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May 3, 2023

B.C. Sustainable Energy Association
c/o William J. Andrews, Barrister & Solicitor
70 Talbot Street
Guelph, ON
N1G 2E9

Attention: William J. Andrews

Dear William J. Andrews:

Re: FortisBC Energy Inc. (FEI)

2022 Long Term Gas Resource Plan (LTGRP) – Project No. 1599324

Response to the B.C. Sustainable Energy Association (BCSEA) Information Request (IR) No. 2

On May 9, 2022, FEI filed the LTGRP referenced above. In accordance with the amended regulatory timetable established in British Columbia Utilities Commission Order G-99-23 for the review of the LTGRP, FEI respectfully submits the attached response to BCSEA IR No. 2.

In its responses, FEI has identified responses which were provided by, contributed to, or developed with its consultants, the Posterity Group and Guidehouse.

For convenience and efficiency, if FEI has provided an internet address for referenced reports instead of attaching the documents to its IR responses, FEI intends for the referenced documents to form part of its IR responses and the evidentiary record in this proceeding.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Sarah Walsh

Attachments

cc (email only): Commission Secretary
Registered Parties

44.0 Topic: System extensions & GHG Reduction Standard

Reference: Exhibit B-1, p. ES-16, pdf p. 37

The *CleanBC Roadmap to 2030* states that the GHG Reduction Standard emissions cap on gas utilities will be approximately 6 MT CO2e in 2030, of which FEI estimates approximately 5.7 Mt CO2e would apply to FEI in 2030. [Exhibit B-1, p.ES-16, pdf p. 37]

44.1 Does FEI agree that a hard cap on GHG emissions means that increasing the number of customers through system extensions will increase the per-customer decarbonization requirement?

Response:

FEI cannot accurately address this question without the details of the GHG emissions cap for natural gas utilities, including the overall cap level, eligible compliance pathways, and other specifications of the policy, which have not yet been determined by the Province.

44.2 How, conceptually, does a hard cap on GHG emissions, as distinct from a GHG emissions intensity standard, affect FEI's long-term planning? How does a hard cap on GHG emissions affect FEI's planning for system extensions?

Response:

Both a hard cap on GHG emissions, which would set a limit on the total amount of emissions allowed by FEI's customer base, or a GHG emissions intensity standard, which would set a per unit emissions target, could be designed to meeting BC's provincial emissions reductions targets.

Important design details of either a hard cap or an intensity standard would need to be known before assessing the relative impacts of either approach on long-term planning or system extensions. Until the full design of the policy is outlined by the Province, it is not possible to assess the relative stringency on the obligated parties and the impacts to FEI's business and long-term planning.

For example, a hard cap could still allow compliance measures that would allow the cap to be exceeded if certain conditions were met or would allow lower cost compliance measures such as GHG offsets. This is a common feature of many GHG cap systems that either place a price ceiling on emissions credits or allow a form of compliance fund that allows obligated parties to exceed their GHG limits provided they pay into a fund. Conversely, an intensity-based system like the BC Low Carbon Fuel Standard (LCFS) could be designed to have fewer allowances and/or only recognize more costly compliance measures.

45.0 Topic: Hybrid Heating Systems

Reference: Exhibit B-6, FEI Response to BCUC IR1 9.3

Regarding hybrid heating systems (understood by BCSEA to refer to electric heat pumps with natural gas peaking), FEI states in part:

> "FEI considers, however, this opportunity is more appropriately examined for its potential to benefit the electric system. Some customers choosing to electrify their space heating equipment, and retaining their existing gas system to deliver energy during peak periods, can help to defer investment in electric generation, transmission and distribution resources, potentially benefitting the customer through lower bills, as well as indirectly benefitting all other electric customers."

45.1 If not addressed in the response to BCUC IR2 82, please discuss whether hybrid heating systems have the potential to alter the results of the Main Extension Test by reducing the anticipated incremental delivery margin without reducing the capital costs. If so, does FEI expect this will limit the implementation of hybrid heating systems? If not, please explain why not.

Response:

FEI does not expect the current main extension (MX) test would limit the implementation of hybrid heating systems. Hybrid heating systems have the potential to reduce natural gas load of new customers connecting to the gas system, relative to that of customers who use gas-only appliances for heating. Each MX test is unique and assesses the relationship between costs and revenues to attach a customer on a case-by-case basis. Hybrid heating systems work by using gas during higher heating (peak times) while using other energy during the shoulder months (lower heating times). A hybrid heating system would be one appliance whose gas load and associated revenue is assessed when performing an MX test. As such, it is but one appliance that contributes to the revenue which is compared to the capital costs of attaching the customers.

The capital costs to connect a customer with a hybrid heating system are no different than connecting other customers with similar load. FEI does not have specific load information to add hybrid systems as an appliance into the MX test data at this time; however, it expects that there may be a slight reduction in overall gas load with a hybrid system. As such, the reduced gas load from a new connection to a hybrid heating system (all else equal) could result in a reduction in the expected revenue contemplated by the MX test. However, this can be offset by the addition of additional gas appliances or lower capital costs, thus resulting in a positive MX test result. Further, even if expected revenues were insufficient to cover the costs to connect, FEI could still connect the customers with customer contributions. All things equal, it may be that where hybrid systems are installed as opposed to gas-only systems, customer contributions would become more common for a main extension and new connection to proceed. That said, as hybrid systems can reduce the peak on the electric system, these offset costs to the electric system may need to be considered within the MX test parameters.

45.2 Please discuss whether the advent of hybrid heating systems may cause FEI to consider measures such as demand charges.

Response:

Implementing measures such as demand charges may be a consideration in future rate design proceedings. However, there would likely be various factors informing whether such measures are appropriate in the circumstances, such as whether the use of demand charges would impact the average load factor for the residential customer group in circumstances where the gas system primarily serves peak heating load due to the adoption of hybrid heating systems. Additionally, FEI would need to consider the impact of hybrid systems on the otherwise reduced peak of required electrical infrastructure and if this cost impact should have any consideration in the MX test.

46.0 Topic: GHG Reduction Standard

Reference: Application, Exhibit B-1, page 2-9, pdf p.75; Exhibit B-10, FEI Response to BCSEA IR1 1.1, 1.2

FEI states that it is "unable to provide an estimate of the timing [of the GHG Reduction Standard] as the Province has not announced a timeline for implementing the GHGRS." FEI also stated that "The Province has not announced options for compliance pathways for FEI to achieve the GHGRS cap.

46.1 What is FEI's understanding of the current status of the BC Government's implementation of the GHG Reduction Standard and identification of eligible pathways for compliance?

Response:

FEI's understanding is that the BC Government is still considering the eligible pathways for GHGRS compliance and the timing for implementation is unknown.

47.0 Topic: Pillar Four

Reference: Exhibit B-10, FEI Response to BCSEA IR1 8.2, pdf 15; Exhibit B-1, Figure 9-3, pages 9-6

BCSEA IR1 8.2 asks "To what extent does FEI's Pillar Four result in GHG emissions reductions accounted for in BC, as compared to GHG emissions reductions not accounted for in BC?"

In its response, FEI cites Figure 9-3: BC and Global Emission Reductions (Life Cycle) in the Diversified Energy (Planning) Scenario from Serving the Transportation and Global LNG Markets.

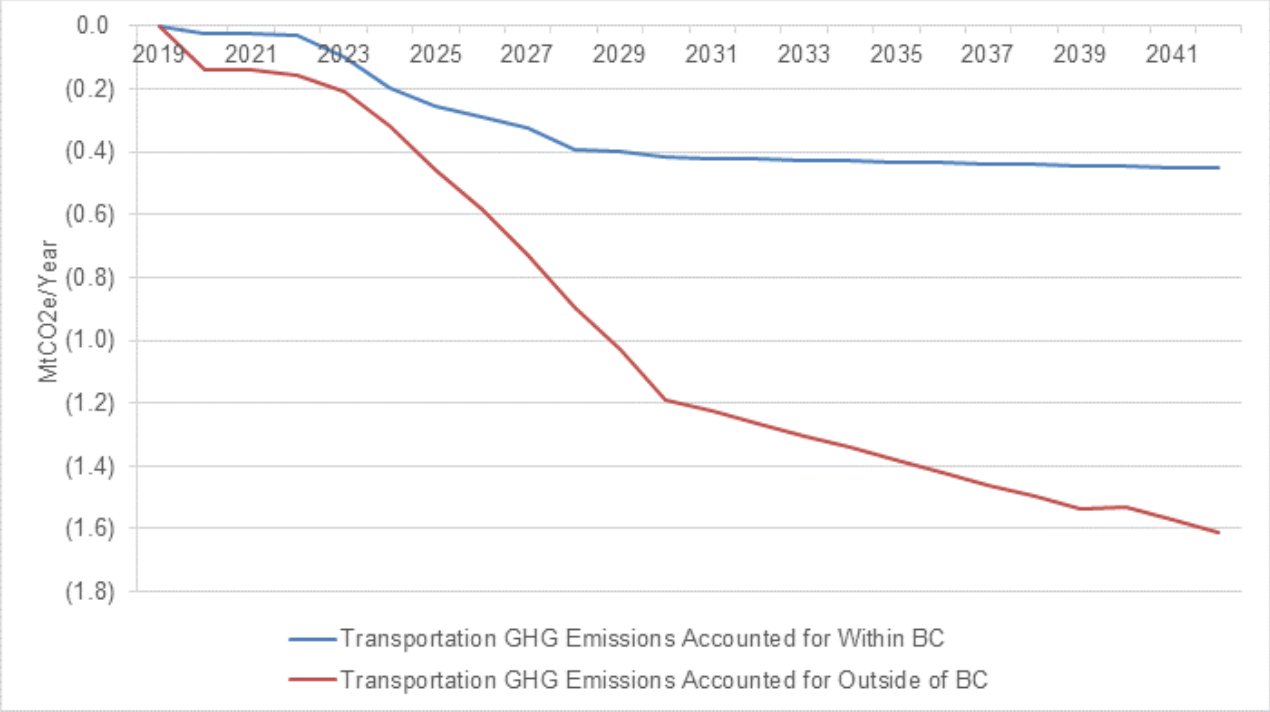
47.1 Please provide the assumptions and calculations used to derive the GHG emissions curves, or point out where they are in the Application materials.

Response:

FEI and Posterity Group have collaborated on the following response.

The following discussion explains the steps FEI took to prepare Figure 9-3 in the Application, reproduced here as Figure 1, to assist with the discussion. In so doing, FEI intends to explain the assumptions and calculations used to determine the relevant GHG emission reduction estimates.

Figure 1: BC and Global Emission Reductions (Life Cycle) in the DEP from Serving the Transportation and Global LNG Markets



FEI took the following steps to produce the figure illustrating the two datasets resulting from BC emission reductions through FEI's LCT customers and global emission reductions through FEI's distribution of global LNG exports:

1. Determine the annual demand for CNG and LNG that is forecast for the LCT and LNG Export customer sectors by 2042 in the DEP Scenario;
2. Determine the annual demand for the higher carbon fuels that would be displaced by 2042 according to the DEP Scenario model (diesel, bunker oil and coal);
3. Multiply the demand by the appropriate emission factors summarized in the following table (in tons CO_2e per GJ) for the LNG components and the higher carbon fuels:

Emission Factors	
Fuel	**Life Cycle**
NG	0.0598
RNG	0.0100
Hydrogen	0.0200
Syngas/Lignin	0.0100
CCUS	0.0148
CNG	0.0636
LNG	0.0635
Global LNG	0.0700
Diesel	0.0758
Bunker Oil	0.0766
Coal	0.1146

4. Calculate the emissions based on the demand of the higher carbon fuels that were displaced;
5. Further calculate these emission reductions relative to the 2019 base year to arrive at emission reductions below the starting point of 2019;
6. In order to calculate what the total emissions would have been if the fuel switching had not taken place, FEI developed a conversion factor based on the 2019 demand if the original high carbon fuel sources had stayed in place over the long-term; and
7. FEI assigned the emission reductions to within BC or outside of BC depending on whether, in its estimate, these emissions would apply to BC's emissions inventory or not, as requested by stakeholders during the RPAG engagement sessions in preparing the 2022 LTGRP.

48.0 Topic: Woodfibre LNG Project

Reference: Exhibit B-1, Figure ES-4: Total Forecast Annual Demand – All Demand Categories, All Scenarios, pdf p. 28

48.1 Please provide an update on the status of the Woodfibre LNG Project and its expected impact on FEI's demand forecast.

Response:

At the present time, the Woodfibre LNG (WLNG) project is in the early stages of site work at the Woodfibre site in preparation for major construction to proceed later this year. FEI is in the process of removing the conditions precedent in its agreement with WLNG prior to starting construction of the pipeline and facilities upgrades required to supply gas to WLNG. On March 15, 2023, the Lieutenant Governor in Council issued Order in Council (OIC) No. 177 which amended Direction No. 5 to the BCUC, the effect of which is that the BCUC is directed to approve a new version of FEI's Rate Schedule 50 – Large Volume Industrial Transportation (RS 50) and two Transportation Agreements under RS 50 between FEI and, jointly, Pacific Energy Corp. and WLNG.

FEI's current milestone for feed gas delivery to the WLNG site is the second half of 2026. The gas volumes delivered by FEI will depend on the facility ramp-up and subsequent production rates. FEI will include these transportation volumes in its future load forecasts as required. As WLNG is a transportation customer, these gas volumes will not be included in FEI's gas supply portfolio. Rather, WLNG is responsible for procuring the gas used by its facility, while FEI is responsible for transporting the gas from the Huntingdon point of delivery to the WLNG site through FEI's pipelines.

The impact of WLNG on FEI's demand forecast is shown in Figures 4-18 and 4-19 of the Application. The impact of WLNG on regional gas transportation and storage constraints is discussed in Section 6.2.4.2 of the Application.

49.0 Topic: Scenario Outcomes

Reference: Exhibit B-10, FEI response to BCSEA IR1 11.1, 11.2, 11.3, pdf pp. 23-24; Exhibit B-6, FEI response to BCUC IR 25.3, pdf 135

BCSEA IR1 11.1 asks "In what ways is the Diversified Energy (Planning) scenario optimized?" In its response, FEI provides a qualitative discussion of ways in which "the DEP scenario optimizes the use of BC's gas and electric delivery systems to achieve BC's GHG emissions reduction targets."

FEI's response to BCSEA IR 11.1 also states:

> "The DEP Scenario would also optimize electrification by streaming this solution to the optimal sectors and applications such as transportations sector's extensive use of electrification of light duty vehicles."

BCSEA IR1 11.3 asks "Did FEI model different amounts of electrification of existing gas loads or reduction of future gas loads due to electrification for its Diversified Energy (Planning) scenario in order to find an optimum split between electricity and gas?" In its response, FEI states:

> "… modeled alternative future scenarios with different levels of electrification and determined that the DEP Scenario was optimal. …"

49.1 Did FEI's optimization of BC's gas and electric delivery systems include a quantitative analysis? If so, please describe it.

Response:

Please refer to the response to BCSEA IR1 11.3 which confirms that FEI used quantitative analysis in evaluating the optimization of the DEP Scenario versus the Deep Electrification Scenario. As explained in the response to CEC IR1 7.2 (Exhibit B-12), the DEP Scenario would allow British Columbians to benefit from an overall reduced level of costs by maintaining both BC's gas and electric infrastructure while sharing the costs of ongoing innovation and acceleration of decarbonization to both systems. As discussed in the response to BCSEA IR1 11.3, for the purposes of quantification, a scenario model was used rather than an optimization model to understand the trade-offs and synergies between different pathways, as an optimization model is not well suited to this task.

BCSEA IR1 11.2 asks "What amounts of electrification of existing gas loads or reduction of future gas loads due to electrification are assumed for the residential, commercial and industrial sectors in the Diversified Energy (Planning) scenario?"

In its response, FEI refers to the table in Exhibit B-6 BCUC IR1 25.2, which "provides the 2042 average gas fuel share reduction targets for existing dwellings (i.e., not new construction) by sector for each setting in the 2022 LTGRP." FEI states that the "moderate electrification" row in the table is aligned with the DEP Scenario.

49.2 Please provide a version of the table in Exhibit B-6 BCUC IR1 25.2 showing the percentage gas fuel share for 2042, as distinct from the percentage reductions in fuel share.

Response:

The following response is provided by Posterity Group.

The following table provides weighted average gas fuel shares for each of the end uses for the moderate, accelerated, and extensive electrification settings. The application of the settings can produce slightly varying results in different scenarios, because of interaction with the other scenario settings. The fuel shares shown are the sum of the fuel shares for natural gas plus any low-carbon gaseous fuels included in the scenario and sector.

	Residential				Commercial				Industrial	
Region:	All regions except CoV		CoV only		All regions except CoV		CoV only		All regions except CoV	CoV only
End Use:	Space Heating	DHW	Space Heating	DHW	Space Heating	Water Heating	Space Heating	Water Heating	Direct-fired heating, heat treating, kilns*, ovens, product drying, space heating, water heating	
"Moderate Electrification"	69%	64%	72%	71%	50%	47%	45%	56%	74% **	69% **
"Accelerated Electrification"	25%	23%	25%	24%	15%	14%	13%	18%	84%	79%
"Extensive Electrification"	11%	10%	11%	11%	7%	6%	7%	9%	48%	45%

Notes to Table:

* Kilns in the Pulp & Paper – Kraft segment

** Posterity Group modelled both price-driven and policy-driven fuel switching. The Moderate Electrification setting was used in the DEP Scenario, but in the industrial sector the change induced by this policy setting is superseded by the much larger price-induced change. This is the reason that industrial natural gas fuel shares are higher in the "Accelerated Electrification" setting than in the "Moderate Electrification" setting. We do not have output for a scenario with only the policy-driven setting and no price signal. To obtain fuel shares that would result from only the policy-driven fuel switching would require a new run of a customized industrial scenario.

49.3 Do the fuel shares (requested in the previous IR) represent optimized allocations between gas and electricity for their respective scenarios?

Response:

The following response is provided by Posterity Group.

No, the fuel shares in the different scenarios are not optimized allocations. The scenarios are each developed based on a narrative intended to explore a combination of potential future policy and/or economic conditions. The settings for electrification were chosen to explore the bounds of possible future policy and economic environments.

50.0 Topic: Forecast Renewable and Low-Carbon Gas Supply

Reference: Exhibit B-10, FEI Response to BCSEA IR1 16.3

In its response to BCSEA IR1 16.3, FEI states:

> "…FEI will acquire renewable and low-carbon gas supplies as prescribed undertakings under the GGRR until FEI has reached the maximum allowed, which is approximately 30 PJ. After the GGRR maximum has been reached, and if FEI determines that it needs greater supply, then FEI anticipates it would file for acceptance/approval of supply with the BCUC pursuant to a suitable section of the UCA." [underline added]

In its response to BCSEA IR1 16.5, FEI states:

> "For fuel types not prescribed under the GGRR, and assuming the current regulatory framework is in place at the time that FEI applies to acquire the fuel, FEI would likely apply to the BCUC pursuant to section 44.2(1)(c) of the UCA for approval of a schedule of its anticipated expenditures.
>
> …
>
> FEI anticipates that it would set out in its application the need for the expenditure and a mechanism for cost recovery." [underline added]

50.1 Would section 44.2(1)(c) of the UCA (expenditure schedule) likely be the route FEI would take in filing for acceptance/approval of renewable and low-carbon gas supplies above the quantitative maximum in the GGRR? Alternatively, please describe the options.

Response:

For the purpose of an "energy supply contract" under section 71 of the UCA, section 68 of the UCA defines "energy" as electricity or natural gas. Section 71 of the UCA would therefore apply to RNG (which is chemically identical to conventional natural gas), but not to other renewable and low carbon gas supplies such as hydrogen.

As such, for quantities of RNG above the GGRR maximum, FEI would apply to the BCUC pursuant to section 71 of the UCA.

For other low carbon supplies such as hydrogen, FEI would apply to the BCUC pursuant to section 44.2(1)(c) of the UCA, assuming the current regulatory framework is in place and that the UCA has not been amended to account for other low carbon energies.

51.0 Topic: System Resource Alternatives

Reference: Exhibit B-10, FEI Response to BCSEA IR1 19.2

In response to BCSEA IR1 19.2, FEI provided an update on its understanding of the status of Enbridge's plans to expand the capacity of the T-South system.

51.1 Did FEI make a firm commitment for access on Enbridge's proposed expansion of T-South? If so, on what terms? If not, why not? It is recognized that confidentiality may apply to the response.

Response:

FEI did not make a firm commitment to Enbridge's proposed T-South expansion for the reasons set out in the response to BCSEA IR1 19.3. Specifically, the expansion will be a significant cost increase to FEI's customers (as the largest shipper on T-South), and it comes with little, if any, benefits for FEI and its customers in terms of access to diverse supply, supply cost, resiliency, or progress towards a renewable and low-carbon energy future.

52.0 Topic: System Resource Alternatives

Reference: Exhibit B-10, FEI Response to BCSEA IR1 20.2

BCSEA IR1 20.2 and FEI's response are as follows:

> "20.2 Does FEI ever consider avoiding a system expansion by coordinating with an electric utility to use electricity to meet the thermal energy needs of new customers that would otherwise be new gas customers?
>
> Response:
>
> FEI has not coordinated with local electrical utilities to avoid system expansion. FEI allows customers to make their own choice regarding their energy needs, and has an obligation to provide service to customers that request it. The natural gas system currently supplies a much greater portion of British Columbia's energy needs in peak winter conditions than the electrical system. A shift in peak demand from the gas to the electrical system over time will create some very significant generation, transmission and distribution expansion requirements to the electrical system, as discussed in the response to BCUC IR1 30.3."

52.1 In light of the energy transition and the anticipated GHG Reduction Standard, will FEI in the future consider coordinating with local electrical utilities to avoid gas system expansion?

Response:

FortisBC considers that there are benefits to better integration and coordination between gas and electric utilities in the Province, although not necessarily solely for the purpose of avoiding gas system expansion. FortisBC observes these benefits within the FEI/FBC shared services territory and is continuing to advance its understanding of these benefits through investigations like the Kelowna Electrification Case Study. FEI considers that it could potentially be the case that gas system expansions associated with the deployment of RNG and/or hydrogen to avoid electric system expansions could be a lower cost pathway to decarbonize. Given that the energy transition has the potential to increase the size of the electric system by two to three times, it is important to consider what benefits there are to avoiding system expansion of both systems, when possible, while continuing to use both existing energy systems to deliver the most cost-effective, reliable, and affordable solution to customers in the Province. Please also refer to the response to BCUC IR1 9.3.1.

53.0 Topic: Okanagan Capacity Upgrade Project

Reference: Exhibit B-10, FEI Response to BCSEA IR1 21

Submissions from FEI on next steps in the proceeding regarding FEI's application for a CPCN for the Okanagan Capacity Upgrade Project are expected by March 31, 2023 in that proceeding.

53.1 Please provide a brief summary of FEI's position on next steps the OCUP proceeding.

Response:

On March 31, 2023, FEI provided an update and submissions to the BCUC on the proposed next steps for the OCU Project proceeding, including:[1]

> "Following the adjournment of the regulatory process on February 23, 2022, the Penticton Indian Band (PIB) and FEI have continued discussions regarding the OCU Project and appreciate the time provided by the BCUC to focus on these discussions. We are pleased to update the BCUC that these discussions are progressing well and we anticipate advising the BCUC whether FEI and the PIB can reach an agreement with respect to the OCU Project by the end of April 2023. FEI is seeking PIB's consent for the OCU Project in that agreement."

On May 2, 2023, FEI provided its reply submission[2] on the proposed next steps for the OCU Project proceeding, which included the filing of supplementary information (Supplementary Filing), one round of IRs on FEI's Supplementary Filing, followed by written arguments. As stated in FEI's submission to the BCUC on March 31, 2023 and further clarified in the May 2, 2023 submission, the Supplementary Filing will include updates to FEI's demand forecast for the region, the Project's cost estimate, rate impact and schedule, consultation and engagement activities, and recent developments in the regulatory and policy environment.

53.2 Please provide an update on the status of the OCUP proposal in relation to the 2022 LTGRP.

Response:

Please refer to the response to BCSEA IR2 53.1.

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[1] Exhibit B-33, Application for Approval of a Certificate of Public Convenience and Necessity for the Okanagan Capacity Upgrade Project (March 31, 2023) online at: https://docs.bcuc.com/Documents/Proceedings/2023/DOC_70795_B-33-FEI-Submission-NextSteps.pdf.

[2] Exhibit B-34, Application for Approval of a Certificate of Public Convenience and Necessity for the Okanagan Capacity Upgrade Project (May 2, 2023) online at: https://docs.bcuc.com/Documents/Proceedings/2023/DOC_71257_B-34-FEI-ReplySubmission-NextSteps.pdf.

54.0 Topic: Next LTGRP

Reference: Exhibit B-10, FEI Response to BCSEA IR1 43.1, 43.2

54.1 Given that FEI's development of its next LTGRP will coincide with BC Hydro's development of its next Integrated Resource Plan, does FEI intend to exchange information and coordinate with BC Hydro in the development of these long-term resource plans? If so, please briefly describe the intended steps. If not, please explain why not.

Response:

Please refer to the response to BCUC IR2 121.4.

54.2 Has FEI considered coordinating with BC Hydro to file the next LTGRP and IRP with the BCUC at the same time, to facilitate development, comparison and regulatory review of the two long-term resource plans? If so, what is the status of this approach? If not, why not?

Response:

Please refer to the response to BCUC IR2 121.4.

55.0 Topic: Kelowna Study

Reference: Exhibit B-20, Kelowna Electrification Case Study – Electrification and the Impacts of Cold Temperature on Peak Demand and System Upgrade Costs

55.1 Please clarify whether the Study examines "electrification of gas demand" scenarios for residential gas customers, for residential and commercial gas customers, or for residential, commercial and industrial gas customers.

Response:

The Study examines electrification of gas demand scenarios for all customers – residential, commercial, and industrial gas customers. Please also refer to the response to BCUC IR2 119.1.1.

55.2 For residential gas customers, electrification is examined in terms of customers switching to electric heat pumps. If the Study also examines commercial and industrial gas customers, what electric technologies were assumed?

Response:

For commercial customers, the Study assumes that the following technologies are adopted:

- Electrification of space heating is achieved by replacing gas furnaces, boilers, and roof top units with electric heat pumps.
- Electrification of domestic hot water heaters is achieved by replacing commercial gas water heaters with commercial heat pump water heaters.
- Electrification of cooking is achieved by replacing commercial gas kitchen appliances with commercial induction appliances.

Industrial gas demand only comprised 2 percent of the total gas load analyzed in the Study; therefore, no assumption was made to equivalent electric technologies beyond being accounted for in the broad 30 percent efficiency gain conversion. Please refer to the response to BCUC IR2 119.1.1 for more context as to what is included within the scope of the Study.

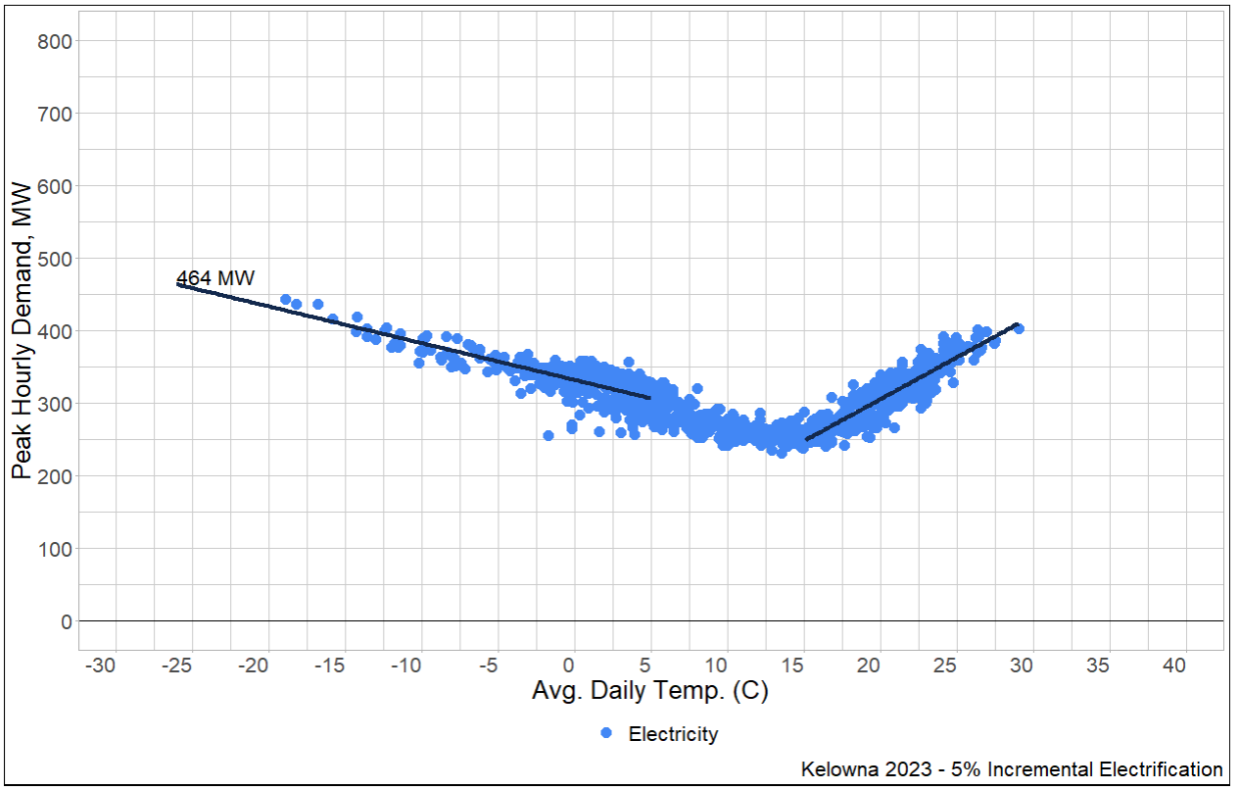
55.3 Please explain how the Study deals with space cooling. Is it assumed that space cooling is exclusively electric? Is it assumed that gas customers who use gas for

heating use electricity for cooling? Does the Study account for the ability of electric heat pumps to provide heating in the winter and cooling in the summer?

Response:

The Study does not account for or analyze space cooling, as the focus of the Kelowna Electrification Case Study is on capacity constraints which will occur at cold temperatures.

As the following figure shows, if the Kelowna region experiences as little as five percent incremental electrification of gas demand, then the annual peak will occur in the winter (i.e., the winter peak on the left side of the trend line is higher than the summer peak on the right side). As incremental electrification increases beyond five percent, the gap between the winter peak and the summer peak increases and the capacity needs in the Kelowna region will continue to occur in the winter. As a result, all capacity analysis under the electrification scenarios to determine the peak load in the Study under electrification of gas demand can be focused on winter loads, with the understanding that summer loads will always be lower.



The key outcome of the study was to determine the demand impacts of electrification of space heating in winter. Further studies and analyses would be required to analyze the energy and demand impacts from cooling in the summer.

The Study states on page 4:

> "… the average daily temperature for Kelowna during the winter can be -26 C or lower (with nighttime temperatures well below -30 C)." [p.4]

55.4 Please define "average daily temperature during the winter." Is it an average of daily high temperatures? An average of daily low temperatures? An average of 24-hour average temperatures? How does "nighttime temperatures" fit in?

Response:

The average (mean) daily temperature (for winter or any other season) is calculated as the average of the maximum and minimum temperature at a location recorded each 24-hour day.

On page 5, the Study states, "Table 3-2 below illustrates the hourly peak electricity demand in varying cold temperatures and at increasing proportions of incremental electrification of gas demand." Table 3-2 is titled "City of Kelowna - Electricity Peak Winter Load in 2040 at Cold Temperatures Based on 25 Percent Increments of Electrification."

55.5 How do the Mean Daily Temperatures in Table 3-2 (for Kelowna in 2040) compare with the temperature assumptions (for Kelowna if possible) used for the 2021 LTERP 2040 peak load?

Response:

The LTERP peak load forecast method does not include calculations based on temperature. Please refer to the response to BCSEA IR2 55.6.

55.6 For reference, how do the Table 3-2 figures for Kelowna Peak Winter Load (MW) for 0% Electrification compare with the figures (for Kelowna if possible) in the 2021 LTERP 2040 peak load?

Response:

Table 3-2 of the Study illustrates that under the 0 percent electrification case, the peak load for the City of Kelowna in 2040 is 472 MW. This value is approximately 10 percent higher than the 2040 business as usual (BAU) peak demand (1 in 20 peak demand) forecast provided in Table 6-4 of the 2021 LTERP of 428 MW. The difference is attributable to the different methods used to produce the two forecasts, as well as any difference in assumptions as were listed in Section 3.1

of the Study. In order for the electric model results to be compatible with the gas model results for the purposes of the Study, the electric peak load had to be modelled using similar methods.

55.7 Do the Study's 0%, 25%, 50%, 75% and 100% Electrification Cases correspond with any of the Load Scenarios in the 2021 LTGRP?

55.7.1 Which of the Study's 0%, 25%, 50%, 75% and 100% Electrification Cases best corresponds with the Diversified Energy (Planning) Scenario?

Response:

The Study's electrification cases are not intended to, nor do they directly correspond with, any of the load scenarios in the 2022 LTGRP, as the timelines in the Study are more aggressive than what was contemplated in the 2022 LTGRP, as well as due to differences in the treatments of customer load classes.

For example, in the 25 percent electrification case in the Study, 25 percent of residential, commercial, and industrial gas demand is converted to electricity by 2040, whereas in the 2022 LTGRP DEP Scenario, 25 percent of residential and commercial demand and 10 percent of industrial demand is converted by 2050.[3] As such, gas demand reduction resulting from electrification by 2040 in the LTGRP DEP Scenario is less than the 25 percent modeled in the Study.

Similarly, in the 100 percent electrification case in the Study, all residential, commercial, and industrial gas demand is converted to electricity by 2040 whereas, in the 2022 LTGRP Deep Electrification Scenario, 100 percent of residential and commercial demand and only 20 percent of industrial demand is converted by 2050.[4]

[3] Footnote 149 of the Application.
[4] Section 4.6.1.1 of the Application.

56.0 Topic: BC Government Announcements

Reference: BC Hydro 2021 IRP Proceeding, Exhibit B-30

In early March 2023, the Government of B.C. announced the issuance of an Environmental Assessment Certificate for Cedar LNG and the establishment of a new energy action framework. BC Hydro brought these developments to the attention of the BCUC in the BCUC's proceeding regarding BC Hydro's 2021 Integrated Resource Plan.

56.1 Please discuss the impact, if any, of these developments on FEI's 2022 LTGRP.

Response:

The issuance of an Environmental Assessment Certificate for Cedar LNG does not directly impact FEI's 2022 LTGRP, as the project would not be located on FEI's delivery system if it proceeds. However, the newly announced Energy Action Framework, which was announced in conjunction with the approval of Cedar LNG,[5] is likely to have an impact on resource planning in the Province in the future. Currently, details surrounding the Energy Action Framework are still unknown by the public, including FEI.

The oil and gas GHG emissions cap announced as part of the Energy Action Framework is an example of a policy that could, if implemented, have an important impact on upstream gas extraction in the Province which would impact downstream gas prices, the carbon intensity of BC natural gas, alternate resources needed to comply with the cap and other potentially important factors that could impact BC's energy system and FEI's overall planning environment. However, in the absence of detail from the Province, it is premature to make any specific conclusions on the impact of the cap or any other elements of the Energy Action Framework.

Nonetheless, the 2022 LTGRP did model multiple futures where significant consideration was given to critical uncertainties, such as non-price driven fuel switching, which could have outsized impacts on demand. This allowed for a wide range of potential impacts, including impacts such as those that may arise from policy developments like the Energy Action Framework, to be captured by the scenarios to provide insight into the potential future demand from a broader range of conditions than has been examined in past resource plans.

[5] Province of British Columbia, News Release: "New energy action framework to cap emissions, electrify the clean economy" (March 14, 2023) online at: https://news.gov.bc.ca/28376.

57.0 Topic: Latter Half of Planning Period

Reference: Application, Exhibit B-1, Chapter 10, Action Plan, p.10-1

The Action Plan "describes the activities that FEI intends to pursue over the next four years based on the information and recommendations provided in this 2022 LTGRP." Further, much of the analysis in the LTGRP focuses (understandably) on the first half of the 20-year test period.

57.1 What are the key elements of the 2022 LTGRP regarding the second half of the 20-year test period?

Response:

FEI's Action Plan set out in Section 10 is a four-year action plan and, therefore, does not set out in detail the steps it will take during the latter half of the planning period. Such activities will be outlined in future LTGRPs in accordance with the BCUC's Resource Planning Guidelines.

Some of the key elements of the DEP Scenario in the second half of the 20-year planning period are discussed in Table 9-1 of the Application, which provides an overview of decarbonization initiatives that support market transformation to 2042. The following discussion highlights key elements from 2030 to 2042 as follows:

- Customer counts continue to grow as demand for decarbonized renewable and low-carbon products and services compensate for demand reduction through electrification and natural efficiencies. Customer demand in the residential, commercial, and industrial customer types remains relatively steady at about 200 PJ.
- Decarbonizing the gas supply will be a major focus over the next 20 years. By 2030 and beyond, FEI's supply will be increasingly supplied by BC-based production of hydrogen, RNG, syngas and lignin projects, which will make up an increasingly large portion of the supply portfolio. Industrial decarbonization will provide significant emission reduction opportunities.
- DSM overall expenditures may decline based on the current model; however, FEI will be exploring all opportunities to promote Advanced DSM measures and participate in the accelerated building retrofit programs being promoted by local governments as low-carbon fuels become more available. Conservation messaging will continue to be prominent in the market.
- LCT and global LNG export demand is expected to level out by 2030 as the marine bunkering industry is developed and stabilizes. New large industrial demand, other than the projects coming onboard prior to 2030 such as the Woodfibre LNG project, is anticipated at this time.
- FEI is cognizant of the rate impacts modelled in the DEP Scenario and will be working with government and other stakeholders to find ways to mitigate these rates for the benefit of FEI's customers and the BC economy.

- FEI will be collaborating with electric utilities and all levels of government in building a diversified energy future that provides reliable, resilient and affordable energy for British Columbia.