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May 3, 2023

British Columbia Public Interest Advocacy Centre
Suite 803 470 Granville Street
Vancouver, B.C.
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Attention: Leigha Worth, Executive Director

Dear Leigha Worth:

Re: FortisBC Energy Inc. (FEI)

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

Response to the British Columbia Public Interest Advocacy Centre representing the British Columbia Old Age Pensioners' Organization, Active Support Against Poverty, Council of Senior Citizens' Organizations of BC, Tenant Resource and Advisory Centre, and Together Against Poverty Society et al. (BCOAPO) 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 BCOAPO 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

A. PLANNING ENVIRONMENT

11.0 Reference: PLANNING ENVIRONMENT

Exhibit B-9, BCOAPO IR 1.1

Topic: SWOT Analysis

Preamble:

FEI identified Internal Weaknesses related to its Clean Growth Pathway as (1) Complexities of the Energy System and (2) Reliance on Emerging Technologies and Threats as (1) Increasing Business Risks (2) Technology Risks and (3) Changing Market Dynamics. **(BCOAPO IR 1.1)**

11.1 Please elaborate on those aspects of the complexities of the energy transition that FEI would assess as internal weaknesses and/or explain how these complexities constitute an internal FEI weakness.

Response:

FEI identified its internal weaknesses related to its Clean Growth Pathway as complexities of the energy system and reliance on emerging technologies. FEI elaborates on each of these below.

Navigating the energy transition is a challenge that requires FEI to consider issues such as the impacts of decarbonization activities on customer costs, strategies to procure increasing levels of low-carbon energy supply, and implementing low-carbon energy technologies, all while continuing to meet annual and peak demand requirements and ensuring the reliability and resiliency of the gas system. The decisions being made on the long-term decarbonization of energy systems in BC are complex in nature and require considerable analysis, reflection, stakeholder engagement and discussion.

The reliance on emerging technologies is also complex. Emerging technologies are often in the early stages of development and their full potential and limitations may not be fully understood. This creates uncertainty and challenges for planning for the future as their use and effectiveness can be difficult to manage.

A key uncertainty is policy and its important role in defining actions and pathways forward for the utility. This uncertainty can manifest internal challenges with respect to resourcing (e.g., human capital), analysis, strategy and decision-making required to navigate the energy transition. FEI continues to provide information and analysis and engage its customers and other stakeholders in dialogue about the energy transition and is continually updating its understanding and approach through the flexible Clean Growth Pathway framework.

11.2 Please elaborate on how reliance on emerging technologies is an internal weakness to FEI, as opposed to an external threat that is part of the energy transition.

Response:

FEI characterized its reliance on emerging technologies as an "internal weakness" as opposed to an "external threat" because it considers an external threat to be a situation that is largely out of its control. This is in contrast to an internal weakness in which FEI considers that, with the appropriate investments in time, capital and resources, the weakness can be overcome. As emerging technologies develop, FEI will continue to monitor, pilot and adopt innovative technologies that support the continued delivery of safe, reliable and affordable energy to its customers while meeting legislated GHG emission reductions.

FEI acknowledges, however, that the pace of technology development is a key uncertainty and could be characterized as an external threat.

11.3 Please provide FEI's views as to which of the identified threats to the Clean Growth Pathway (increasing business risks, technology risks and changing market dynamics) it would assess as being high risk.

Response:

All of the threats identified for the deployment of FEI's Clean Growth Pathway (increasing business risks, technology risks and changing market dynamics) can be characterized as "high risk". Each of these risks will need to be addressed and overcome in order to execute the Clean Growth Pathway. However, FEI considers that these risks are not materially different or more severe than the risks of the scale required for any pathway aligned with the energy transition. There are multi-valent and fundamental risks associated with decarbonizing BC's energy system no matter which approach is taken. The risks may shift to other organizations or to other technology realms, but the magnitude of risks will remain similar in size and scope, although decarbonizing the gas supply, which maintains the use of FEI's gas infrastructure, provides much greater certainty of reliable energy at a lower cost.

B. CLEAN GROWTH PATHWAY

12.0 Reference: CLEAN GROWTH PATHWAY

Exhibit B-9, BCOAPO IR 2.1

Topic: GHG Emissions Initiatives by Sector

Preamble:

FEI indicates that it has not yet advanced programs for negative emissions technologies like nature-based carbon sequestration and carbon capture and storage – as more policy direction on the role of these technologies and strategies is needed from the Province on whether they will comply with the GHGRS. **(BCOAPO IR 2.1)**

12.1 Please explain the policy direction that FEI has received with respect to negative emission technologies.

Response:

FEI has not yet received specific policy direction from the BC Government with respect to the role that negative emission technologies and solutions could play as alternative pathways for FEI to meet the proposed GHGRS emission cap. However, the CleanBC Roadmap[1] signals the Province's intention to develop a comprehensive Provincial approach to the deployment of Carbon Capture Utilization and Storage (CCUS), and the recently-announced move to an output-based pricing system in BC along with a federal CCUS tax credit suggests that there is commitment among the federal and provincial governments to realize the abatement potential of CCUS technology.

12.2 Please elaborate on the activities that FEI is undertaking with respect to negative emissions technologies in the interim, while it is waiting for more policy direction from the Province.

Response:

Please refer to the response to the BCUC IR1 64 series that provides a comprehensive overview of FEI's perspective on the potential for different CCUS technologies and applications to contribute to on-system low-carbon gas supply by 2030 and beyond. In addition, the responses to the BCUC IR1 9 series discuss small-scale residential and commercial carbon capture projects through FEI's Clean Growth Innovation Fund (CGIF) and support for small-scale units

[1] Exhibit B-1, Application, Appendix A-5.

manufactured by CleanO2. FEI is investigating projects that involve carbon capture and will be funding pilot projects that have the potential of storing significant amounts of CO_2 in BC through the CGIF. Additionally, FEI supports BC Indigenous-led nature-based solutions through the First Nations Climate Initiative (FNCI).

FEI is also tracking market developments and monitoring proposed low-carbon hydrogen and CCUS feasibility studies, and pilot scale and commercial scale developments in BC, Alberta and across Canada. FEI is evaluating potential projects and may seek approval of CCUS-related capital expenditures over the 20-year planning horizon. This will be contingent on supporting policies and the successful deployment of CCUS technologies and their industrial application which, as recognized in the CleanBC Roadmap to 2030, are still in the emergent phase in BC and will require a coordinated, comprehensive Provincial approach to guide their deployment.

As described in the responses to the MS2S IR1 9 series, FEI is interested in supporting the development and deployment of CCUS technologies and is engaging with the government to look for ways to advance projects in BC. However, in order for FEI to invest and potentially offer incentive programs, it would first have to receive the appropriate regulatory approvals to do so.

C. ANNUAL ENERGY DEMAND FORECASTING

13.0 Reference: ANNUAL ENERGY DEMAND FORECASTING

Exhibit B-9, BCOAPO IRs 3.1 and 3.2

Topic: Alternate Future Scenarios Comparison Summary

Preamble:

FEI provides a consolidated definition of the Diversified Energy Planning Scenario (DEP) **(BCOAPO IR 3.1)** – with 10 critical uncertainties and various applied input settings that can be summarized as follows:

- Reference settings for (1) Appliance Standards (2) Customer Growth (3) Natural Gas Price (4) New Construction Code (5) Retrofit Code;
- Planning settings for (1) Carbon Price (2) LCT Demand (3) Global LNG Demand (4) Industrial Demand Growth; and
- Moderate Electrification setting for (1) Non-Price Driven Fuel Switching.

FEI also provides a comparison of the input settings of the DEP, the other 5 alternate resource planning scenarios and the reference case. **(BCOAPO IR 3.2)**

13.1 Please confirm that the DEP is the scenario that best represents FEI's vision for the Clean Growth Pathway, is FEI's preferred resource portfolio under the BCUC's Resource Planning Guidelines, and that the DEP is the scenario that FEI will be working towards in its LTGRP Action Plan.

13.1.1 If not confirmed, the please explain what the DEP scenario represents and which of the alternate resource planning scenarios is FEI's preferred resource portfolio.

Response:

Confirmed. Please also refer to the responses to the BCSEA IR1 33 series.

13.2 Please list the 10 critical uncertainties and applied input settings for the DEP and provide an assessment for each of the 10 critical uncertainties as being low, moderate or high risk of variability from FEI's desired outcome, with supporting rationale.

Response:

FEI and Posterity Group have collaborated on the following response.

FEI notes that it models and plans for a range of uncertain outcomes inherent in long-term planning but would not set the model to a "desired" outcome. In resource planning, these uncertain outcomes are reflected in demand variability between the different scenarios. For the purpose of this response, FEI interprets the phrase "variability from FEI's desired outcome" to mean variability from FEI's Planning (or DEP) Scenario in terms of impact on customer demand.

Table 1 below discusses the 10 critical uncertainties and applied input settings for the DEP Scenario in the context of the risk of resulting variability. Please refer to Table 1 in the response to BCUC IR2 81.2.1 in which FEI discusses the order of impact of critical uncertainties on gas demand. The critical uncertainties with the highest order of impact will logically be the ones that have the most impact on demand. These are subjective assessments made by FEI for the purposes of this response and have not been modelled to provide a quantitative assessment.

Table 1: Risk of Variability from the DEP Scenario Based on Critical Uncertainties

Critical Uncertainty	DEP Setting	Risk of Variability
Residential, Commercial and Industrial Demand Category		
Appliance Standards	Reference	**Low:** Please refer to the response to BCUC IR2 81.2.1. Risk level may increase based on timing of retrofit code which may require gas appliances to be greater than 100 percent efficiency.
Carbon Price	Planning	**Low:** DEP Scenario has adjusted for high carbon prices and included these in rate impacts analysis. Please refer to the response to BCUC IR2 90.4.
Customer Forecast	Reference	**Low:** Policy environment may increase risk if customer growth is limited.
Fuel Switching	Moderate Electrification	**High:** Risk increases if electrification is beyond DEP Scenario levels discussed in response to BCUC IR1 25 series.
Natural Gas Price	Reference	**High:** The model accounts for some variability in gas prices/commodity costs and geo-political factors (for example) may increase risk.
New Construction Code	Reference	**Low:** Described in the response to BCUC IR2 81.2.1.
Retrofit Code	Reference	**Low:** Risk level may increase based on timing of retrofit code gas requirements for MEPS to be greater than 100 percent efficiency.
Low-Carbon Transportation and Global LNG Demand Category		
LCT Demand	Planning	**Medium:** FEI's planning scenario was conservative in terms of future market capture. These initiatives mitigate customer rate impacts while providing emission reduction opportunities in BC.
Global LNG Demand	Planning	**Medium:** FEI's planning scenario was conservative in terms of future market capture. These initiatives mitigate customer rate impacts while providing emission reduction opportunities outside BC.

Critical Uncertainty	DEP Setting	Risk of Variability
New Large Industrial Demand Category		
Industrial Demand Growth	Planning	**Low:** New demand from Woodfibre remains fairly certain. Additional industrial demand will mitigate customer rate impacts while providing emission reduction opportunities.

13.3 Please explain which of the 5 alternate resource planning scenarios or the reference case would be FEI's second preference in terms of its preferred resource planning scenario, while recognizing the likelihood of occurrence based on FEI's current assessment of the policy and planning environment. Please also provide FEI's rationale for this second preference.

Response:

FEI has not selected a "second preference" in terms of resource planning scenarios. FEI's Action Plan includes actions that will position FEI to respond to the future, whether it unfolds as per the DEP Scenario or otherwise. If FEI determines that the future appears to be unfolding differently than FEI modelled for its DEP Scenario in the 2022 LTGRP, then FEI will incorporate those findings into the development of its planning scenario in the next LTGRP.

D. DEMAND-SIDE RESOURCES

14.0 Reference: DEMAND-SIDE RESOURCES

Exhibit B-9, BCOAPO IRs 4.1 and 4.2, and Exhibit B-6, BCUC IR 44.1

Topic: Comparison of DEP High Scenario vs. Reference case

Preamble:

FEI indicates that in the scenario modelling, DSM reduces natural gas, but does not reduce the use of other low-carbon gaseous fuels, such as RNG or hydrogen. This results in the Reference Case DSM energy savings of 24.4 PJ being similar to the DEP DSM energy savings of 26.0 PJ. FEI also indicates that a new version of the model that will be available for the next LTGRP will largely eliminate this constraint, allowing for DSM savings across all fuels. **(BCOAPO IR 4.1 and BCUC IR 44.1)**

FEI provides a schedule of DSM expenditures from 2022 to 2042 for the DEP scenario with a high DSM setting and the Reference Case with a medium DSM setting, with DEP DSM spending totaling $3.698 billion and the Reference Case DSM spending totaling $1.384 billion. **(BCOAPO IR 4.2)**

14.1 Please confirm that under the initial modelling in the 2022 LTGRP (i) the DEP DSM savings are 107% higher (26.0/24.4) than the Reference Case DSM savings, while (ii) the DEP DSM costs are 267% higher ($3.698/$1.384) than the Reference Case DSM costs. As part of the response, please also provide FEI's views or comment on this relationship between savings and costs.

Response:

The following response is provided by Posterity Group in consultation with FEI.

FEI confirms that the DEP DSM savings are 107 percent higher than the Reference Case DSM savings, while the DEP DSM costs are 267 percent higher than the Reference Case DSM costs. This is primarily due to the DEP using the High DSM setting with a 100 percent incentive level as opposed to the Reference Case using the Medium DSM setting with a 50 percent incentive level. This results in accelerating expenditures without necessarily achieving a proportionate increase in energy savings. The increased incentive levels may influence uptake patterns differently for different measures.

In terms of energy savings, in the early stages of the LTGRP development, the DSM analysis model was designed to prioritize reducing conventional gas with a focus on the GHG emission reduction potential of DSM programs and activities. The proportion of renewable and low-carbon gas in the DEP Scenario was not envisaged at that time. As a result, the analysis may show curtailed DSM expenditures and savings in the DEP Scenario over the Reference Case due to the higher proportion of conventional gas in the Reference Case. Additionally, potential savings

may be reduced even further as the DEP Scenario also includes some electrification of gas end uses, which does not occur in the Reference Case. In general, the potential for most measures declines more in the DEP Scenario than in the Reference Case.

As discussed in the response to BCUC IR1 38.6, it is important to consider that the DSM analysis in the Application is meant to assess the size of the available DSM resource rather than provide a cost-optimized estimate of program potential. In practical application, through shorter-term DSM Expenditures Plans, FEI would optimize the costs of energy savings to the extent that there is not a large additional expenditure for a small amount of additional savings (i.e., where moving from an incentive level of 50 percent to 100 percent of incremental cost only attracts a few additional participants).

14.2 Please explain if FEI is able to provide a high-level estimate or directional estimate of the DEP DSM energy savings and DEP DSM costs consistent with the updated version of the DSM modelling.

14.2.1. If yes, please provide the high level or directional estimate.

Response:

The following response is provided by Posterity Group in consultation with FEI.

FEI is not yet able to provide a high-level estimate or directional estimate of the DEP DSM energy savings and costs consistent with the updated version of the DSM modelling. Although the latest versions of the Navigator software have this capability now, it has not yet been used with client data, and to produce a high-level estimate of the amount of savings and costs would require a re-run of the model for the DEP Scenario. However, testing the new feature with simulated data results in savings directionally higher with this feature than without it.

In general, the feature functions by calculating the savings and costs for the main fuel in the blend (conventional natural gas, in this case) and then calculating savings and costs for the other blended fuels in proportion to their fuel share relative to the main fuel. In most cases this means savings and costs will be higher than if they were estimated only for the main fuel. The main exception is a scenario in which costs are constrained by a budget limit. For those scenarios, the costs and savings likely will not rise but will be split between the fuels instead of calculated only for the main fuel in the blend.

14.3 Please provide a breakdown of both the DEP and Reference Case DSM expenditures between incentive and non-incentive spending for 2022 to 2042.

Response:

Please refer to the response to CEC IR1 33.1.

E. GAS SUPPLY PORTFOLIO PLANNING

15.0 Reference: GAS SUPPLY PORTFOLIO PLANNING

Exhibit B-9, BCOAPO IR 5.2 and Exhibit B-6, BCUC IRs 52.5 and 52.6

Topic: Impacts on Gas Supply Arrangements

Preamble:

FEI provided an illustrative example of a Gas Supply Portfolio with a breakdown of various potential supply sources (Natural Gas, RNG, Hydrogen and Other (Syngas/Lignin/CCS)), under the DEP and over the 20-year planning horizon to 2042 **(BCUC IR 52.6)** – which can be summarized into 5-year intervals as follows:

- **PJ - Gas Supply Portfolio (Table 1)**
  - 2022 = 201 PJ Natural Gas; 6 PJ RNG;
  - 2027 = 159 PJ Natural Gas; 22 PJ RNG; 11 PJ Hydrogen; 4 PJ Other;
  - 2032 = 122 PJ Natural Gas; 33 PJ RNG; 26 PJ Hydrogen; 9 PJ Other;
  - 2037 = 97 PJ Natural Gas; 36 PJ RNG; 39 PJ Hydrogen; 12 PJ Other; and
  - 2042 = 75 PJ Natural Gas: 39 PJ RNG; 53 PJ Hydrogen; 15 PJ Other.

- **Percentage of Gas Supply Portfolio (Table 2)**
  - 2022 = 97% Natural Gas; 3% RNG;
  - 2027 = 81% Natural Gas; 11% RNG; 6% Hydrogen; 2% Other;
  - 2032 = 64% Natural Gas: 18% RNG; 13% Hydrogen; 5% Other;
  - 2037 = 53% Natural Gas; 20% RNG; 21% Hydrogen; 6% Other; and
  - 2042 = 41% Natural Gas: 22% RNG; 29% Hydrogen; 8% Other.

- **Percentage of Gas Supply Portfolio - Renewable & LCE (Table 1)**
  - 2022 = 3%
  - 2027 = 19%
  - 2032 = 36%
  - 2037 = 47%; and
  - 2042 = 59%.

"As BC's renewable and low-carbon gas industry is in nascent stages of development, FEI is pursuing all available near-term opportunities while continuing to develop in-BC resources and supply chains over the long term…FEI assumes that RNG…will continue to provide most of the growth opportunity in its renewable gas supply portfolio to 2030 and expects new supply, hydrogen in particular, will start to support renewable gas supply volume growth by 2030 and gain momentum beyond 2030…FEI does not have a detailed forecast of where each type of supply originates…" **(BCUC IR 52.5)**

"However, this example is not intended to provide a forecast of each individual component of the portfolio…However, FEI has not developed a separate 20-year forecast for each individual component of its renewable and low-carbon supplies…for the Application." **(BCUC IR 52.6)**

15.1 Recognizing that the Gas Supply Portfolio analysis provided in the response to BCUC IR 52.6 is an illustrative example of the DEP, please confirm (or otherwise explain) that the analysis of the implied growth rates in terms of additional PJ per year (in both the 5-year intervals and 20-year planning horizon) with respect to RNG and Hydrogen presented below is a reasonable depiction of the illustrative example:

PJ – Average Growth Rate per Year for 5-Year Intervals & 20-Year Planning Horizon

- 2022 to 2027 = RNG 3.2 PJ/year (16/5); 2.2 PJ/year Hydrogen (11/5);
- 2027 to 2032 = RNG 2.2 PJ/year (11/5); 3.0 PJ/year Hydrogen (15/5);
- 2032 to 2037 = RNG 0.6 PJ/year (3/5); 2.6 PJ/year Hydrogen (13/5);
- 2037 to 2042 = RNG 0.6 PJ/year (3/5); 2.8 PJ/year Hydrogen (14/5); and
- **2022 to 2042** = RNG 1.7 PJ/year (33/20); 2.7 PJ/year Hydrogen (53/20).

Response:

FEI agrees with the analysis of the implied growth rates in terms of additional PJ per year (in both the 5-year intervals and 20-year planning horizon) with respect to RNG and Hydrogen.

15.2 Please compare the implied growth rates of RNG in BCOAPO IR 15.1 above to (i) FEI's historical RNG growth rate and (ii) RNG potential studies in FEI's possession. Please also provide FEI's comments on the risks of the illustrative example as it relates to the ability to achieve the illustrative growth in RNG.

Response:

The following compares the implied growth rates of RNG as requested.

(i) In terms of FEI's current (historical) RNG growth rate, as discussed in the response to BCUC IR1 52.5, as of Q3 2022, FEI has over 30 biomethane supply agreements that have been approved by the BCUC, which are expected to supply a total volume of RNG of approximately 20 PJ per year, with a potential maximum RNG supply volume of approximately 23 PJ annually once these biomethane facilities are fully operational in the 2025-26 timeframe.

These volumes are representative of a growth rate of approximately 23 PJ per four years which is about 5.75 PJ per year. This represents a higher growth rate than 1.7 PJ per year over the 20 years or 3.3 PJ per year over the first five years as suggested in BCOAPO IR2 15.1. FEI recognizes that these are ambitious targets and is working diligently to bring on greater contracted supply than that described in the response above.

(ii) In terms of RNG supply potential studies, please refer to the response to BCUC IR1 77.2 for a review of FEI's forecast of renewable and low-carbon gas supply potential based on the BC Renewable and Low-Carbon Gas Supply Potential Study[2] and additional research.[3]

(iii) FEI recognizes that the ramp-up to meet the renewable and low-carbon gas supply targets are ambitious. Please refer to the following IR1 responses, grouped by topic, in which FEI provided a comprehensive review of the key risks, risk mitigation and opportunities FEI will be undertaking in working towards these targets:

Renewable and low-carbon gas:

- BCUC IR1 52.4, 52.5, 52.6, 71.8, 77 series.

Hydrogen specifically:

- BCUC IR1 61 series, 62 series;
- BCSEA IR1 18.2;
- CEC IR1 21 series;
- RCIA IR1 4.1, 24 through 29 series; and
- MS2S IR1 6 series, 8 series.

15.3 Please compare the implied growth rates of Hydrogen in BCOAPO IR 15.1 to Hydrogen potential studies in FEI's possession. Please also provide FEI's

[2] Exhibit B-1, Appendix D-2.

[3] BC Supply Potential - Figures 3-7 and 3-8 in the Application (based on the Study).
Canada supply potential additional research:
- Salim Abboud et al., *Potential Production of Methane from Canadian Wastes,* 2010.
- Canadian Biogas Association, *Canadian Biogas Study: Benefits to the Economy, Environment and Energy - Technical Document*, 2013.
- TorchLight Bioresources Inc., *Renewable Natural Gas (Biomethane) Feedstock Potential in Canada*, 2020.

US supply potential additional research:
- American Gas Foundation, The Potential for Renewable Gas: Biogas Derived from Biomass Feedstocks and Upgraded to Pipeline Quality, September 2011.
- National Research Energy Laboratory, Energy Analysis: Biogas Potential in the United States, October 2013.
- American Gas Foundation, Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment, December 2019.

comments on the risks of the illustrative example as it relates to the ability to achieve the illustrative growth in Hydrogen.

Response:

Please refer to the response to BCOAPO IR2 15.2.

15.4 Please explain if FEI expects that it would be able to mitigate some of the risk of Hydrogen growth in the illustrative example, through additional RNG purchases, if necessary.

Response:

To the extent that FEI is able to acquire RNG more cost effectively than hydrogen in order to meet the proposed cap on GHG emissions attributable to natural gas use in buildings and industry, FEI expects to take advantage of those opportunities. Please refer to the responses to the BCUC IR2 79 series in which FEI describes its strategy to acquire all cost-effective renewable and low-carbon gas resources available to it.

F. STAKEHOLDER, INDIGENOUS AND COMMUNITY ENGAGEMENT

16.0 Reference: STAKEHOLDER, INDIGENOUS & COMMUNITY ENGAGEMENT

Exhibit B-9, BCOAPO IR 6.3

Topic: Engagement

Preamble:

"FEI's long-term plan…and the DEP scenario, aims to balance affordability with the costs associated with increasing government ambition and intervention to reduce GHG emissions…FEI responded to stakeholder feedback by providing rate impact models…through the DEP scenario and alternate scenarios…FEI's rate impact analysis was informed by the Pathways Report…pursuing a Diversified Pathway is approximately $100 billion…less costly by 2050 than an Electrification Pathway…considering rates impacts across the gas and electric systems, the DEP scenario leads to the most affordable, lowest overall energy bill impact for consumers…the increase in gas expenditures is more than offset by the avoided total residential consumer expenditures for electricity…The Clean Growth Pathway represents FEI's plan to moderate the costs of responding to the urgent requirements of climate change." **(BCOAPO IR 6.3)**

16.1 Please explain if FEI's policy perspective on customer rate impacts is that the key metric is the "relative" differential of rate impacts between the Diversification Pathway/DEP Scenario and an Electrification Pathway, considering that FEI assesses the Deep Electrification scenario as "not plausible" in Section 4.6.1.1 of the 2022 LTGRP Application.

16.2 Please explain if FEI's policy perspective on customer rate impacts is that "absolute" levels of rate impacts are not important considerations for customers.

16.3 Please explain how developing rate impact analysis effectively responds to customer concerns with respect to on-going affordability of energy rates. For instance, does FEI believe that quantifying directional rate impacts is a response to customer affordability concerns.

Response:

According to the CleanBC Roadmap, FEI will be required by relevant government policies to reduce GHG emissions, which is why the comparison of different scenarios to meet government GHG reduction targets is relevant. The absolute rate increases are also important to evaluate for the purposes of developing strategies to moderate overall impacts of rate increases to customers. However, because government GHG reduction goals will be an important factor shaping the operating environment for utilities over the planning horizon, there is greater relevance in evaluating the relative impacts of different strategies to achieve those goals. When all

components of the utility's revenue requirement are known, consideration could be made for potential rate mitigation mechanisms.

Although the Deep Electrification Scenario is not plausible, it is still a critical point of comparison and contrast to the DEP Scenario. The DEP and Deep Electrification Scenarios in the LTGRP are essentially different pathways that could achieve deep GHG emission reductions. Although the Deep Electrification Scenario is viewed as not plausible for the reasons set out in the response to BCUC IR1 30.3 and in the Evidentiary Update to the Application (Exhibit B-20), it is essential to examine the implied rate impacts given the significant emphasis the Province and local governments have placed on electrification policies. Depending on the potential costs required for each pathway, the future rate impacts would be different for each pathway. Therefore, quantifying directional rate impacts for the different pathways is important and it addresses customer affordability concerns. It shows, directionally, the Diversified Pathway is more affordable than the Electrification Pathway for both gas and electric customers while meeting the current and/or future government GHG emission policies. Without quantifying the directional rate impacts, the concern of affordability while still meeting GHG emission targets would not be addressed.

G. OUTCOMES OF CLEAN GROWTH PATHWAY

17.0 Reference: OUTCOMES OF CLEAN GROWTH PATHWAY

Exhibit B-9, BCOAPO IR 8.1

Topic: Risk Management

Preamble:

"FEI has assessed the risks related to the Clean Growth Pathway…but this risk assessment was conducted in a manner different than that requested in the information request…FEI has not sought to rank these risks in terms of criteria such as severity or likelihood, risk clock speed, or to create a risk heat map, but rather identifies the potential risks and presents actions to mitigate them." **(BCOAPO IR 8.1)**

17.1 Please provide a summary of FEI's assessment of the key/highest risks and associated mitigation plans of the Clean Growth Pathway/DEP Scenario in the manner in which this risk assessment was conducted by FEI.

17.2 Considering the importance of the Clean Growth Pathway to FEI's vision and future, please explain (i) why FEI has not conducted a risk assessment using a risk management framework with assessments of severity and likelihood, ability to mitigate, risk clock-speed, interconnectivity, risk capacity/tolerance/appetite and mitigation strategies and (ii) if FEI plans to apply a more comprehensive risk management framework for the filing of the next LTGRP Application.

Response:

Please refer to Table 2 in the response to BCUC IR1 74.2 for references to IR responses on risks and mitigations plans on topics such as renewable gas, DSM, CCUS, Negative Emissions Technologies, and Offsets.

Long-term resource planning is focused on potential factors that may influence customer demand growth and potential supply and infrastructure solutions to meet that demand. The LTGRP sets the foundational and contextual backdrop for FEI to evaluate approaches to address customer supply and energy demand to which, on a project-by-project basis, FEI will conduct a more in-depth risk analysis. The LTGRP analysis and Action Plan include contingency planning and monitoring activities that regularly scan the planning environment and progress on actions that will alert FEI to increasing risks to the Plan. As such, the LTGRP does not focus on developing detailed or project by project risk assessments but is instead the pre-cursor for more in-depth evaluations of risk at that level. Risk assessments will occur at the action planning stage when specific resource projects are identified and require BCUC approval.

18.0 Reference: OUTCOMES OF CLEAN GROWTH PATHWAY

Exhibit B-9, BCOAPO IRs 9.1, 9.2, 9.3.1 and 9.5 and Exhibit B-6, BCUC IRs 75.5 and 75.6

Topic: Rate Impact Implications of DEP

Preamble:

"Since affordability is relative…FEI views affordability and affordable rates through the lens of FEI's ability to transition to low carbon fuels at the lowest reasonable cost…Given this context, FEI notes that climate policy accounts for approximately 60% of the change in the annual bill. Using the 2022 LTGRP planning horizon of 20 years, the effective annual bill increase attributable to non-climate policy (CPCN's and other capital) is approximately 2.4% for a residential customer." **(BCOAPO IR 9.1)**

"FEI understands that one of the objectives of the GHGRS cap is to allow flexibility to pursue a broad set of compliance pathways to enable a cost-effective portfolio of GHG emission reductions activities…Since the details of the GHGRS are not yet finalized, FEI is unable to determine what measures or targets for affordability would be appropriate." **(BCOPAO IR 9.2)**

"FEI considers that intergenerational inequity should not be a concern as long as costs are incurred and recovered within the time frame over which customers benefit from those expenditures. To the extent that there are rate impacts over the 8 year time frame…that can be deferred and considered over a longer time frame, FEI will consider that it in its upcoming regulatory filings, at the time that rate approvals are requested." **(BCOAPO IR 9.3.1)**

"The LTGRP is not a rate setting proceeding nor is FEI seeking approval of any rates over the 20-year planning period through the LTGRP…the rate impacts provided…simply provide a directional view…Any rate impact mitigation strategies are more appropriately explored in these rate setting proceedings…and should not be considered as part of the Application." **(BCOAPO IR 9.5)**

FEI provides a breakdown of the 118% cumulative rate increase by 2042 **(BCUC IR 75.5)**, that can be summarized as follows:

- Delivery = 60% =26% CPCN's & Regular Capital; 25% Inflation; 9% Other
- Commodity Related Charges = 48%; and
- Carbon Tax = 10%.

FEI also indicates that the RGSD Project has not been included in the rate impact analysis. FEI anticipates that the RGSD Project will cost approximately $4 billion and could have an estimated in-service date of late 2029. As FEI has not completed its analysis of the

potential cost savings associated with RGSD, it was not able to provide estimated rate impacts for the project at this time. **(BCUC IR 75.6)**

18.1 Please confirm (or explain otherwise) that climate change policy accounts for approximately 40% (48%/118%) of the expected rate impacts in the 20-year planning horizon and would account for approximately 1.6% (4.0%*0.4) of the expected 4.0% even annual rate increases over that timeframe.

Response:

Not confirmed. FEI notes the following:

1. FEI is unable to reconcile the 40 percent from this information request. FEI's response to BCOAPO IR1 9.1, which is referenced in the preamble above, provided an estimate of approximately 60 percent regarding the change in the annual bill that could be driven by climate policy by 2042 under the DEP Scenario. FEI notes that the 60 percent referenced in the response to BCOAPO IR1 9.1 was a rounded-up number which FEI will explain further below.

2. While responding to this information request, FEI noticed the response to BCOAPO IR1 9.1 had a typographical error. The amount attributable to non-climate policy (CPCNs and other capital) is approximately 24 percent for a residential customer, not 2.4 percent.

For clarity, Table 1 below provides an additional breakdown of climate change policy, non-climate change policy, and inflation to the cumulative residential rate impact by 2042 that was shown in BCUC IR1 75.5. It can be seen from the table below that the portion attributable to climate change policy is 56 percent, which FEI rounded up to 60 percent in the response to BCOAPO IR1 9.1 as discussed above.

Table 1: Breakdown of Residential Cumulative Effective Rate Increase by 2042 under FEI's DEP Scenario between Climate Change Policy and non-Climate Change Policy

Attribute	Component	Cumlative (%)	Proportion (%)
Climate Change Policy	Demand Forecast	18%	15%
	Low Carbon Transportation (LCT)	-12%	-10%
	Demand Side Management (DSM)	3%	3%
	Commodity Related Charges	48%	41%
	Carbon Tax	10%	8%
Subotal		**67%**	**56%**
Non-Climate Change	CPCNs (Approved/Filed)	12%	11%
	Sustainment Capital (VITS, CTS and ITS)	14%	12%
Subtotal		**27%**	**24%**
Inflation	Inflation	25%	21%
Total		**118%**	**100%**

FEI provides further explanation of each category of rate impact from climate change policy below:

- **Demand Forecast** – The portion attributed to the loss of gas throughput in FEI's system resulting from increased electrification policies from all three levels of government, including municipal bylaws, building codes, and electrification incentives;
- **LCT** – The portion related to the offsetting revenue resulting from the sales of CNG and LNG, which are intended to replace higher emission fuels such as diesel;
- **DSM** – The portion related to the costs of DSM incentives, including the administrative costs of operating the DSM program.
- **Commodity Related Charges** – The portion related to the cost of gas, which due to climate change policy, includes more expensive renewable gas such as hydrogen, biomethane, syngas, and lignin. This is the largest contributor of the effective rate increase. Without climate change policy, the portion of FEI's renewable gas would have been much less than conventional gas; and
- **Carbon Tax** – The portion directly resulting from government policy on climate change which is targeted to increase form the current level of $65 per tonne to $140 per tonne of GHG emission. FEI notes the committed carbon tax plan by the Province is now $170 per tonne by 2030. Please refer to the response to CEC IR2 53.4 which shows the breakdown of the total effective rates and carbon tax rates in $ per GJ under the DEP Scenario by 2042 if carbon tax is modelled to $170 per tonne by 2030. The portion of the residential cumulative effective rate increase by 2042 under the DEP Scenario due to climate change policy with $170 per tonne of carbon tax would also slightly increase by approximately 2 percent, i.e., from 56 percent to 58 percent.

FEI notes that the estimate of 56 percent due to climate change policy is considered to be conservative. As explained in the response to BCUC IR1 75.6, FEI included a certain level of capital as a proxy over the 20-year planning period to reflect the potential of additional investments in LCT, LNG, renewable gas and hydrogen. This capital is included as part of the sustainment capital line in Table 1 above since the capital could be utilized for conventional gas projects or for projects related to climate change. As such, FEI conservatively did not attribute these proxies of capital to climate change policy. If the sustainment capital was to be attributed to climate change policy, FEI estimates half of the 12 percent (i.e., 6 percent) related to sustainment capital could be attributable to climate change policy.

18.2 Please elaborate on the reasons why FEI views it necessary for details of the GHGRS to be finalized in order for it to set targets or metrics with respect to bill affordability for customers.

Response:

FEI strives to provide low-cost and reliable energy to its customers; however, with the uncertainty in the nature of the compliance pathways related to the GHGRS it is not possible to set targets with respect to bill affordability for customers. For example, the nature of the eligibility of vital climate solutions such as energy efficiency programs and renewable and low-carbon gases has not been determined by the Province – each of which will have important impacts on rates. Until FEI knows the details of the GHGRS, it is not possible to accurately project what the impact to rates will be.

18.3 Given the magnitude of the potential rate increases over the next 20-years (118%), please explain why FEI did not include the development of a Rate Mitigation Plan as part of its Action Steps in the LTGRP Application.

Response:

Although FEI did not include any proposal of rate mitigation in the LTGRP for the reasons explained in the response to BCOAPO IR1 9.5, which is referenced in the preamble above, FEI disagrees that its Action Plan does not account for rate mitigation. As shown in Section 10 of the LTGRP, one area of FEI's Action Plan is to continue to pursue LCT and global LNG initiatives for load growth while reducing local and global GHG emissions. As illustrated in the breakdown of the cumulative rate increase shown in the responses to BCUC IR1 75.5 and BCOAPO IR2 18.1,

load growth through FEI's LCT initiatives will provide offsetting revenue, helping to reduce or mitigate the rate impact to FEI's customers resulting from other climate change policies. This is an important part of FEI's Action Plan and one that will provide benefits and rate mitigation to FEI's customers.

Further, as discussed in the response to BCOAPO IR2 18.2, key details on the design of the GHGRS and other Provincial GHG reduction policies are needed to have a more accurate assessment of rate impacts in order to develop strategies to mitigate rate increases.

18.5 Please provide a detailed explanation of the upcoming or planned rate setting proceedings in which FEI will be in a position to provide rate mitigation strategies and proposals.

Response:

FEI may consider rate mitigation strategies quarterly or annually as part of its quarterly and annual gas cost reports, where FEI considers the changes in gas cost rates and the balances in the Commodity Cost Reconciliation Account (CCRA) and Midstream Cost Reconciliation Account (MCRA), and, as is most common, FEI may consider rate mitigation strategies when applying for changes to the delivery rate. Depending on the type of rate-making plan (e.g., multi-year rate plan or cost of service rate plan), such proceedings may occur annually (through the annual review process) or every two (or more) years. It is within these contexts that FEI reviews and determines if rate mitigation strategies are warranted.

FEI generally considers whether rate mitigation strategies are warranted during revenue requirement applications because it is able to consider both delivery rate impacts and gas cost impacts (i.e., the overall bill impact) and it is during the revenue requirement process that all aspects of FEI's revenue requirement are identifiable, and this information is required to determine if rate mitigation is needed or not. While FEI does not propose specific rate mitigation strategies in its long-term resource plans, these strategies may nonetheless be needed over the 20-year planning period, and FEI is not precluded from proposing any rate mitigation strategy in future rate-setting proceedings.

Please also refer to Section 9.4 of the Application and the response to BCOAPO IR1 9.5 regarding the purpose and limitations of the rate impact analysis provided in the LTGRP.

18.6 Please (i) explain FEI's views on the informational value and reliability of rate impact analysis that excludes the RGSD with a high-level cost estimate of $4 billion

and expected in-service of late 2029 and (ii) provide a rate impact analysis with the RGSD Project $4 billion cost only, in order to provide a directional indication of the magnitude of the additional rate impacts of the RGSD Project.

Response:

As stated in the responses to BCUC IR1 75.6 and 75.6.1, FEI is currently assessing the technical and financial feasibility of the RGSD project. FEI notes again that there is expected to be substantial cost mitigation activities associated with the RGSD project which will offset the rate impact of the estimated cost of $4 billion. At this time, FEI has not completed the analysis necessary to provide the full scope of the potential cost savings associated with the RGSD project. FEI considers that by including the rate impact of the $4 billion of capital costs for the RGSD project without incorporating the significant mitigation benefits that would be available would significantly lower the informational value and reduce the reliability of the rate impact analysis provided in the LTGRP. Doing so would artificially inflate the rate impact of FEI's scenarios and would also lead to a prejudicial impact on the project while it is still being developed.

19.0 Reference: OUTCOMES OF CLEAN GROWTH PATHWAY

Exhibit B-9, BCOAPO IRs 10.2. 10.3 and 10.4 and BCUC Resource Planning Guidelines Section 7

Topic: Action Plan

Preamble:

"The Action Items…are not intended to represent individual projects…may involve ongoing activities that do not have defined end dates…For these reasons, FEI internally develops and manages detailed project plans, including timelines and milestones…is not conducive to review through LTGRP proceedings." **(BCOAPO IR 10.2)**

"For the reasons set out in…BCOAPO IR1 10.2, FEI is not able to provide a Gantt chart for the referenced items." **(BCOAPO IR 10.3)**

"Please see…BCUC IR1 78.2…outlines key parameters FEI will monitor to evaluate progress and performance of its decarbonization initiatives. FEI will continue to have numerous applications before the BCUC, through which the BCUC will remain informed of FEI's activities. FEI also publicly reports on many of these key parameters in FortisBC's annual corporate and sustainability reports. FEI does not consider that the BCUC needs to make any further direction to FEI in this regard." **(BCOAPO IR 10.4)**

"7. Development of an Acton Plan…The action plan should include a contingency plan that specifies how the utility would respond to changed circumstances, such as changes in load, market conditions or technology and resource options. For resources with considerable uncertainty, the action plan should incorporate an experimental design and monitoring plan to allow for hindsight evaluation of associated market impacts and full resource costs." **(BCUC Resource Planning Guidelines, Section 7, Page 5)**

19.1 Please explain how (i) FEI's high-level action plans and (ii) FEI's position that the BCUC does not need to make any monitoring directives/undertake monitoring activities flowing from the 2022 LTGRP proceeding, meet the requirements under Section 7 of the BCUC Resource Planning Guidelines.

Response:

FEI reiterates, as stated in the response to BCOAPO IR1 10.4 and cited in the preamble, that it does not consider that the BCUC needs to make any further [emphasis added] direction with regard to monitoring the progress of the Action Items set out in Section 10 of the 2022 LTGRP. The wording in this IR appears to suggest that there are currently no monitoring activities in place or intended to take place; this is not the case, as explained in the responses to BCOAPO IR1 10.2 and 10.4. FEI considers that the monitoring activities that exist as part of FEI's regular filings to the BCUC, combined with those activities outlined in Section 10 of the LTGRP and in the responses to BCOAPO IR1 10.2 and 10.4, adequately address the BCUC Resource Planning

Guidelines. If the BCUC determines that additional monitoring activities are required, FEI anticipates those additional activities will be outlined in the decision regarding the 2022 LTGRP.

19.2 In the absence of milestones and required timelines or a Gantt chart of the action plans, please explain which of the bullet points provided on pages 10-1 to 10-9 of the Application under the 11 Action Steps, represent the critical-path actions steps that are required to keep the overall Clean Growth Pathway/DEP scenario moving in accordance with FEI's plan, both in terms of outcomes/accomplishments and timelines.

Response:

FEI interprets the phrase "critical-path actions steps" in this IR to mean the end-to-end pathway and timeline for any activity that must be completed before the next activity in a series begins. FEI considers that none of the action items set out in Section 10 of the LTGRP must wait until other action items are completed in order to begin. Rather, FEI anticipates that aspects of most of the action items will be underway at the same time to greater or lesser extents and that completion of one is often not dependent on completion of another.

FEI considers that, in some cases, the sub-activities listed under each of the high-level action items will have dependencies on some other sub-activities. For example, some activities may require BCUC approval to proceed, in which case seeking BCUC approval prior to implementing such an activity will be a dependency. However, each of these single dependencies does not set "critical-path action steps" for the entire Action Plan nor FEI's Clean Growth Strategy overall.

Further, in some cases it may turn out that a sub-activity within an action item set out in Section 10 of the LTGRP cannot be completed as envisioned in the Action Plan. This does not mean that the entire Clean Growth Pathway, or even that action item, cannot be completed. In such a case, it may be that an alternate solution needs to be developed. In this way, FEI's Clean Growth Pathway and cost-effectively reaching the government emission reductions targets is going to require an agile approach rather than a step-by-step series of actions. In such a planning environment, setting up a series of specific milestones that must be met (i.e., a critical path of action steps), or preparing a Gantt Chart of sequential activities, provides little value.

19.3 Please explain (i) which of the key parameters outlined in the response to BCUC IR 78.2 and reported in the FortisBC's annual report are lagging or leading indicators of the success of the Clean Growth Pathway/DEP Scenario and (ii)

provide any leading indicators of success that FEI has developed and will be monitoring to ensure the success of the Clean Growth Pathway/DEP Scenario.

Response:

As discussed in the response to BCUC IR1 78.2, FortisBC regularly tracks its performance towards the Clean Growth Pathway/DEP Scenario by monitoring and measuring performance through numerous leading and lagging indicators, some of which are disclosed in FortisBC's annual Corporate and Sustainability Report. FortisBC tracks activities and indicators applicable to both FEI and FBC.

FortisBC classifies leading indicators as forward-looking actions that help in achieving a goal and lead to GHG emission reductions, whereas lagging indicators are classified as backward-looking results that show what has been achieved towards a goal. For instance, the main lagging indicator that is tracked and measured is the total GHG emissions that FortisBC helped customers avoid in a given year. The table below summarizes some of the leading and lagging indicators that are disclosed in FortisBC's annual Corporate and Sustainability Report:

Pillar	Leading Indicators Summary	Lagging Indicators Summary
Pillar 1 - Transitioning to renewable and low-carbon gases to decarbonize the gas supply	The number of contracts signed/ approved by BCUC for renewable and low-carbon gases.	The total number of suppliers and supply volume of renewable and low-carbon gases.
Pillar 2 - Investing in DSM programs in support of energy efficiency and conservation measures to reduce energy use among residential, commercial, and industrial customers	Activities such as providing programs that increase participation in energy efficiency programs that will support decreases in energy consumption.	Investments in energy efficiency programs, natural gas efficiency programs, electricity programs.
Pillar 3 - Support for low-carbon transportation infrastructure to reduce emissions in this sector	Providing medium and heavy-duty vehicles and short sea vessels support to use CNG and LNG.	The total number of medium and heavy-duty vehicles and short sea vessels using CNG or LNG.
Pillar 4 - Investing in LNG to lower GHG emissions in marine fueling and global markets	Providing marine customers with refueling services allowing them to displace higher carbon fuels.	Total number of containers of LNG delivered to marine customers.
Overall progress across pillars	Activities across pillars that lead to customer's GHG emission reductions.	Aggregate total GHG emissions that FortisBC helped customers avoid in a given year.

Although FortisBC has a plan and tracks progress to it, the successful implementation of the Clean Growth Pathway/DEP Scenario depends on important parameters such as the political and policy environment, market conditions, technological innovation, and long-term drivers like economic and population growth. This highlights that FortisBC's tracking framework is an enabling framework but depends on important external factors for its success.