

March 20, 2023

BY EMAIL AND FILED VIA RESS

Nancy Marconi
Registrar
Ontario Energy Board
2300 Yonge Street
Suite 2700
Toronto, ON M4P 1E4

Dear Ms. Marconi:

**Re: Enbridge Gas Inc. (“Enbridge Gas”)
EB-2022-0200 – 2024 Rates Application
Submissions on Procedural Order No. 3 and Treatment of Guidehouse’s Low-
Carbon Pathways (LCP) model and data**

We act as counsel to Enbridge Gas in this matter.

In Procedural Order No.3, released late in the day on Friday March 17th, the OEB directed Enbridge Gas to immediately provide the LCP model and model output dataset that underpin the Guidehouse pathways report filed by Enbridge Gas. This direction was made in response to a letter from Environmental Defence filed late in the day on Tuesday March 14th.

At the outset, Enbridge Gas wishes to emphasize that the model and data requested by Environmental Defence belong to Guidehouse and are not items in the possession or control of Enbridge Gas. As soon as Environmental Defence’s letter was received, Enbridge Gas sent it to Guidehouse and began to work with Guidehouse to determine what is available to be produced, and what concerns exist. This process was ongoing when Procedural Order No. 3 was received. While both Enbridge Gas and Guidehouse intended to respond to the Environmental Defence letter, we were still in the process of gathering information at the end of the week.

Given the timing of Procedural Order No. 3, Guidehouse has not had time to retain local counsel to represent its interests in this proceeding. Instead, Guidehouse’s own lawyers have prepared a response and have asked Enbridge Gas to submit the response to the OEB on Guidehouse’s behalf. Guidehouse’s letter dated March 19, 2023 is attached to this letter.

As can be seen, Guidehouse is respectfully requesting that the OEB reconsider its direction to require Enbridge Gas to produce the LCP model. The reasons for Guidehouse’s position go well beyond an assertion that the LCP model is proprietary. As explained by Guidehouse (and detailed in part in the response to SEC Interrogatory #48), the LCP model is very complex (requiring special training to operate) and is not something that can be used without accompanying software that Guidehouse is not authorized to share. Guidehouse further explains that sharing underlying code associated with the LCP model is unlikely to assist any parties, and could cause extensive harm to Guidehouse if released (posted publicly) or misused (even inadvertently) by any party given confidential access under the OEB’s rules.

In its letter, Guidehouse includes two proposals that are aimed at providing parties with the information that they request.

First, in relation to the LCP model, Guidehouse offers to meet offline with interested parties to explain and answer questions about how the model works and is used. That seems to be a more useful way to address Environmental Defence's request to understand and test Guidehouse's work than would be the case if Guidehouse were to simply provide code or programming or other information that cannot be used or applied. It also seems more efficient than using large amounts of technical conference time.

Second, Guidehouse has confirmed that it will provide the data requested by Environmental Defence. As this data has to be created, it will take some time. However, Guidehouse has confirmed that all such data will be provided in the same timeframe as the technical conference (by March 31st).

We have shared Guidehouse's letter and the proposals described above with counsel for Environmental Defence and School Energy Coalition (the two parties who had requested that the LCP model be filed).

In response (without prejudice to other positions they may take), counsel for these intervenors has requested that Guidehouse provide copies of internal explanatory documentation, manuals, guides, and training materials that it has for the LCP model. Guidehouse advises us that its internal documents are highly sensitive and could allow its models to be recreated, at least in part, by others. They do propose that they can put together a detailed overview of how the model works and share that on a confidential basis. In addition, there is an "workbook" of inputs used specific to Enbridge Gas that will be provided. We understand that Guidehouse is currently working to collect those materials.

There is also a plan (pending confirmation of schedules) for Guidehouse to meet with these intervenor representatives late tomorrow (March 21st) to answer questions about the LCP model and the materials provided.

On the basis of Guidehouse's letter (and the explanation set out above), we respectfully ask that the OEB reconsider its direction to require Enbridge Gas to produce the LCP model immediately to parties who have signed the OEB's Declaration and Undertaking.

In the event that the OEB maintains its direction to have Enbridge Gas file the LCP model, we will obtain confirmation from Guidehouse about what they will provide to Enbridge Gas for filing. As stated, the LCP model is not something that Enbridge Gas has in its possession or control (note the Guidehouse letter where they indicate that "there is no dashboard for parties to access the model from outside Guidehouse's system, nor has Guidehouse ever provided a client with access to the tool".)

In Procedural Order No. 3, the OEB directed Enbridge Gas to file a submission if continued confidential treatment for the Guidehouse model and data is requested.

Enbridge Gas and Guidehouse do not seek confidential treatment for data that will be provided in response to the Environmental Defence letter. That data is described in Guidehouse's letter under the heading "Model output dataset".

As described in Guidehouse's letter, any code or programming associated with the Guidehouse LCP model is commercially sensitive, and its disclosure could cause economic damage to Guidehouse. Therefore, we expect that Guidehouse and Enbridge Gas would request continuing confidential treatment for any disclosure of "the model" or components thereof.

We note that Appendix B to the OEB's [Practice Direction on Confidential Filings](#) indicates that the "[u]nderlying dataset and/or model of a consultant retained by a party" will "presumptively be considered confidential, subject to any objections from parties as to why confidential treatment should not be accorded to such information in a particular proceeding".

We note also that Appendix A to the OEB's [Practice Direction on Confidential Filings](#) indicates that one of the factors that the OEB may consider in addressing confidentiality of filings is "whether the type of information in question was previously held confidential by the OEB".

Enbridge Gas submits that there is ample precedent for the OEB determining that experts' models should be afforded confidential treatment under the OEB's rules.

However, before providing examples of such cases, Enbridge Gas notes that there is also precedent for the OEB declining to require production of an expert's model even on a confidential basis. In the LDC Co. (Alectra) MAADs proceeding, there was a request for production of a "Business Case Model" from Deloitte. The applicants stated that the model is a proprietary and confidential Deloitte Work Product and that disclosure would be injurious to the financial interest of Deloitte. The OEB determined that "the applicants are not required to file the business case model in excel format as the model is proprietary" (a non-excel version was filed confidentially).¹ Enbridge Gas submits that this rationale applies equally in the current circumstances, particularly given the explanation provided by Guidehouse in its letter.

In any event, the OEB has consistently afforded confidential treatment to expert models and datasets where requested. Examples can be seen in cases involving Toronto Hydro², Hydro One Sault Ste. Marie³, Hydro One Transmission⁴ and Hydro Ottawa⁵. As stated in the Toronto Hydro decision:

¹ EB-2016-0025, Decision on Confidentiality Requests, September 2, 2016, at page 4 – found at <https://www.rds.oeb.ca/CMWebDrawer/Record/541357/File/document>.

² EB-2018-0165.

³ EB-2018-0218, Decision on Confidentiality and Procedural Order No. 2, November 6, 2018, at page 3 - "the OEB finds that the technical material and the aggregated form of data contained in the Working Papers such as models, calculations, and source codes, represent significant intellectual property. The public disclosure of this information could reasonably be expected to cause potential commercial and financial harm to PSE and SNL." – found at <https://www.rds.oeb.ca/CMWebDrawer/Record/625451/File/document>

⁴ EB-2019-0082, Decision on Confidentiality, September 11, 2019, at pages 6-7 and Decision on Issues List and Confidentiality, September 23, 2019, at pages 5-6.

⁵ EB-2019-0261, Decision on Confidentiality and Procedural Order No, 4, July 7, 2020, at pages 1-2, found at <https://www.rds.oeb.ca/CMWebDrawer/Record/681250/File/document>.

The OEB will treat the datasets and models supporting PSE's Econometric Benchmarking Report as confidential on the basis that the datasets and models contain proprietary technical information. This is consistent with how the OEB has treated this type of material in previous proceedings. The public disclosure of this information could reasonably be expected to cause potential commercial and financial harm to PSE.⁶

Enbridge Gas submits therefore that the OEB has already determined that expert models that include proprietary methods and data may not be disclosable at all, and if disclosed should be kept confidential because of the potential harm that could result to the expert from disclosure.

While there might be other avenues available to an expert whose model is published to address misuse or appropriation of proprietary information (such as the copyright principles noted in the Procedural Order), there are no assurances of success/recovery and there are substantial costs and time associated with pursuing recovery. This can be generally avoided through confidential treatment which limits disclosure to only a few people and includes the assurances afforded through the Declaration and Undertaking.

As a final comment, Enbridge Gas notes that the OEB's Declaration and Undertaking is directed to the OEB and not to the expert, so there is no independent right of enforcement or damages for the expert in the event that the Declaration and Undertaking is not honoured. This is a reason to question the requirement for disclosure (even on a confidential basis) of information that could be harmful to the expert if released or misused but would only be of marginal benefit (if at all) to the receiving parties.

In summary, Enbridge Gas asks the OEB to consider Guidehouse's proposal to address the items addressed in Environmental Defence's letter and reconsider the direction to require Enbridge Gas to produce the LCP model.

Enbridge Gas is prepared to provide updates as appropriate about the meetings and correspondence with interested parties on this topic.

Enbridge Gas and Guidehouse (as noted in its letter) are available to answer any questions about this letter.

Yours truly,

AIRD & BERLIS LLP



David Stevens
DS/

⁶ EB-2018-0165, Decision on Confidentiality and Procedural Order No. 2, November 21, 2018, at page 4 – found at <https://www.rds.oeb.ca/CMWebDrawer/Record/626831/File/document>.

c: All parties registered in EB-2022-0200
Guidehouse, attn. Max Brady, Associate General Counsel

Attachment, March 19, 2023 Letter from Guidehouse.

47705292.1



March 19, 2023

Via Email: dstevens@airdberlis.com

David Stevens
Aird & Berlis LLP
Brookfield Place,
181 Bay Street, Suite 1800,
Toronto, Ontario M5J 2T9

Re: Enbridge Gas Inc. 2024 to 2028 Rates Application EB-2022-0200

Dear Mr. Stevens:

Guidehouse Inc. (“Guidehouse”) was in the process of responding to the Environmental Defence letter received by your office on March 14, 2023 (the “Letter”), and forwarded that same day to Guidehouse, when we received a copy of Procedural Order No. 3 (the “Order”) from you on March 17, 2023. Both the Letter and Order are associated with the Enbridge Gas Inc. (“Enbridge Gas”) proceeding relating to Enbridge Gas’s application to change its natural gas rates and other charges beginning January 1, 2024, EB-2022-0200 (the “Application”) before the Ontario Energy Board (“OEB”).

The Order relates to “the model and model output dataset that underpin the Guidehouse pathways report that forms part of Enbridge Gas’s evidence” in the Application and requires that the model and model output dataset be turned over to the OEB to be shared with intervenors on a confidential basis.¹ However, this Order was issued solely on the basis of whether the information requested is confidential and without input from Guidehouse as to the relevance of such information to the intervenors or the availability of such information.

With the release of the Order late on Friday, Guidehouse has not had time to retain local counsel to represent it in this matter. Instead, we ask that you submit this letter to the OEB, on our behalf, respectfully requesting that the OEB reconsider the direction set forth in its Order requiring that the Guidehouse model be provided to intervenors.

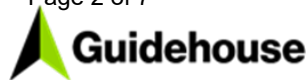
1. The model

Disclosure of the model would not provide any helpful information to an intervenor or otherwise advance an intervenor’s ability to review and assess the pathways report. The model is complex, lacks a standalone application in which to run, needs an additional third party software license to use and is not in a format amenable to filing. Moreover, disclosure of the model could result in significant competitive damage to Guidehouse.

Guidehouse’s model is a prohibitively complex resource internal to Guidehouse that requires training in both its use and interpretation of outputs.² The model is based on proprietary Guidehouse source code that is not understandable to lay persons, nor does the model provide usable information in a readily available output. Basic use of the model alone requires at least 20 hours of training for use by a Guidehouse consultant while further training is necessary to interpret the model outputs. For a Guidehouse consultant trained in interpreting the model outputs, it takes dozens of hours to review the source code and associated outputs.

¹ See OEB, *Practice Direction on Confidential Filings*, December 17, 2021, Appendix B (categories of information that are presumptively confidential include the “underlying dataset and/or model of a consultant retained by a party”).

² Guidehouse previously provided a three page summary of the operation and complexity of the model in its response to SEC IR 48, which is attached hereto as Appendix A.



A third party reviewing the model's programming would be unable to understand the code without running the model. The model consists of thousands of lines of code developed over approximately 5,000 hours in the last three years. Running the model would require a comprehensive understanding of internal Guidehouse software development procedures and context along with in depth knowledge and experience with constraint matrices for linear optimization. Moreover, the model is not a standalone executable application and requires a substantial investment in the installation of paid third-party software and associated computation costs. For example, Guidehouse pays for a license with a third party for the software underlying the model and Guidehouse is not permitted to provide access to that software to any external party. Therefore, any such third party would be required to purchase a separate license in order to run the model.

As shown above, there may be some misunderstanding about how the model works or can be accessed: There is no dashboard for parties to access the model from outside Guidehouse's systems. Guidehouse has never provided a client with access to the tool, nor has Guidehouse ever provided its model in a regulatory or court proceeding. Even within Guidehouse access to the model is restricted to internal development and trained project modelling team members.

In addition to failing to provide an intervenor with any helpful information for purposes of the proceeding, release of the model could result in significant competitive damage to Guidehouse if the source code were improperly used or disclosed. Guidehouse has invested significant time and resources in developing its model and use of the model is limited solely to Guidehouse's own internal use in the performance of services for its clients. If the source code were to be used or disclosed in violation of a Declaration and Undertaking, Guidehouse would suffer significant damage that could result in the loss of millions of dollars of revenue.³ The risk of potential damage to Guidehouse resulting from the improper use or disclosure of the model significantly outweighs any possible usefulness of the model to intervenors.

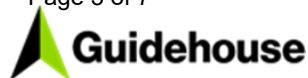
Guidehouse is willing to meet offline with interested parties to explain and answer questions about how the model works and is used. Such a meeting (in conjunction with the additional model output datasets offered below) would be more beneficial to an intervenor as opposed to providing a model that can be neither used nor applied by such party.

2. Model output dataset

The model output datasets that underpin the Guidehouse Pathways report that the OEB has ordered to be produced, however, may be helpful to intervenors. Guidehouse has already provided a number of the model output datasets the Elson Advocacy letter dated March 14, 2023, alleges Guidehouse declined to provide. Contrary to Elson Advocacy's assertions in the Letter at page 2, Guidehouse has provided the following items:

1. RNG consumption by scenario and by decade in Exhibit I.1.10-ED-32, in units of billion cubic meters (bcm) and petajoules;
2. RNG supply by scenario and by decade in Figure 17 of the Pathways report, in units of petajoules;
3. RNG demand by scenario in years 2030 and 2038 in Table A-8 of the Pathways report;
4. RNG total cost of production by scenario and by decade in Exhibit I.1.10-GEC-20;
5. Hydrogen total volumes of consumption by scenario and by decade in Exhibit I.1.10-ED-42;
6. Blue hydrogen total cost of production in Exhibit I.1.10-GEC-20;
7. Number of residential households assumed to install heat pumps, by scenario and by decade, in Exhibit I.1.10-SEC-52 Attachment 1; and
8. Buildings sector portion of electric peak demand in Exhibit I.1.10-GEC-15.

³ Moreover, the OEB's Declaration and Undertaking is directed to the OEB and not to Guidehouse. As such, Guidehouse has no independent right of enforcement or damages to protect itself in the event that the Declaration and Undertaking is not honored.



In addition, Guidehouse is willing to provide the additional model output datasets identified below, however, these additional model output datasets were not part of the original report requested by Enbridge and therefore do not yet exist. Calculation of these additional model output datasets will require time and substantial resources that prohibit Guidehouse from providing them ahead of the technical conference. Guidehouse is willing to dedicate staff time to provide such calculations as soon as they can be available. Below is a schedule of when Guidehouse can release the additional requested model output datasets, although Guidehouse will provide the requested data earlier if possible. Moreover, Guidehouse witnesses will be appearing at the Technical Conference and will be available to answer follow-up questions concerning the information set forth in this letter, as well as on the Pathways report and interrogatory responses.

Requested model output dataset	Date of submission to Enbridge
Cost of RNG (\$/m3)	March 24 st end of day
Total cost of green hydrogen production	March 24 st end of day
Cost of H2 (\$/PJ and \$/m3)	March 24 st end of day
Cost of electric resources (\$/kWh, \$/kW, and LUEC)	March 24 st end of day
Contribution of heat pumps to peak electricity demand (kW per average home & efficiency)	March 31 st end of day
Total # of residential homes assumed to electrify space heating with heat pumps in each scenario	March 31 st end of day
Peak electricity demand projections separated by the residential and commercial sectors	March 31 st end of day

3. Conclusion

For the foregoing reasons, providing the Guidehouse model would not be helpful to an intervenor or otherwise advance the intervenor’s ability to review and assess the Pathways report and intervenors would be better served by reviewing the additional model output datasets as they become available.

While we remain confident that issues related to disclosure of the model can be resolved amicably between interested parties, Guidehouse will continue to work on identifying local counsel that can be retained to represent Guidehouse before the OEB if a hearing on disclosure of the model is necessary.

Very truly yours,

Guidehouse Inc.

By: Max J. Brady, Associate General Counsel

Date: March 19, 2023

Enclosure

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.21

Question(s):

Please provide a copy of the Low Carbon Pathways model and all explanatory guides or materials related to its use.

Response:

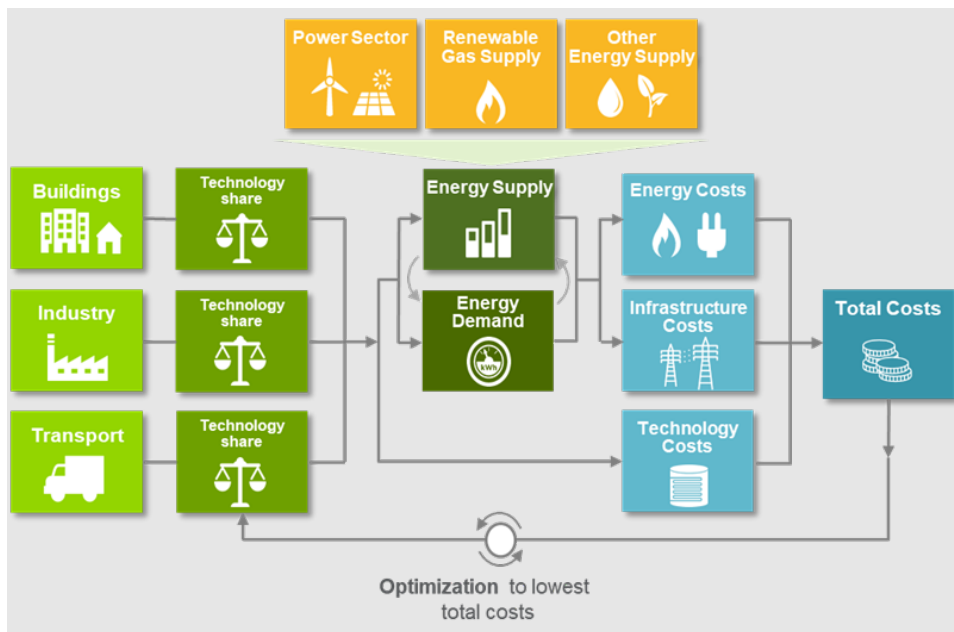
The following response was provided by Guidehouse Canada Ltd.:

The Low Carbon Pathways (LCP) model used in the *Pathways to Net Zero Emissions for Ontario* Study is a proprietary model developed by Guidehouse and is not available for commercial use. Therefore, Guidehouse declines to provide the model for review. The following information provides details on the structure and function of the LCP model.

Guidehouse's proprietary Low Carbon Pathways (LCP) model is an integrated capacity expansion and dispatch optimization model that allows users to identify the lowest cost, energy system pathway to a decarbonized future under different scenarios. The cost-optimization engine of the LCP model minimizes the net present value of the total system costs over the analyzed study time frame while considering various constraints at the energy system level (e.g., the buildout and availability of supply, the development of interconnections, etc.) as well operational constraints at the individual technology level (e.g., the operation of power generation plants, etc.)

The LCP model uses optimization techniques to identify the technological and infrastructure changes needed to achieve carbon emissions reduction targets while balancing the entire energy system on an hourly basis across multiple geographies and energy carriers. LCP does this by making hundreds of thousands of decisions about how energy should be produced, transported, and stored while minimizing the total system cost. Figure 1 provides a schematic overview of the LCP model.

Figure 1 - Low Carbon Pathways Model Schematic



LCP stands out from similar models available in the energy industry due to several key features. First, LCP is able to choose both how much of a technology to deploy in a given year and how to dispatch that technology on an hourly basis within the same optimization. Second, LCP captures interactions between the energy sub-systems, such as interactions between the natural gas, electricity, and hydrogen systems. Third, LCP can be configured to make supply- and demand-side decisions in an integrated fashion within the same optimization. Figure 2 describes the objective function, decision variables, and constraints used in the model.

Figure 2 - LCP Model Objective Function, Decision Variables, and Constraints

OBJECTIVE FUNCTION	The model's primary objective function is to minimize energy system costs over the analysis horizon (e.g., 2020-2050) – including supply, infrastructure, and demand costs.		
	Supply Costs	Infrastructure Costs	Demand Costs
	<ul style="list-style-type: none"> • Cost of new entry (CONE) • Fixed O&M (FOM) • Variable O&M (VOM) • Fuel cost • Emissions cost 	<ul style="list-style-type: none"> • CONE, FOM, VOM by energy carrier (electricity, CH4, H2, heat) • Both inter- and intraconnections are considered 	<ul style="list-style-type: none"> • Demand technology costs • Others as needed
DECISION VARIABLES	The model determines the optimal capacity and dispatch for supply and infrastructure, as well as the optimal mix of demand-side technologies.		
	Supply Tech Capacity & Dispatch	Infrastructure Capacity & Dispatch	Demand Technology Mix
	<ul style="list-style-type: none"> • Installed cap. by supply tech, year, region • Fossil gen, renewables, crossloads, short- and long-term storage • <i>Energy dispatched by supply tech, year, season, hour, region</i> 	<ul style="list-style-type: none"> • Installed capacity by energy carrier, region, year • <i>Energy transferred by energy carrier, region, season, timestep, year</i> 	<ul style="list-style-type: none"> • Gas boilers/furnaces • Electric heating and end uses • District heating • Other demand technologies
CONSTRAINTS	The model is constrained by existing and planned supply and infrastructure capacity, interim & final emissions reduction targets, and balancing energy supply and demand.		
	Emissions	Supply & Infrastructure Capacity	Energy Balance
	<ul style="list-style-type: none"> • Total emissions are <= the target • Targets can be set by year 	<ul style="list-style-type: none"> • Maximum Supply Capacity: by supply tech, region, and year • Sufficient Infrastructure Capacity: by energy carrier, region, and year 	<ul style="list-style-type: none"> • Demand = Supply <ul style="list-style-type: none"> • <i>Electricity, CH4, H2, Heat</i> • Energy is balanced by energy carrier, year, season, hour, and region

Low Carbon Pathways Modeling Detail for the Pathways Study

In this *Pathways to Net Zero Emissions for Ontario* study, Guidehouse applied the LCP model to optimize the supply of electricity, hydrogen, and methane to meet demand in two net-zero 2050 scenarios. The following describe some of the major features of the LCP model as applied in this study:

- Capacity expansion and dispatch optimization: Optimization of generation, storage, and interconnections assets across the electricity and gas (methane and hydrogen) networks.
- Lowest-cost net zero pathway: Optimized pathways to achieve compliance with net-zero emissions targets.
- Intra-annual temporal resolution: Uses representative and peak days to reflect the seasonal variability of electricity and gas demand loads and supply resources.
- Geographical resolution: Simulates the Ontario energy system on a provincial scale and models energy import and export to neighbouring regions.

As an integrated energy system model, the cross-sector interactions between electricity, hydrogen, and methane are an integral part of the analysis (e.g., electrolyzers increase

demand for electricity, hydrogen gas turbine usage increases hydrogen demand). The analysis also models the use of transmission interties between Ontario and neighbour regions (e.g., power lines and pipelines) and storage assets (e.g., gas and electricity storage) to balance supply and demand. The modeling methodology is based on a “copper plate” for the province, meaning the focus of the analysis is primarily on inter-connections (between the province and its neighbours) rather than intra-connections (i.e., network capacity within the province; although nominally allowed for in the energy system costs, it is not the focus of the modeling).

The LCP model uses a nodal network to model an interconnected energy system; each node has a unique energy supply and demand varying over time. All existing electricity and gas interties between regions are simulated in the model. The model allows for existing interties to be expanded or for new ones, where applicable, to be constructed and for the option to repurpose methane interties for hydrogen.

A description of the main configuration parameters of the LCP model and several other modeling considerations is presented in Figure C-1 of the *Pathways to Net Zero Emissions for Ontario* Report.