EB-2022-0246
Brockton Gas 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 A, Tab 2, Schedule 1, Page 2

Question(s):

(a) Please prepare a side-by-side comparison table showing each aspect of the project (i) at the time that it received approval by the Government of Ontario for NGEP funding and (ii) as proposed today. For instance, please include the capital costs, the NGEP subsidy, the customer attachments, the NGEP subsidy per forecast customer attachment, the forecast revenue, the kms of pipe to be built, etc.
(b) Please provide all correspondence between EPCOR and the Government of Ontario regarding this project.
(c) Has the Government of Ontario provided approval for EPCOR to continue to receive the full NGEP subsidy despite the changed project parameters, including the reduced customer attachments and reduced number of customers that will have an opportunity to connect to gas?

Interrogatory # 1.0-ED-2

Reference: Exhibit B, Tab 1, Schedule 1, Attachment 3

Question(s):

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

Interrogatory # 1.0-ED-3

Reference: Exhibit B, Tab 1, Schedule 1, Attachment 3

Question(s):

(a) Please complete the following table to confirm which of the following facts EPCOR communicated to the Municipality of Brockton (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		
Information	**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]		
(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]		
(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 EPCOR's estimated savings are).[4]		
(v) That EPCOR may charge customers for a connection		

[1] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.
[2] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.
[3] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.
[4] 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.

depending 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.[5]		
(ix) That heat pumps result in far less greenhouse gas emissions than gas furnaces.[6]		

Interrogatory # 2.0-ED-4

Reference: Exhibit D

Question(s):

(a) Please provide a table showing individually for each component of the project: (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 EPCOR were to use the next smallest sized pipe, and (iv) the cost savings from using the next smallest size pipe.
(b) Individually for each component of the project, please indicate whether EPCOR 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-5

Reference: Exhibit B, Tab 1, Schedule 1, Attachment 1

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.

[5] EB-2022-0249, Exhibit I.ED.5.
[6] *Ibid*.

(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 EPCOR'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-6

Reference: Exhibit B, Tab 1, Schedule 1, Attachment 1

Questions:

(a) Please confirm when the Innovative Research survey was actually conducted in the community.
(b) Please justify EPCOR's decision to rely on a survey conducted over three years ago despite changes in the market since that time.
(c) Please complete the following table comparing certain market factors at the time the EPCOR survey was conducted versus now. If other market factors have changed, please add those at the end of the table.

Market Developments Since Customer Attachment Survey Was Conducted		
	When attachment survey was conducted	Current status
Gas commodity charges ($/m^3)		
Gas distribution charges (variable, $/m^3)		

Gas distribution charges (fixed charges, on an annual basis)		
Availability of a $5,000 rebate for customers to switch to high-efficiency electric heat pumps[7]		
Availability of 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.[8]		
Availability of 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. [9]		
EPCOR infill customer connection charges policy		
Annual costs to heat with gas (commodity and distribution)		
Annual costs to heat with an electric heat pump (energy and any incremental distribution)		
Annual costs to cool with traditional air conditioner		

[7] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.
[8] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.
[9] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.

Annual costs to cool with a cold-climate heat pump		

Interrogatory # 3.0-ED-7

Reference: Exhibit B, Tab 1, Schedule 1, Attachment 1

Questions:

(a) Please complete the following table to confirm which of the following facts EPCOR communicated to customers in its surveys (and for any that were communicated, please provide the communication including a pinpoint reference to where that fact is contained):

Information Communicated to Customers		
Information	**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.[10]		
(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.[11]		
(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.[12]		

[10] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.
[11] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.
[12] EB-2022-0249, Exhibit I.ED.20 & Exhibit I.ED.5.

(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 EPCOR's estimated savings are).[13]		
(v) That EPCOR may charge customers for a connection depending 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.[14]		
(ix) That heat pumps result in far less greenhouse gas emissions than gas furnaces.[15]		

Interrogatory # 3.0-ED-8

Reference: Exhibit B, Tab 1, Schedule 1, Attachment 1

Questions:

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

Cost of Converting to Methane Gas Space Heating

[13] 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.
[14] EB-2022-0249, Exhibit I.ED.5.
[15] *Ibid*.

Existing Equipment	EPCOR best estimate	Figure used in Innovative Research Group Survey
Electric baseboards (no ductwork)		
Electric forced-air furnace		
Electric heat pump		
Oil furnace		
Propane furnace		

Interrogatory # 3.0-ED-9

Reference: Exhibit B, Tab 1, Schedule 1, p. 3

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. EPCOR 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-10

Reference: Exhibit E

Questions:

(a) Please provide a copy of the most recent eight quarterly reports for schedule 2 community expansion projects that EPCOR 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 Brockton project and the information in this application, please detail those in a table with a reconciliation of the differences.

Interrogatory # 3.0-ED-11

Reference: Exhibit E, Tab 1, Schedule 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-12

Reference: Exhibit E, Tab 1, Schedule 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-13

Reference: Exhibit E, Tab 1, Schedule 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)	

(a) Please complete the following table:

NGEP Subsidy from Existing Customers	
Forecast gas customers (total)	
NGEP subsidy	
NGEP subsidy per customer	

Interrogatory # 3.0-ED-14

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) If there are significant revenue shortfalls or cost overruns in years 1 though 10 that, does EPCOR undertake not to seek to recoup the amounts from existing EPCOR customers at the first rebasing case after the end of the rate stability period? Please explain the answer.
(b) If EPCOR does not provide that undertaking, who will ultimately cover the cost of revenue shortfalls or capital cost overruns that accrue in years 1 through 10, EPCOR customers or EPCOR shareholders? Please explain the answer.
(c) If there are significant revenue shortfalls in years 11 though 40, does EPCOR undertake not to seek to recoup the amounts from existing EPCOR customers? Please explain the answer.
(d) If EPCOR does not provide that undertaking, who will ultimately cover the cost of revenue shortfalls that accrue in years 11 through 40, EPCOR customers or EPCOR shareholders? Please explain the answer.

Interrogatory # 3.0-ED-15

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) What is EPCOR's rate base for its Ontario gas business?
(b) What is EPCOR's revenue requirement for its Ontario gas business?
(c) When would the assets being built in the Brockton gas expansion project be fully depreciated according to EPCOR's existing depreciation policies?
(d) How much of the capital for this project would remain undepreciated by 2050?
(e) What is EPCOR's depreciation period for plastic mains and plastic services?

Interrogatory # 3.0-ED-16

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

Preamble:

Questions:

(a) Please reproduce the DCF table with an illustrative scenario where customer attachments each year are 50% of those forecast. EPCOR 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).
(c) If this scenario would occur and existing customers were to bear the cost of the shortfalls, how would that impact the rates of existing customers?

Interrogatory # 3.0-ED-17

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

Questions:

(a) Please complete the following table showing the outcomes in various scenarios in terms of the profitability index, NPV, and gross revenue deficiency. EPCOR 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-18

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

Questions:

(a) Please describe all studies and analysis that EPCOR has undertaken to determine the likelihood of residential customers switching from gas to electric heat pumps before the end of the 40-year revenue horizon (if any). Please file any studies or assessments that were undertaken.

(b) Please confirm that customers with propane furnaces that attach to EPCOR's system will be able to convert their existing furnaces to burn methane gas without replacing those furnaces?
(c) What is the estimate average age of propane furnaces for EPCOR customers in the expansion area? Please base the average on the best available information, including the Innovative Research Group survey results, and confirm whether the answer has added three years to the average life to reflect the passage of three years since the survey was conducted.
(d) If a customer with a propane furnace converts it to methane gas to connect to EPCOR's system, please confirm that they could subsequently switch away from EPCOR's system in favour of an electric heat pump when their furnace reaches the end of its life.

Interrogatory # 3.0-ED-19

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

Questions:

(a) Enbridge does not charge customers to close an account and stop receiving gas service. Does EPCOR have the same policy? If not, please describe EPCOR's charges for this and the basis on which EPCOR can charge its customers for closing an account, with specific reference to EPCOR's conditions of service.
(b) Enbridge is proposing not to charge customers for "cut off at main," wherein a customer not only closes their account but has their service line and meter removed by Enbridge. Does EPCOR have the same policy? If not, please describe EPCORs charge for removing its assets from a customer's property and the basis on which EPCOR can charge its customers for this, with specific reference to EPCOR's conditions of service.

Interrogatory # 3.0-ED-20

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

Questions:

(a) Please provide a table showing the forecast revenue from forecast rate 6 and rate 11 customers as a percent of the total forecast revenue.
(b) Please provide a table listing the type of business for each of the 17 rate 6 and rate 11 customers that are forecast to connect to the system, including an assessment of the likelihood that they will remain in business and on the gas system for 40 years.
(c) Please explain why *none* of the proposed rate 6 and rate 11 customers would be covered by the 20-year revenue horizon under EBO 188.
(d) Please provide a table showing, for each of the 17 rate 6 and rate 11 customers that are forecast to connect to the system, whether EPCOR has received a firm and binding commitment that they will connect. If a binding commitment has not be received, please describe exactly what assurances EPCOR has that the customers will connect.
(e) Please describe the criteria for rate classes 1, 6, and 11.

Interrogatory # 3.0-ED-21

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

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 (if any form part of the connection/revenue forecast);
    (iv) The full cost of mains that are required in new developments (if any 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 1

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 describe EPCOR's charges for connecting individual homes situated near mains (i.e. infills) to its network (i.e. the equivalent to Enbridge's Extra Length Charge). These charges would include the individual customer's service line, meter, and regulator.
(b) Please confirm that individual customer connection charges apply 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.

(c) Please provide a table showing, for all the buildings in the project area, the *approximate* length of service line that will be required. If EPCOR 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 EPCOR 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.]
(d) Please add to the table from (c): the approximate connection charge that would apply for that building (pre-tax) and the total including tax (if tax is applied).

Interrogatory # 3.0-ED-22

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

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.

(c) If EPCOR does not include normalized system reinforcement costs, please explain why.

Interrogatory # 3.0-ED-23

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

Questions:

(a) What is the average cost to connect a customer to EPCOR's network across the whole network?
(b) What is the average cost to connect a customer to EPCOR's network for homes that are 20 meters or more away from the pipe?
(c) What is the forecast average all-in cost to connect a new residential customer *in the project area*, 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 also include a breakdown between direct costs, incremental overheads, and normalized system reinforcement costs.
(d) Please confirm that individual customer connections are subject to EBO 188.
(e) Please confirm whether the charges for infill customers are sufficient to meet the 40-year revenue horizon maximum in EBO 188.
(f) How much connection capital can be supported with the revenue from one individual residential customer while maintaining a profitability index of 1? Please provide answers with and without including the system expansion surcharge (SES).
(g) 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.
(h) 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.
(i) What are the average incremental operational costs for EPCOR per average residential customer (e.g. billing, etc). Please provide a breakdown of these costs.
(j) Are the full costs in (i) included in the DCF table in the evidence?

Interrogatory # 3.0-ED-24

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

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 3, please explain and provide a reconciliation table.
(c) Does EPCOR 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 EPCOR 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-25

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

Questions:

(a) Please provide EPCOR'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.[16] 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;[17]
    (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.

[16] If EPCOR does not have its own tool, it can find one created for Enbridge here: EB-2022-0249, Exhibit I.ED.16, Attachment 7. However, that tool requires proper assumptions to be incorporated, including inclusion of the monthly service charges, etc.
[17] The specs for the Moovair central can be found here: https://moovair.ca/central-moov-2022/.

(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.[18] [To explain why we suggest using that model as a concrete example.]
(f) Do the average-use figures assumed in EPCOR'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-26

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

Preamble: These questions relate to the probability that some potential customers switch to cold climate heat pumps instead of gas, lowering the number of actual customer attachments. They also related to the probability that customers who do connect later exist the gas system in favour of installing a cold climate heat pump.

Questions:

(a) For each of the following statements, please confirm if EPCOR agrees with the conclusion. If EPCOR agrees with part but not all of the conclusion, please fully explain and describe with parts EPCOR agrees with. For any parts EPCOR disagrees with, please fully justify the response:
    (i) **Improved cold climate performance:** In the past, heat pumps were inappropriate for our cold winters. Some contractors are not aware that this has changed. Cold climate heat pumps have high performance down to low temperatures (many down to -30°C). Even today, a standard cold climate heat pump can provide 100%

[18] https://moovair.ca/why-moovair/

of the heat in a Toronto home throughout a typical winter without supplemental heat.[19] But centrally-ducted heat pump units sold today also include a simple and cheap electric coil that fits into the air handler (i.e., blower fan unit) in the basement for supplemental heat for extremely cold days just in case. The technology continues to improve, and the best units have high heating capacities and efficiency levels in the range of 200% even at -30°C.[20]

(ii) **Efficiency:** Heat pump efficiency has improved with advancements, such as variable speed compressors, which make them cheaper to operate both for heating and cooling.

(iii) **Rebates:** Customers can now receive significant rebates and interest-free loans to purchase a heat pump (see below for details), which were not previously available.

(iv) **Carbon price:** By 2030, the carbon price on gas will equal 32.40 cents/m^3.[21]

(b) Does EPCOR agree that Natural Resources Canada is a credible and reliable source of information on heat pumps, including heat pump efficiencies?

(c) Does EPCOR have any reason to disagree with the facts as outlined in "Heating and Cooling With a Heat Pump" by Natural Resources Canada?[22] Please file a copy of this document so it can be referred to on the record with an exhibit number.

(d) Does EPCOR agree that Abacus Data is a credible and reliable polling firm?

(e) Does EPCOR have any reason to disagree with the polling data regarding heat pump knowledge and interest in the Abacus Data polling that occurred earlier this year?[23] Please file a copy of this document so it can be referred to on the record with an exhibit number.

(f) Does EPCOR agree that knowledge of heat pumps is low now and is steadily increasing?

Interrogatory # 3.0-ED-27

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

Questions:

(a) 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*.[24] Please convert the costs to Canadian dollars.

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[19] Guidehouse Heat Pump Study for Enbridge Gas, p. 10 (link, Ex. K2.2, PDF p. 285); This recent study prepared by Guidehouse for Enbridge shows that a cold climate heat pump can provide 100% of the heating for a Toronto home with a heating load of 2.5 tons. For Toronto homes that are larger or more leaky, supplementary electric resistance heating is forecast to only be required for 1 hour each year. The analysis is based on a standard cold climate heat pump as opposed to a top-of-the-line unit.

[20] EB-2022-0200, Exhibit J18.7 (link).

[21] Enbridge, *Federal Carbon Charge* (link).

[22] https://natural-resources.canada.ca/energy-efficiency/energy-star-canada/about/energy-star-announcements/publications/heating-and-cooling-heat-pump/6817.

[23] https://environmentaldefence.ca/wp-content/uploads/2023/07/Environmental-Defence-Ontario-Prespectives-Clean-Energy-July-2023.pdf

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

(b) 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.
(c) Please provide a copy of and comment on the most up-to-date analysis by the Canadian Climate Institute on the cost-effectiveness of heat pumps.
(d) Please file a copy of and 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-28

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 EPCOR 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.
(c) Please provide any studies or analysis that EPCOR 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-29

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). [25] 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*.[26] If not, please explain.
(c) Please confirm that Canada has committed to net-zero emissions from electricity generation by 2035. If not, please explain.

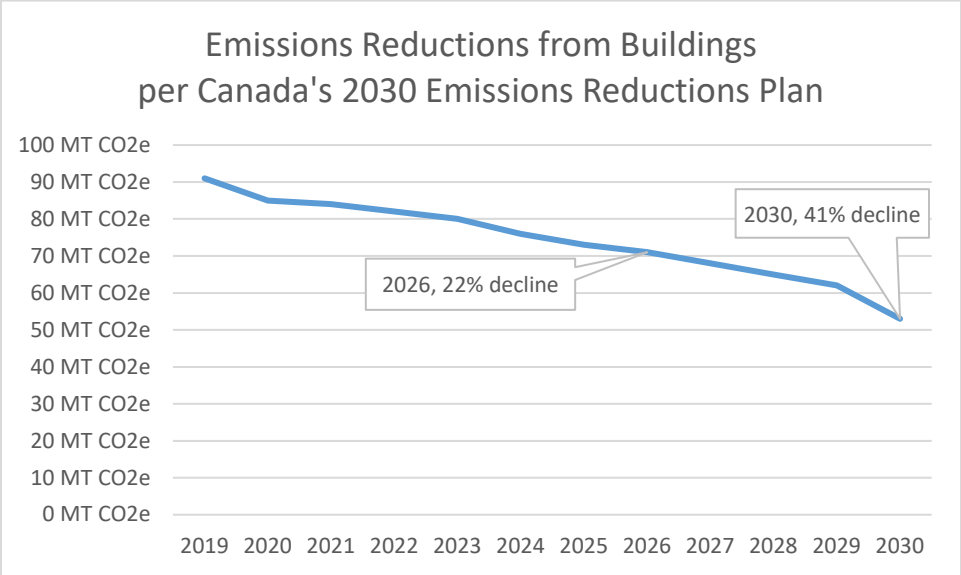
Interrogatory # 3.0-ED-30

Reference: Exhibit E, Tab 1, Schedule 1

[25] 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
[26] *Canadian Net-Zero Emissions Accountability Act*, s. 9.

Questions:

(a) Please confirm that the following chart accurately depicts a projection of emissions reductions from buildings per Canada's 2030 Emissions Reduction Plan.[27] If not, please prepare a chart that EPCOR believes is accurate:



(b) Does EPCOR 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-31

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;[28]

[27] For the underlying numbers, see here: *2030 Emissions Reduction Plan – Canada's Next Steps for Clean Air and a Strong Economy* (link).
[28] https://natural-resources.canada.ca/energy-efficiency/homes/canada-greener-homes-initiative/canada-greener-homes-grant/canada-greener-homes-grant/23441

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;[29] 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.[30]

(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-32

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-33

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) Does EPCOR 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?

[29] https://natural-resources.canada.ca/energy-efficiency/homes/canada-greener-homes-initiative/oil-heat-pump-affordability-program-part-the-canada-greener-homes-initiative/24775.
[30] https://natural-resources.canada.ca/energy-efficiency/homes/canada-greener-homes-initiative/canada-greener-homes-loan/24286

(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) 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)?[31]
(e) What is EPCOR's best estimate of the emissions (gCO2e/MJ & tCO2e/m3) arising from unburned methane emissions from customer equipment?
(f) Please confirm that the methane emissions cited in the following reference are only the methane emissions from *combustion*, not from leaks, and if EPCOR 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-34

Reference: Exhibit E, Tab 1, Schedule 1

Questions:

(a) With respect to the revenue generated in the first 10 years, does EPCOR 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 EPCOR 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-35

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:

[31] 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).

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 # 3.0-ED-36

Reference: Exhibit J

Questions:

(a) Please confirm that Enbridge's average use variance accounts do not protect Enbridge from average use variances in gas expansion areas over the first 10 years of a project due to the OEB-mandated rate stability period. Please explain the answer.
(b) Please confirm that EPCOR would not seek disposition of the Customer Volume Variance Account until the first rebasing application following the end of the rate stability period. If that is not confirmed, please explain how that would be consistent with the rate stability period.
(c) If average customer use is lower than forecast, who does EPCOR propose should bear the cost of the revenue shortfall – the existing customer base or EPCOR shareholders? If EPCOR proposes that the existing customer base bear these costs, when would they be included in the revenue requirement? If EPCOR proposes to do that prior to the end of the rate stability period, please explain how that would be allowed.

Interrogatory # 3.0-ED-37

Reference: Exhibit K, Tab 1, Schedule 1, p. 2-3

Preamble:

EPCOR states:

> 9. EPCOR is forecasting that during the system expansion construction phase of the Project, it will incur additional charges of approximately $500,000 in order to manage excess soil in compliance with the Regulation and related requirements.
> …
> 12. Without approval of this variance account, the PI for the project is forecast to be 0.90.

Questions:

(a) Please reproduce and file the DCF tables including the expected increase in soil handling costs.
(b) If the OEB were to rule that the soil handling costs are a normal project cost that must be included in the budget, how would EPCOR proceed? For instance, would it attempt to re-design the project or cancel it entirely?
(c) Please develop a detailed option for the OEB to consider wherein the soil handling costs are treated as a normal project cost that must be included in the budget. This option would explain how EPCOR could amend its project to bring it back to a profitability index of 1 (if at all)? For instance, how could EPCOR shrink the project further so as to improve the profitability index, similar to the project changes that occurred earlier this year.

Interrogatory # 5.0-ED-38

Reference: Exhibit I, Tab 1, Schedule 1

Questions:

(d) Please provide a route map indicating which portions of the pipeline would be on private or public land.
(e) Please provide a map showing the trees that will need to be removed for the pipeline construction.
(f) 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-39

Reference: Exhibit I, Tab 1, Schedule 1

Questions:

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

"If the Applicant is providing the public or potential customers with a comparison of annual energy costs with different fuels it shall include an estimate of the average annual energy costs for heating with a cold climate heat pump."

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

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

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