/document

(e) What are the lifetime carbon emissions (CO2e) corresponding to the 40-year customer attachment and revenue forecasts in relation only to unburned methane from customer equipment (i.e. extraction and transportation)?[18]
(f) What is Enbridge's best estimate of the emissions (gCO2e/MJ & tCO2e/m3) arising from unburned methane emissions from customer equipment?
(g) Please confirm that the methane emissions cited in the following reference are only the methane emissions from *combustion*, not from leaks, and if Enbridge disagrees, please explain with excerpts: Ontario Ministry of the Environment and Climate Change. (2017, November). Guideline for Quantification, Reporting and Verification of Greenhouse Gas Emissions. Table 20-3 and Table 20-4. https://prod-environmental-registry.s3.amazonaws.com/2018-01/013-1457_d_Guide.pdf.
(d) What are the emissions from the combustion of gas in Ontario (gCO2e/MJ & tCO2e/m3)?

Interrogatory # 3.0-ED-36

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) Is the price of gas and/or the incentives available for electric heat pumps impacting the customer attachments in community expansion projects? Please explain the answer.
(b) To help us explore the question in (a), please complete the following tables and prepare a chart for each showing the trendline. For the second table, please divide the annual forecast by 12 to generate a monthly forecast figure.

Customer Attachments in Community Expansion Locations by Month				
	Jan 2020	Feb 2020	…	Dec 2022
Number of customer attachments				

Customer Attachments in Community Expansion Locations by Month Percent of Forecast				
	Jan 2020	Feb 2020	…	Dec 2022
Number of customer attachments as % of forecast				

Interrogatory # 3.0-ED-37

[18] Any of the following sources could be used as an emissions factor: Quantifying Methane Emissions from Natural Gas Water Heaters (link); Unburned Methane Emissions from Residential Natural Gas Appliances (link); An Estimate of Natural Gas Methane Emissions from California Homes (link); Beyond-the-Meter: Unaccounted Sources of Methane Emissions in the Natural Gas; Distribution Sector (link); Methane and NOx Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Homes (link).

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) What is the annual average consumption (m3) and annual average distribution revenue ($) per residential customer assumed by Enbridge in this proceeding?
(b) What is the annual average consumption (m3) and annual average distribution revenue ($) per residential customer being realized by Enbridge in its other community expansion projects? Please provide all underlying calculations. If possible, please make an adjustment for customers attaching mid-year.

Interrogatory # 3.0-ED-38

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) Please reproduce the table provided in EB-2022-0200, Exhibit JT3.16, adding rows to show: the average revised forecast PI (weighted by final cost) and the total of column xi (shortfall).
(b) Please explain the reasons for the shortfalls in the Fenelon Falls and Scugog Island projects.

Interrogatory # 3.0-ED-39

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) With respect to the revenue generated in the first 10 years, does Enbridge or do ratepayers bear the risk of average use being lower than forecast?
(b) With respect to the revenue generated in the final 30 years, does Enbridge or do ratepayers bear the risk of average use being lower than forecast?
(c) Please describe how regulatory adjustments relating to average use interact with the customers attached through community expansions. Please address both the first 10 years and final 30 years.

Interrogatory # 3.0-ED-40

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) Please indicate how much revenue would need to be collected from customers over the final 30 years of this project to cover outstanding capital costs and ongoing O&M costs. Please provide all underlying calculations.
(b) Please complete the following table:

Required Revenue per Project Discounted Cash Flow Tables ($,000)	
SES Revenue	
Distribution Revenue	
Total Revenue	
Years 11-40 SES Revenue	
Years 11-40 Distribution Revenue	
Years 11-40 Revenue	
Percent of revenue in years 11-40	

Interrogatory # 5.0-ED-41

Reference: Exhibit I, Tab 1, Schedule 1

Questions:

(a) Please provide a route map indicating which portions of the pipeline would be on private or public land.
(b) Please provide a map showing the trees that will need to be removed for the pipeline construction.
(c) Please provide satellite images of each portion of the pipe with an overlay showing where the trench will be dug for the pipeline. Please provide this as a high-resolution image so that a viewer can zoom in to see the impact on properties and vegetation along each portion of the pipeline route.

Interrogatory # 7.0-ED-42

Reference: Exhibit I, Tab 1, Schedule 1

Questions:

(a) Would Enbridge agree to the following condition of approval? If not, please explain why not and provide alternative wording for a commitment that Enbridge would make.

> "The Applicant shall provide potential customers with a comparison of the average annual energy costs and lifetime all-in costs of converting to gas versus converting to a cold climate air source heat pump."

(b) Please provide a copy of:
   (i) All promotional or informational materials sent to customers in community expansion areas that have connected to the gas system in the past three years, including materials sent by mail, email, or social media;
   (ii) A copy of all newspaper and online advertisements relating to switching to gas in the past three years; and
   (iii) A copy of all Enbridge website pages relating to switching to gas.

(c) For the items in (b) that are undated, please indicate the date range during which they were sent to customers or published.

(d) Please provide a copy of all Enbridge communication plans or communication strategy documents relating to community expansions or switching to gas more generally.