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December 22, 2022

British Columbia Public Interest Advocacy Centre
Suite 803 470 Granville Street
Vancouver, B.C.
V6C 1V5

Attention: Ms. Leigha Worth, Executive Director

Dear Ms. 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. 1

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-287-22 for the review of the LTGRP, FEI respectfully submits the attached response to BCOAPO IR No. 1.

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, FEI has occasionally provided an internet address for referenced reports instead of attaching lengthy 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:

Diane Roy

Attachments

cc (email only): Commission Secretary
Registered Parties

A. PLANNING ENVIRONMENT

1.0 Reference: Exhibit B-1, FEI 2022 LTGRP Application

Planning Environment page 2-1, lines 8-14

Topic: SWOT Analysis

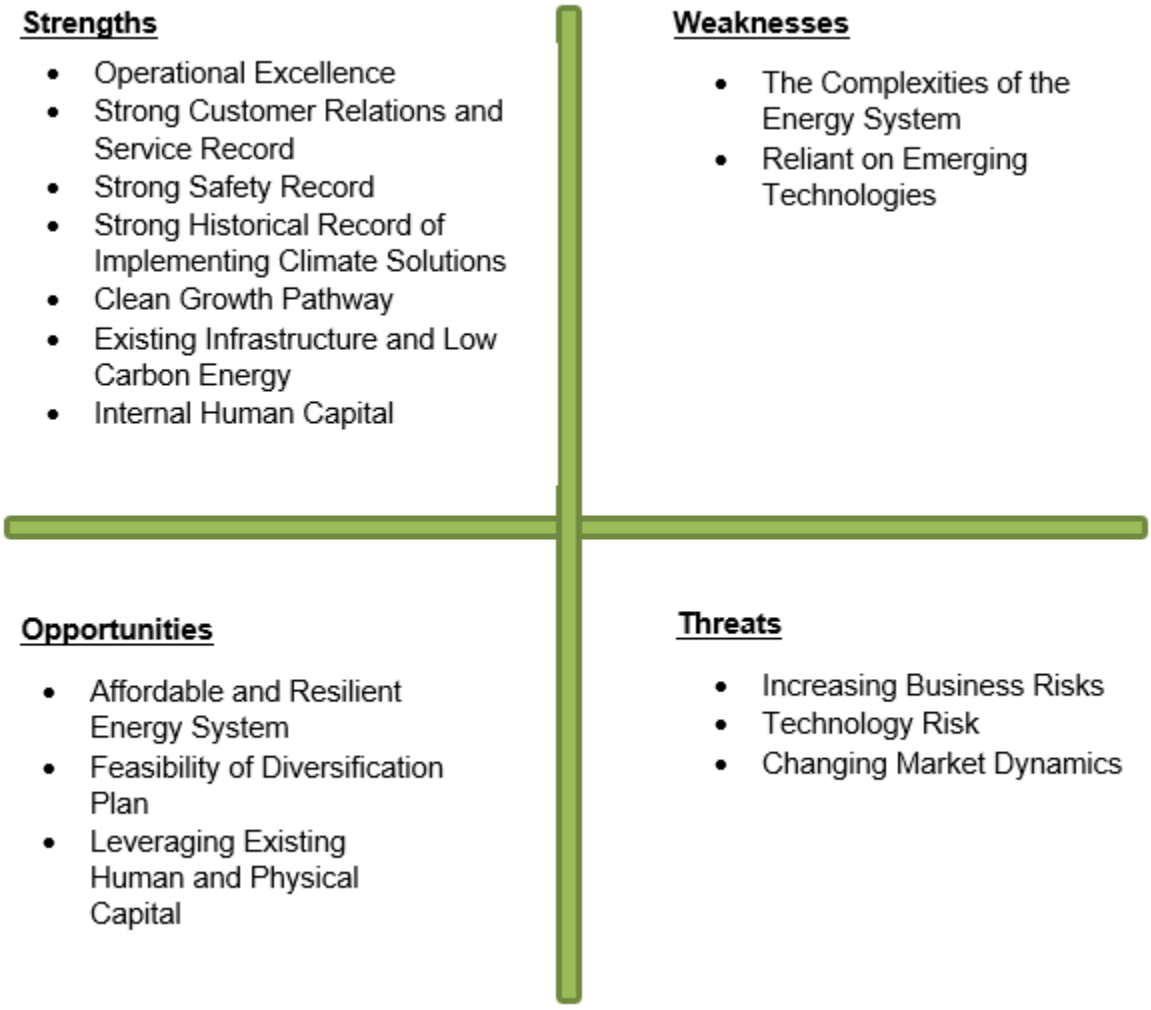
Preamble: FEI states:

> "Understanding the planning environment is the first step in FEI's resource planning process. The planning environment is set in the context of the evolution of FEI's Clean Growth Pathway and the many factors influencing FEI's long-term energy decisions, including the need to decarbonize in a way that maintains cost-effective, reliable and resilient service to customers. The planning environment includes relevant external factors that could impact FEI's demand-side and supply side resource options and prices for future market purchases, influenced by an accelerated path to decarbonization." **(Application, page 2-1)**

1.1 Please provide a SWOT analysis (strengths, weaknesses, opportunities, threats) based on FEI's understanding and analysis of its internal capabilities, the external factors that exist in both its current and expected planning environment and considering FEI's vision as articulated in its Clean Growth Pathway and Diversified Energy Planning Scenario.

Response:

The following figure summarizes the most significant strengths, weaknesses, opportunities and threats based on FEI's analysis of its internal capabilities, external factors and considering FEI's vision as articulated in its Clean Growth Pathway and DEP Scenario.



Each of these strengths, weaknesses, opportunities and threats are discussed in more detail below.

Strengths

- **Operational Excellence**: FEI consistently embraces problem solving and leadership as a driver of continuous improvement across all areas of the business, including with respect to driving the adoption and implementation of a low-carbon energy future.
- **Strong Customer Relations and Service Record**: FEI has strong customer relations and a reliable customer base who continue to engage with FEI, providing demand for the products and services that FEI delivers. FEI consistently scores high Service Quality Measurement (SQM) awards, winning five awards in 2022. This demonstrates FEI's dedication to prioritizing customer needs and providing solutions.

- **Strong Safety Record**: A core value for FEI, safety is critical to the success of its business. FEI promotes a culture of safety to prevent injuries and incidents and uses every available opportunity to learn from and improve its safety record.

- **Strong Historical Record of Implementing Climate Solutions:** FEI has a strong track record of implementing climate solutions for BC over the last decade, including its renewable and low-carbon gas program and DSM program. Regarding renewable and low-carbon gas, FEI has signed contracts for approximately 20 PJ of renewable gas to be coming online by 2025 for FEI customers. Regarding DSM, FEI has invested greater than $350 million in conservation and energy management programs since 2009. FortisBC has developed many customized zero- and low-carbon solutions for vehicles, marine vessels and rail, investing over $3.6 million in public and fleet electric vehicle charging infrastructure since 2018 and over $30 million of capital investment in CNG and LNG stations since 2011.

- **Clean Growth Pathway**: FEI's Clean Growth Pathway is its long-term plan to support the transition to a lower carbon energy future for BC which continues to guide FEI's proactive approach to addressing the challenges of decarbonization. FortisBC established its first emissions reduction target in 2019, "30BY30", setting an initial and voluntary target of reducing the GHG emissions associated with FortisBC's customers' energy use by 30 percent by the year 2030.[1] The resulting internal reporting framework is a leading-edge program that has enabled FEI to identify and execute low-carbon strategies and monitor and verify progress toward its goals, which are published in FEI's annual corporate and sustainability report.

- **Existing Infrastructure and Low-Carbon Energy**: FEI owns and operates a safe and reliable energy delivery system which can be leveraged to help meet provincial climate goals by aligning new energy supply with low-carbon objectives such as incorporating renewable and low-carbon gas supply.

- **Internal Human Capital**: FEI continues to invest in and retain a significant amount of skilled worker experience in key areas such as gas supply (natural gas, renewable and low-carbon gas), system planning, resource planning, demand-side management and customer service. This collective experience and expertise remain a key driver of the renewable and low-carbon future being developed for BC.

Weaknesses

- **The complexities of the energy transition:** Navigating the energy transition is a challenge as it involves consideration of issues such as societal costs, practicality, meeting peak demand requirements, reliability and resiliency, which are complex in nature and require considerable analysis, reflection and discussion. Recognizing this challenge, FEI is providing information and analysis and engaging its customers and other

[1] From a 2007 baseline year, which is used in BC's provincially-legislated emission targets.

stakeholders in dialogue about the energy transition. For example, through the Pathways Report, FEI outlined in detail the merits of a diversified energy approach as compared to an electrification pathway.

- **Reliant on emerging technologies**: FEI, like other energy utilities, is reliant on new and developing technologies that are needed to support the transition to a low-carbon future. This, however, is a weakness common to all broad-based decarbonization strategies required to achieve net-zero emissions and all paths rely on technological progress.

Opportunities

- **Affordable and Resilient Energy System**: The DEP Scenario demonstrates how the Clean Growth Pathway has the advantage of leveraging the resilience and reliability of the gas delivery system, achieving GHG reductions aligned with the provincial government's objectives, and being a more affordable and practical pathway for BC than relying on electrification alone as it makes use of existing infrastructure.
- **Feasibility of a Diversified Approach to Energy Systems**: For many residents, businesses and industries in BC, switching to new heating systems can be difficult, expensive or not commercially viable. A diversified approach to emissions reduction utilizing all options available allows for BC to maintain use of robust energy systems already in place, leading to lower overall costs compared to the alternatives (please see Appendix A-2 in the Application).
- **Leveraging existing human and physical capital**: FEI is looking to leverage the potential of the existing gas system, technical know-how and employee expertise to reduce GHG emissions.

Threats

- As discussed in its evidence in the BCUC 2022 Generic Cost of Capital proceeding, FEI's business risk is increasing and the need to address climate change and transition to renewable and low-carbon energy sources (i.e., energy transition) is a key driver and impacts many of FEI's business risk categories, especially FEI's political risk.
    - Policy decisions could enable the realization of the DEP Scenario or they could significantly limit its potential. With all levels of government introducing policies in rapid succession, including the CleanBC Roadmap to 2030, Clean Fuel Regulations, and 2030 Emissions Reduction Plan, the constantly-evolving policy requirements associated with supporting the energy transition impact FEI's business in the short term, and increase risks over the long term. For example, policies unfavorable to the use of gas serve to limit FEI's customer connections or retrofits and decrease FEI's cost competitiveness.
    - The energy market landscape continues to experience significant levels of transformation, owing to new climate policies, political uncertainty, changing

consumer preferences, evolving business and industrial requirements and increasing commodity price volatility. Further, an increasing number of investors are demanding energy companies, including utilities, prioritize environmental, social and governance considerations when making business decisions, which increases the complexity of long-term planning for providing low-carbon energy to FEI's customers.

- As a regulated utility, dependence on regulators for approvals that directly impact its ability to earn a fair return. There continues to be increasing requirements relating to Indigenous and stakeholder engagement, environmental reviews, and evolving municipal challenges which cause delays and increase uncertainty for the approval and implementation of applications and projects necessary to provide cost-effective and reliable service to customers.
- New considerations and challenges, in such areas as Indigenous rights and engagement, and an increased potential for unexpected events and negative sentiments to the fossil-fuel industry to impact its operations.

B. CLEAN GROWTH PATHWAY

2.0 Reference: Exhibit B-1, FEI 2022 LTGRP Application
Section 3.2.1, page 3-4, Figure 3-2
Topic: GHG Emissions Initiatives by Sector

Preamble:

In Figure 3-2 FEI lists various initiatives to support decarbonization in the Transportation, Industry, and Building Sectors.

2.1 Please describe other decarbonization initiatives that FEI considered and rejected in these three sectors and explain FEI's rationale for rejecting such initiatives.

Response:

FEI has not rejected any decarbonization initiatives outright and recognizes that all available opportunities will need to be leveraged in order to meet provincial decarbonization goals across the building, industrial and transportation sectors. However, some options have a lower priority at this time due to policy uncertainty associated with the GHGRS on the scope of GHG emissions required, allowed abatement pathways and roles of other organizations.

For example, FEI has not yet advanced programs for negative emissions technologies like nature-based carbon sequestration, carbon dioxide removal or bioenergy with carbon capture and storage. This is because more policy direction on the role of these technologies and strategies is needed from the Province with respect to whether they will comply with the GHGRS.

C. ANNUAL ENERGY DEMAND FORECASTING

3.0 Reference: Exhibit B-1, FEI 2022 LTGRP Application
Section 4.5.3, pages 4-21 – 4-26, Table 4-1
Topic: Alternate Future Scenarios Comparison Summary

Preamble: FEI states:

> "Table 4-1 below summarizes the six alternate future scenarios that FEI has modelled, including the Diversified Energy (Planning) Scenario described in Section 4.5.1 as FEI's planning scenario. Scenario descriptions, input settings for each critical uncertainty, and a brief discussion of each scenario's specific attributes is included." **(Application, page 4-21)**

3.1 Please provide a consolidated definition of the Diversified Energy Planning Scenario (FEI's chosen planning scenario) by summarizing the assumptions in each one of the 10 input settings. For instance, provide a description of the reference setting for appliance standards, the reference setting for the carbon price, the reference setting for customer forecast, and the moderate electrification setting for fuel switching, and so on up to and including the planning setting for Industrial demand growth.

Response:

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

The energy demand assumptions and values for all scenarios[2] are summarized in Table 4-1 and in Appendix B-3 of the Application. The table below provides the settings of the critical uncertainties used to create the DEP Scenario including a qualitative description of the setting and either quantitative values used as inputs to the model or, in cases where the input was not a simple quantitative value, the mechanism by which the setting was implemented. For convenience, the table below can be readily compared to Table 4-1 of the Application.

Table 1: Critical Uncertainties and Settings for the DEP Scenario

Critical Uncertainty	Setting applied	Description	Values/Mechanism
Residential, Commercial and Industrial Demand Category			
Appliance Standards	Reference	The Reference Case assumes that the 2019 in-market mandatory or legally-enshrined appliance standards continue across the entire forecast period.	Efficiency assumptions for newly-installed equipment are implemented based on equipment lifespan and stock turnover rates.

[2] The Reference Case is explained in Section 4.4.1.3 and Appendix B-3 of the 2022 LTGRP.

Critical Uncertainty	Setting applied	Description	Values/Mechanism
Carbon Price	Planning	The Planning trajectory matches the federal carbon price announcement and grows to $170 per tonne in 2030 (in nominal dollars), remaining constant thereafter.	Year — Carbon Price (CAD per tonne), 2020$ Real 2020 — 40 2021 — 45 2022 — 50 2023 — 61 2024 — 74 2025 — 86 2026 — 98 2027 — 109 2028 — 120 2029 — 130 2030 to 2042 — 140
Customer Growth	Reference	See Section 4.3.1.1 of the Application for an explanation of the customer forecast.	• Residential - 0.48 percent compound annual growth • Commercial - 1.06 percent compound annual growth • Industrial - (based on customer commitments) 0.0 percent annual growth

Critical Uncertainty	Setting applied	Description	Values/Mechanism
Natural Gas Price	Reference	The Reference trajectory is based on expectations for natural gas prices at the Sumas market hub and based on an average of the market price forecasts provided within the Northwest Power and Conservation Council (NPCC) 2021 Eighth Power Plan (2021 Power Plan) and the long-term North American Gas Market Outlook from IHS Markit (IHS), released in February 2021.	Year — Gas Price (CADGJ), 2020$ Real 2020 — 3.29 2021 — 3.91 2022 — 3.68 2023 — 3.65 2024 — 3.88 2025 — 3.88 2026 — 3.94 2027 — 4.09 2028 — 4.08 2029 — 4.29 2030 — 4.44 2031 — 4.38 2032 — 4.49 2033 — 4.67 2034 — 4.57 2035 — 4.61 2036 — 4.68 2037 — 4.61 2038 — 4.72 2039 — 4.89 2040 — 4.84 2041 — 4.92 2042 — 5.01
New Construction Code	Reference	The Reference Case assumptions are based on what was known and enforceable in the market as of 2019.	• See Appendix B-3, Table B3-2. • Residential: Step 4 for the City of Vancouver; Step 3 for all other regions. • Commercial: Step 3 for the City of Vancouver; Step 2 for all other regions.
Non-Price Driven Fuel Switching	Moderate electrification	Assumes 25 percent electrification of residential and commercial gas demand and 10 percent electrification of industrial demand by 2050. This results in an approximately 14 percent decline in gas fuel share over the 20-year planning horizon.	Electrification proportions of FEI demand are interpolated for each end-use and sector from 2050 over the 20-year planning horizon of the LTGRP.

<table>
<tr><th>Critical Uncertainty</th><th>Setting applied</th><th>Description</th><th>Values/Mechanism</th></tr>
<tr><td>Retrofit Code</td><td>Reference</td><td>The Reference setting is based on known, legally enshrined and mandatory requirements at the time the demand forecast analysis was undertaken.</td><td>No retrofit code was in place nor formally proposed at the time the demand forecast was undertaken, therefore there is no impact on the demand forecast in the DEP Scenario.</td></tr>
<tr><td colspan="4">Low-Carbon Transportation and Global LNG Demand Category</td></tr>
<tr><td>LCT demand</td><td>Planning</td><td>In the Planning setting, incentives supporting CNG and LNG infrastructure under Greenhouse Gas Reduction Regulation (GGRR) will be extended beyond 2030 and the BC-Low Carbon Fuel Standard continues. This setting includes no solution to the discontinued 15L road engine for truck fleet customers and consumption by these customers will halt by 2026, however, the mining and remote power market segments will grow by an average of 2.9 PJ annually from 2024 to 2042. Demand from CNG customers is assumed to grow at 3 percent per year. The growth of CNG demand is forecast to capture about 2.9 percent of the eligible market by the end of the forecast period of 2042. This level of market capture constitutes a growth rate of approximately 3 percent per year with average demand increase of 0.015 PJ per year from 2031 to 2042.</td><td>
<table>
<tr><th colspan="3">Demand (PJ)</th></tr>
<tr><th>Year</th><th>CNG</th><th>LNG</th></tr>
<tr><td>2020</td><td>0.96</td><td>1.46</td></tr>
<tr><td>2021</td><td>1.00</td><td>1.40</td></tr>
<tr><td>2022</td><td>1.03</td><td>1.41</td></tr>
<tr><td>2023</td><td>1.06</td><td>8.40</td></tr>
<tr><td>2024</td><td>1.10</td><td>19.18</td></tr>
<tr><td>2025</td><td>1.13</td><td>28.12</td></tr>
<tr><td>2026</td><td>1.18</td><td>34.48</td></tr>
<tr><td>2027</td><td>1.21</td><td>40.85</td></tr>
<tr><td>2028</td><td>1.24</td><td>49.93</td></tr>
<tr><td>2029</td><td>1.27</td><td>53.49</td></tr>
<tr><td>2030</td><td>1.30</td><td>57.23</td></tr>
<tr><td>2031</td><td>1.31</td><td>57.47</td></tr>
<tr><td>2032</td><td>1.33</td><td>57.78</td></tr>
<tr><td>2033</td><td>1.34</td><td>58.09</td></tr>
<tr><td>2034</td><td>1.36</td><td>58.40</td></tr>
<tr><td>2035</td><td>1.37</td><td>58.71</td></tr>
<tr><td>2036</td><td>1.39</td><td>59.03</td></tr>
<tr><td>2037</td><td>1.40</td><td>59.34</td></tr>
<tr><td>2038</td><td>1.42</td><td>59.66</td></tr>
<tr><td>2039</td><td>1.43</td><td>59.99</td></tr>
<tr><td>2040</td><td>1.45</td><td>60.29</td></tr>
<tr><td>2041</td><td>1.46</td><td>60.61</td></tr>
<tr><td>2042</td><td>1.48</td><td>60.93</td></tr>
</table>
</td></tr>
</table>

Critical Uncertainty	Setting applied	Description	Values/Mechanism
Global LNG Demand	Planning	The Planning setting assumes there is continued LNG adoption in the short sea market segment. The marine bunkering jetty at Tilbury is constructed, accelerating the adoption of LNG by trans-Pacific marine vessels. The ISO exports market segment is assumed to increase by 0.33 PJ per year from 2021-2030 and remain constant thereafter.	Year: Annual Demand (PJ) 2020: 3.00 2021: 3.00 2022: 3.33 2023: 3.66 2024: 3.99 2025: 4.32 2026: 4.65 2027: 4.98 2028: 5.31 2029: 5.64 2030 - 2042: 6.30
Industrial demand growth	Planning	Demand from the Woodfibre LNG project is added to FEI's demand in 2025, resulting in an average of 94.8 PJ of LNG annually from 2025-2042.	Year: Annual Demand (PJ) 2020 - 2025: 0 2025 onward: 94.89

3.2 Please provide a table that includes a comparison of the input settings for the six scenarios which includes each of the 10 input settings as rows, each of the six scenarios as columns, and provides the selected input setting under each column.

Response:

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

The table below provides the input settings by Critical Uncertainty and Scenario. Please see Appendix B-3 of the Application for more information about the settings for each of the Critical Uncertainties.

Critical Uncertainty	Reference Case	Diversified Energy (Planning)	Deep Electrification	Price-Based Regulation	Economic Stagnation	Lower Bound	Upper Bound
Appliance Standards	Reference	Reference	Accelerated	Reference	Reference	Accelerated	Reference
Carbon Price	Reference	Planning[3]	Reference	High	Low	High	Low

[3] The 'Planning' setting for Carbon Price was used in the Diversified Energy (Planning) Scenario. There is an error in Table 4-1 of the Application where it is stated that the 'Reference' setting was applied.

Critical Uncertainty	Reference Case	Diversified Energy (Planning)	Deep Electrification	Price-Based Regulation	Economic Stagnation	Lower Bound	Upper Bound
Customer Forecast	Reference	Reference	Low	Reference	Low	Low	High
Fuel Switching	Reference	Moderate electrification	Accelerated electrification	Reference	Reference	Extensive electrification	Reference
Natural Gas Price	Reference	Reference	Low	High	Low	High	Low
New Construction Code	Reference	Reference	Accelerated	Reference	Delayed	Accelerated	Delayed
Retrofit Code	Reference	Reference	Accelerated	Reference	Reference	Accelerated	Reference
LCT Demand	Reference	Planning	Low	High	Low	Low	High
Global LNG Demand	Reference	Planning	Planning	Reference	Reference	Reference	High
Industrial Demand Growth	Reference	Planning	Reference	Reference	Reference	Reference	High

Appendix B-3 provides a description of the assumptions underpinning each setting. Selected content from the Appendix has been provided below summarizing the assumptions for each critical uncertainty based on the order of their appearances in the Appendix. Please also refer to Appendix B-3 for additional details.

Customer Growth:

The Application provides further analysis to simulate the impact of economic growth on customer counts that relies on a statistical approach using confidence intervals (CI). This approach uses the historical variation in customers to provide high and low uncertainty bands for the BAU customer forecasts. See Appendix B-1 for additional information. This statistical method serves as a proxy to model the potential impact of economic growth on customer numbers but may also account for other intrinsic factors, such as FEI marketing and promotional campaigns. Note that rate schedules with fewer customers experience a greater range between their high and low outcomes than larger rate schedules. Please see Figures B3-2 to B3-6 which illustrate the customer number trajectories for key rate schedules.

Natural Gas Price:

The Reference trajectory is based on expectations for natural gas prices, with prices increasing most years as demand increases due to LNG exports from BC and coal plant retirements in the PNW. The high and low-price trajectories provide reasonable extremes of possible future prices. The high trajectory assumes rapid world economic growth, increasing the demand for natural gas supplies. The low trajectory assumes slow economic growth with reduced demand for natural gas

in favour of lower-carbon renewable energy sources. Please see Figure B3-7 which displays the resulting Reference, High, and Low natural gas price trajectories.

Carbon Price:

The Low trajectory assumes that the carbon tax is removed early in the planning horizon and not replaced by other carbon pricing mechanisms. The Reference trajectory assumes the carbon tax is held constant once the maximum announced value (as of the time the settings were determined) was reached and held constant throughout the planning horizon. The Planning trajectory matches the federal carbon price announcement and grows to $170 per tonne in 2030 (in nominal dollars), remaining constant thereafter. The High trajectory maintains this level of annual increase beyond 2030, while the Medium trajectory assumes a lower level of consistent annual increase over the planning horizon. Please see Figure B3-8 which displays the carbon pricing outcomes.

New Construction Code:

The Reference Case assumptions are based on what was known and enforceable in the market as of 2019. BC has enacted the BC Energy Step Code, and the provincial Climate Leadership Plan (CLP) declares a goal of net-zero-ready new construction for 2032. The model progressively applies two settings in the parametric analysis: accelerated and delayed. These settings are relative to the Reference Case where the accelerated setting contemplates earlier adoption/compliance and the delayed setting contemplates later adoption/compliance. The scenarios assume a differentiation between the City of Vancouver and all other regions, as the City of Vancouver has adopted bylaws, including its building code and the Vancouver Building Bylaw (VBBL), that are more stringent than those in other municipalities. The following table provides the New Construction Code settings assumptions.

3.3 Please explain whether FEI considered other scenarios which it ultimately rejected. If so, please describe the scenario and why it was rejected.

Response:

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

No, FEI did not consider other scenarios that it ultimately rejected. FEI considers that the six scenarios it has developed and examined cover a sufficiently broad range of scenarios for the purpose of long-term resource planning, given the planning environment that existed at the time the scenarios were developed.

D. DEMAND-SIDE RESOURCES

4.0 Reference: Exhibit B-1, FEI 2022 LTGRP Application

Section 5.4.1, page 5-15, lines 11-14

Section 5.4.1, page 5-16, Figure 5-3

Topic: Comparison of DEP High Scenario vs. Reference case

Preamble: FEI states:

> "Energy savings from the Reference Case (Medium DSM Setting) is 24 PJ which is almost equivalent to the DEP High Scenario. This is due to the high proportion of conventional natural gas and very limited electrification in this scenario and therefore there is a relatively higher potential for DSM savings." **(Application, page 5-15)**

4.1 Please elaborate on the reasons why the energy savings in the Medium DSM Setting in the Reference Case is almost equivalent to the DEP High Scenario.

Response:

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

In the scenario modelling, DSM reduces natural gas use. DSM does not reduce the use of other low-carbon gaseous fuels, such as RNG or hydrogen.

Compared to the Reference Case, the DEP Scenario includes much less natural gas use, especially in the later years of the forecast period. Although the High DSM DEP Scenario has a higher percentage of savings from DSM, it is a higher percentage of a relatively small number. DSM savings in the Reference Case are a smaller percentage of natural gas use, but because gas use is much higher this equates to a larger absolute DSM savings number.

The table below illustrates gas demand and DSM savings for the Reference Case in comparison to the DEP Scenario.

Variable	Reference Case (Medium DSM Setting)		DEP Scenario (High DSM Setting)	
	2030	2042	2030	2042
Pre-DSM Demand	206.6	216.4	161.9	122.7
Post-DSM Demand	193.7	192.0	143.6	96.7
DSM Savings	12.9	24.4	18.2	26.0
% Gas Reduction	6.2%	11.3%	11.2%	21.2%

In the Reference Case Medium DSM Setting, the consumption of natural gas rises slowly over the forecast period, reaching a level about 0.8 percent above the base year consumption by 2042. DSM, with incentives of 50 percent of measure incremental cost, saves 11.3 percent of the natural gas consumption by the end of the forecast period.

In the DEP Scenario, the consumption of natural gas (pre-DSM) falls by 42.8 percent by the end of the forecast period. The High DSM setting, with incentives set at 100 percent of measure incremental cost, saves a higher percentage of the natural gas, reaching savings of 21.2 percent by the end of the forecast period.

Multiplying 21.2 percent times the 57.2 percent of natural gas remaining from the Reference Case gives savings of (0.212 / 0.113) * (0.572 / 1.008) = 1.063 or 6.3 percent higher than the savings in the Reference Case Medium DSM Setting. In the earlier years of the forecast period, the savings in the DEP High DSM Setting are nearly twice as great as the savings in the Reference Case Medium DSM Setting, but the greater electrification and use of renewable gaseous fuels reduces the DSM savings later in the forecast.

While electrification certainly reduces the scope for natural gas DSM, the replacement of conventional natural gas by low-carbon gaseous alternatives would not necessarily have the same effect. For the Application, the replacement of conventional natural gas by other fuels was modelled such that the scope for DSM was reduced. As discussed in the response to BCUC IR1 44.1, the new version of the model that will be available for the next LTGRP will include modelling options that largely eliminate this effect, allowing DSM savings across all fuels but applying the reductions to conventional natural gas first.

4.2 Please provide the total forecast DSM expenditures by year for both the DEP High DSM Scenario and the DSM Reference Case for each year between 2022 and 2042 and the total for each for the 20-year period.

Response:

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

The table below provides annual DSM expenditures (incentive and non-incentive spending) for the DEP Scenario with the High DSM Setting and the Reference Case Scenario with the Medium DSM setting, as well as the total spending for the forecast period.

Note that fixed program costs are not included in the spending values produced by the load forecast model used to conduct the DSM analysis for the scenarios. Therefore, non-incentive costs reflect program administration costs that scale on a per-measure basis.

DSM Expenditures (millions CAD$)		
Year	**DEP scenario with High DSM setting**	**Reference Case with Medium DSM setting**
2022	$242	$61
2023	$236	$62
2024	$230	$65
2025	$218	$66
2026	$224	$67
2027	$224	$68
2028	$229	$70
2029	$211	$65
2030	$184	$66
2031	$198	$67
2032	$193	$69
2033	$178	$70
2034	$171	$72
2035	$158	$71
2036	$146	$70
2037	$136	$69
2038	$125	$67
2039	$114	$64
2040	$106	$64
2041	$102	$56
2042	$72	$54
TOTAL	**$3,698**	**$1,384**

4.3 Please explain whether, in the diversified planning scenario, there is any test or analysis that optimizes the relative cost effectiveness of using DSM vs. obtaining low carbon energy supply to meet the legislated GHG emission reductions or caps.

4.3.1 If not, please explain why.

Response:

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

The tests used to determine the cost-effectiveness of DSM measures do, to a degree, compare the cost-effectiveness of DSM to that of obtaining low-carbon energy, by incorporating a proxy for the cost of obtaining low-carbon energy in the avoided costs of the DSM cost-effectiveness test. The following discussion describes how DSM cost-effectiveness tests can be used to screen DSM measures based on the avoided costs of the blend of fuel types which may vary over the planning horizon. To pass the tests, saving a unit of energy through DSM initiatives must be more cost-effective than acquiring this additional unit of energy. FEI anticipates that as the industry and market for renewable and low-carbon gas production evolves, so too will the ability to improve the use of market data in such analysis, subject to any future changes to the DSM Regulation that might apply.

In the DEP Scenario with the High DSM Setting, all the DSM measures are screened using both the TRC test and the MTRC test as set out by the DSM Regulation, with the two tests combined using an "OR" function. That means if the measure passes either screen, it is included in the potential. It does not have to pass both. Additionally, the TRC test was conducted using both the avoided cost of conventional natural gas and again using the avoided cost of renewable and low-carbon gas in the final DSM analysis of the Application.

The MTRC test uses an avoided cost based on a Zero-Emissions Energy Alternative (ZEEA) that is defined in the DSM Regulation as the long run marginal cost of clean electricity in BC. Throughout the forecast period, the assumed cost of the ZEEA is higher than either the avoided cost of natural gas or the avoided cost of renewable and low-carbon gas used in the TRC test. Using the MTRC test as one of the screens in the OR function allows measures to be included in the potential early in the forecast period, therefore ensuring that the cost of low-carbon energy is considered in identifying those DSM measures that are cost-effective. Since these tests compare the cost of DSM against the cost of acquiring resources, they effectively optimize the resource mix.

Further, FEI has explored the use of the Cost of Conserved Energy (CCE), which also compares the cost of DSM activities to the cost of acquiring supply, as a potential DSM screening tool. Please refer to the response to BCUC IR1 35.3 for further discussion of the advantages and disadvantages of using CCE to screen DSM measures.

E. GAS SUPPLY PORTFOLIO PLANNING

5.0 Reference: Exhibit B-1, FEI 2022 LTGRP Application
Section 6, page, 6-14, 6-20, 6-28
Exhibit A-5, BCUC 52.6 and 52.16
Topic: Impacts on Gas Supply Arrangements

5.1 Further to BCUC IR 52.16, please explain if the increase in renewable and low carbon gas supplies is expected to result in any stranded assets or the requirement to de-contract contractual arrangements FEI has entered on a longer-term basis, such as storage, supply, and transportation.

5.1.1 Please explain whether FEI has reflected the costs associated with stranded assets and de-contracted contractual arrangements as part of its cost analysis supporting its 2022 LTGRP.

Response:

FEI does not expect that the DEP Scenario, where FEI is expecting to increase renewable and other low-carbon gas supplies, will result in any stranded assets or the requirement to de-contract or terminate contractual arrangements. As discussed in Section 7.4 of the Application, FEI's approach to the low-carbon energy future is its Clean Growth Pathway and its DEP Scenario. This approach will be to maximize the use of existing assets, while also maximizing the number of decarbonization pathways available to meet the energy demands, thereby avoiding the costs that would come with the complete reengineering of BC's energy sector. As such, the cost and rate analysis provided in Section 9.4 of the Application does not consider costs associated with stranded assets or de-contracted gas supply arrangements. Please also refer to the response to BCUC IR1 16.1 for a general discussion on stranded asset risk and BCUC IR1 16.1.2 for discussion on actions that FEI is taking to mitigate the risk of stranded assets.

5.2 Further to BCUC IR 52.6, please provide the data associated with the breakdown of forecast renewable and low carbon gas supply for the re-stated Figure 6-3 for each year of the period 2022 – 2042. Please also provide the percentage of the total annual gas supply represented by the expected volumes of RNG, Hydrogen, Syngas, and Lignin as well the total for each of the years 2022 – 2042.

Response:

Please refer to the response to BCUC IR1 52.6.

Preamble: FEI states:

> "While FEI has long regarded resiliency as an important system attribute, the T-South incident (discussed in Section 3.2.2.3) brought into focus the risk of supply interruption for FEI's customers. FEI obtains most of its natural gas via the Westcoast T-South system, making a disruption on the T-South system the greatest supply risk facing FEI at present." **(Application, page 6-14)**

5.3 Please explain whether FEI has reflected its resiliency objective as part of a prior LTGRP.

5.3.1 If not, please explain why.

Response:

FEI did not specifically include resiliency as an objective in prior LTGRPs. Please also refer to the response to CEC IR1 47.1 for further discussion of the increasing importance of resiliency as an explicit planning objective.

5.4 Please explain whether the DEP Scenario as reflected in the 2022 LTGRP, will impact FEI's resiliency risks.

5.4.1 If yes, please describe the impact.

Response:

As described below, the DEP Scenario provides opportunities to reduce resiliency risk for the province overall by leveraging both the gas and electric systems in the transition to a low-carbon future.

FEI's view on the resiliency benefits of two energy systems is outlined in the Pathways Report.[4] The Pathways Report discusses the resiliency risk of a Deep Electrification scenario, as well as the benefits to resiliency of a diversified energy system. For instance, Guidehouse states:

- "Guidehouse experts have consistently found that a moderate, targeted approach to electrification tied with deployment of renewable gases while fuel switching away from

[4] Appendix A-2.

petroleum is the most cost-effective and resilient method to achieve a lower carbon energy future."[5]

- "The gas system provides valuable reliability and resiliency to the province's energy system. As decarbonization progresses, this resiliency increases in importance."[6]
- "It is critical to acknowledge that electricity and gas complement each other—both are needed and can reinforce each other. Taking a systemwide view of energy infrastructure that recognizes the value and coordinates the gas and electric systems to manage decarbonization affordability and resiliency provides the greatest overall benefits for BC."[7]
- "There is more opportunity for [research and development] and efficiency improvements in the gas supply and corresponding end-use equipment that can be investigated alongside electrification initiatives."[8]

Preamble: FEI states:

> "FEI has increased resiliency within the existing portfolio by holding contingency resources; however, resiliency needs to be further improved through new infrastructure projects. With the advancement and growth of renewable and low-carbon gas supplies in the region, FEI's future infrastructure is being planned to support the transition to a lower carbon future by providing increased resiliency and supporting a broader range of supply resources." **(Application, page 6-28)**

5.5 Please provide a comprehensive list of the infrastructure, transmission, and distribution projects that FEI is planning "to support the transition to a lower carbon future by providing increased resiliency and supporting a broader range of supply resources." In providing this list, please identify which projects are underway, which projects are in the planning phase, and identify potential projects.

Response:

Given FEI's commitment to achieving a lower carbon energy future in BC, all of FEI's infrastructure, transmission, and distribution projects (planned or potential) will support this transition as well as provide increased resiliency and support for a broader range of supply resources. Planned major projects include the Okanagan Capacity Upgrade (OCU), the Tilbury LNG Storage Expansion (TLSE) Project, Advanced Metering Infrastructure and the Regional Gas Supply Diversification (RGSD) Project. Future projects, as they develop, will contribute to

[5] Appendix A-2, p. 4.
[6] Appendix A-2, p. 5.
[7] Appendix A-2, p. 7.
[8] Appendix A-2, p. 27.

resiliency by providing a diversity of supply and, like the RGSD Project, will be compatible with the development and delivery of hydrogen and other renewable gases to FEI customers.

The BC Renewable and Low-Carbon Gas Supply Potential Study[9] found that BC has significant renewable and low-carbon sources of energy that could be produced over the coming years going out to 2050. FEI's network of pipelines within the province will play an integral role in moving this supply from production sources to consumers. Various sources of supply will need to be developed and be accessible by FEI's pipeline network to meet 2030 and 2050 decarbonization targets.

5.6 Please provide a high-level forecast of the expenditures FEI expects to incur as part of its 2022 LTGRP over the period 2022 to 2042 to support its resiliency objective.

Response:

FEI has interpreted the question as asking about planned on-system resiliency expenditures.

FEI has identified two major projects that will significantly increase FEI's resiliency: the TLSE Project and the RGSD Project.

The TLSE project will provide on-system LNG to be disbursed in times of emergency and during weather-related events, while the RGSD project will provide customers with a secondary source of piped gas supply that will strengthen security of supply during times of disruption, such as that experienced during the 2018 T-South Incident. Both projects are driven by a number of objectives, but resiliency is the key project driver.

As filed in the CPCN application, the cost of the TLSE Project is estimated at $770 million. High-level preliminary cost estimates of the RGSD Project are in the range of $4 billion. Both projects, if successfully developed, are expected to be in-service by 2030.

In addition to these two major projects, FEI is also considering a number of additional on-system resiliency projects over the 20-year horizon, as discussed in Section 7.5.2 of the Application. The sum total cost for these projects over the 20-year period has a Lower Bound Scenario estimate of $0, a Reference Case estimate of $1.13 billion, and an Upper Bound Scenario estimate of $3.444 billion. These figures have been incorporated into the calculated rate impact for the Lower Bound, Reference Case, and Upper Bound scenarios respectively. It should be noted that these are potential projects, and that FEI will be evaluating the need and the alternatives prior to any funding requests. These potential investments consist of:

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

1) Interior Transmission System Resiliency Solution – Currently envisioned as an LNG liquefaction, storage, and regassification facility in the Vernon area of the Okanagan region.

2) Pattullo Gas Replacement Resiliency Recovery – Currently envisioned as a 5.1 km NPS 20 Intermediate Pressure loop of the existing main along Fraser Street in Vancouver.

3) Supply Diversification Resiliency Projects – there are a number of communities in FEI's service territory that rely on a single gas supply to meet their energy needs, whether due to there being only a single supply, or because the second supply is insufficient to meet the needs of the community. These projects would look at bringing a second source of gas to a subset of the communities of North Vancouver, Mission, West Kelowna, West Vancouver, Kamloops, and Prince George.

F. STAKEHOLDER, INDIGENOUS AND COMMUNITY ENGAGEMENT

6.0 Reference: Exhibit B-1, FEI 2022 LTGRP Application

Section 8.2.2, 8.3.4, 8.4.2, pages 8-5 to 8-25

Exhibit A-1, BCUC 66.3 & 67.2

Topic: Engagement

Preamble: The Resource Planning Advisory Group (RPAG) – Table 8-3 (pages 8-6 to 8-7)

Indigenous Groups – Section 8.3.4 (pages 8-13 to 8-17)

Community Engagement – Table 8-5 (pages 8-19 to 8-21)

6.1 Further to BCUC IR 67.2, please summarize any areas of disagreement as expressed by RPAG membership with respect to the use of the Diversified Energy Planning Scenario by FEI as its planning scenario for the 2022 LTGRP.

Response:

In the response to BCUC IR1 67.2, FEI reviewed the Resource Planning Advisory Group (RPAG) session notes and presentations with respect to FEI's selection of the DEP Scenario as its planning scenario for the Application by reviewing the four pillars of the Clean Growth Pathway. While there were no major areas of disagreement expressed by RPAG members, there were requests for clarification about how the different decarbonization initiatives were modeled in calculating FEI's GHG emission reductions, and support for electrification of buildings was indicated by some members.

6.2 Further to BCUC IR 66.3, please elaborate and clarify how the feedback received from the RPAG, Indigenous Groups, and the Community Engagement sessions, specifically impacted the development and outcomes of the Clean Growth Pathway and the Diversified Energy Planning Scenario.

Response:

Please note that BCUC IR1 66.3 was referring to Indigenous Group discussions and was not referencing all of FEI's engagement sessions.

Section 8 of the Application provides detail on FEI's stakeholder, Indigenous and community engagement initiatives for the Application, from which input and feedback was received on the

development and outcomes of the Clean Growth Pathway and the DEP Scenario. Further, all community engagement presentations and workshop notes can be found online at:

https://www.fortisbc.com/about-us/projects-planning/natural-gas-projects-planning/natural-gas-planning-stakeholder-engagement.

Refer to the following sections of the Application for more details on how community engagement feedback was incorporated:

- RPAG technical workshop details are described in Section 8.2. In particular, Section 8.2.2 outlines feedback received and where the feedback is addressed in the Application. A detailed summary is described in Table 8-3.
- Dialogue and engagement with Indigenous groups is described in Section 8.3. In particular, Section 8.3.4 provides examples of feedback received and where it is addressed in the Application. Some of the feedback was more pertinent to FEI's near-term business operations, especially in the context of reconciliation. The need for continued and evolving engagement is reflected in Action Plan Item 4 in Section 10 of the Application, including the need to review resource requirements for continually improving engagement.
- Community engagement session details are described in Section 8.4. In particular, Section 8.4.2 provides examples of the feedback received and where it is addressed in the Application. A detailed summary of each engagement session is described in Table 8-5, followed by general themes that were incorporated into the plan and examples of feedback received that was forwarded to FEI project teams.

FEI emphasized throughout these sessions that long-term resource planning is an ongoing process, with ongoing consultation and engagement. Due to the dynamic shifts in BC's energy planning landscape, it is anticipated that the next resource plan will be underway soon after resolution of the Application. FEI encourages all stakeholders to participate in the complex discussions and considerations required for the decarbonization of BC's energy system and economy.

Preamble: FEI states:

> "Clarification on the steps FEI and the Province are taking to encourage renewable energy collaborations with First Nations communities and to navigate the challenges associated with the transition to low-carbon energy solutions, such as rate impacts and affordable energy supply over the twenty-year planning horizon" **(Application, page 8-16)**

"GHG emission reduction opportunities are critical, but affordability and carbon tax impacts need to be considered. Will need to monitor both electricity, natural gas and renewable costs over time through the energy transition." **(Application, page 8-19)**

"Discussed approaches FortisBC is taking to balance affordability and GHG reduction in presenting the Pathways Report and FortisBC's 30BY30 initiative." **(Application, page 8-20)**

"Energy affordability and housing affordability is a top priority for the region and low-income segments are already struggling to manage utility bills" **(Application, page 8-21)**

"General agreement that the Diversified Energy (Planning) Scenario with complementary and robust gas and electric systems will be more resilient in the long-term and with the need to balance affordability with decarbonization initiatives" (Application, page 8-21)

"Energy affordability was top of mind, especially for low-income customer segments" **(Application, page 8-21)**; and

"How low-income customers could be supported through the low-carbon transition" **(Application, page 8-25)**

6.3 Please explain how specifically the Clean Growth Pathway and the Diversified Energy Planning Scenario put forward by FEI for acceptance by the BCUC has addressed the issues from the stakeholder engagement/feedback with respect to balancing affordability with the cost of decarbonization.

Response:

Affordability was a key priority expressed in FEI's stakeholder engagement and was taken into consideration in the development of the Application and in development of the Clean Growth Pathway. FEI's long-term plan, and specifically the DEP Scenario, aims to balance affordability with the costs associated with increasing government ambition and intervention to reduce GHG emissions and the adoption of policies to take greater climate action.

FEI responded to stakeholder feedback by providing customer rate impact models for decarbonization of the gas system through the DEP Scenario and alternate scenarios in the Application. This information is on the public record for further discourse through this proceeding and ongoing resource planning consultation. Electricity rates associated with electrification may also rise due to the need for more transmission, distribution, generation and substation infrastructure required to meet increases in electricity peak demand. FEI's rate impact analysis

was informed by the Pathways Report[10] that showed pursuing a Diversified Pathway is approximately $100 billion dollars less costly by 2050 than an Electrification Pathway. When considering rate impacts across the gas and electric systems, the DEP Scenario leads to the most affordable, lowest overall energy bill impact for consumers because the increase in gas expenditures is more than offset by the avoided total residential consumer expenditures for electricity.

BC's energy system planning is complex and will require more discussion and collaboration with government and all stakeholders. Balancing affordability with the urgent need for climate action while meeting BC's growing need for energy over the long term is a societal challenge. The Clean Growth Pathway represents FEI's plan to moderate the costs of responding to the urgent requirements of climate action.

[10] Exhibit B-1, Appendix A-2.

G. OUTCOMES OF CLEAN GROWTH PATHWAY

7.0 Reference: Exhibit B-1, FEI 2022 LTGRP Application

Section 9.2.1.5, page 9-4

Topic: GHG Emissions

7.1 Please provide an alternate Figure 9-1 that reflects FEI's total GHG emission reductions for both Residential, Commercial, and Industrial customers and Low-Carbon Transportation and Global LNG.

Response:

Updating Figure 9-1 in the Application to include emission reduction opportunities for Low-Carbon Transportation (LCT) and global LNG does not provide a meaningful way to illustrate FEI's total GHG emission reductions subject to the GHGRS cap. Please refer to Figure 9-5 in the Application as a more appropriate visualization of FEI's total (i.e. lifecycle) emission reductions, including the break out of those that can be accounted for within and outside of BC.

The objective of Figure 9-1 is to illustrate FEI's emission reduction initiatives that will be undertaken to meet the proposed GHGRS emissions cap for gas utilities. Only emissions from FEI's residential, commercial, and industrial customers will be subject to the GHGRS cap (please see the response to RCIA IR1 8.1) and, therefore, are the only sectors represented on this figure. Further, it should be noted that Figure 9-1 is based on end-use emissions while the LCT and global LNG emission reductions illustrated in Figure 9-5 are based on lifecycle emissions. It is not a straightforward process to convert these into end-use emissions for meaningful comparative purposes.

FEI received feedback from the RPAG that it was important to break out emission reductions that counted towards the GHGRS from LCT and global LNG. In doing so, FEI provided clarity of what initiatives were included for GHGRS emission reduction compliance. In recognition of the importance, and to provide a complete picture of all GHG emission reduction initiatives being undertaken in the Clean Growth Pathway, FEI provided Figure 9-5 in the Application. This figure provides a more appropriate visualization of FEI's total emission reductions than could be provided by adding LCT and global LNG to Figure 9-1.

For further discussion on FEI's emission reduction initiatives in the DEP and alternate scenarios please refer to the responses to BCUC IR1 72.2, 72.2.1 and 74.2.

7.2 Please explain which set of GHG emission reductions FEI is using in its Diversified Energy Planning Scenario to meet the GHGRS. For example, is it the Residential,

Commercial, and Industrial GHG emission reductions or the combined GHG emission reductions.

Response:

GHG emissions from FEI's residential, commercial and industrial customers will be subject to the GHGRS cap on emissions from buildings and industry. The emissions and emission reductions for these customers (categorized in Section 4 of the Application as the residential, commercial and industrial demand category) are a result of FEI's Clean Growth Pathway initiatives as modelled in the DEP Scenario. The emission reductions from low-carbon transportation and global LNG demand are not represented in the emission reductions to meet the GHGRS, as discussed in the response to BCOAPO IR1 7.1.

7.3 Please reconcile the 2019 GHG emissions from FEI's customers, of 12.84 Mt (Figure 9-6, page 9-9) with the total 2019 GHG emissions in Figure 9-1 which appears to be slightly higher than 11 Mt.

Response:

Figure 9-1 presents GHG emissions from FEI residential, commercial and industrial customers, which are a subset of the total customer emissions presented in Figure 9-6. Figure 9-6 includes customer-related emissions relating to CNG and LNG for on-road transportation as well as LNG for marine. In addition, Figure 9-1 is based on end-use emission factors used to calculate compliance with the GHGRS cap, while Figure 9-6 is based on life-cycle emission factors which adds roughly 20 percent to end-use emissions totals.

7.4 Please provide a breakdown of the 5.21 Mt 2030 DEP GHG emission reductions and the 7.83 Mt 2040 DEP GHG emission reductions (Figure 9-6, page 9-9) between the various sectors (Oil & Gas, Transportation, Industry, and Buildings & Community) that make up the total 2019 BC GHG emissions inventory that is slightly lower than 70 Mt.

Response:

In the table below, FEI provides a breakdown of the 5.21 Mt CO_2e DEP Scenario GHG emission reductions for 2030 and the 7.83 Mt CO_2e DEP Scenario emission reductions for 2042[11] between the various sectors (Oil & Gas, Transportation, Industry, and Buildings & Community) that make up the total 2019 BC GHG emissions inventory. As indicated in Section 9.2.3 of the Application, the purpose of Figure 9-6 is to provide a comparison of total (i.e. lifecycle) GHG emission reductions associated with FEI's customers in the DEP Scenario to the 2019 BC GHG emissions inventory for context and comparative purposes only.

Please note that, due to limitations of the modeling software, the table below and Figure 9-6 in the Application do not include the following emission reductions described in the response to BCUC IR1 72.2:

4) Emission reductions through the additional actions FEI will be taking to meet the proposed GHGRS cap by 2030; and

5) Pre-DSM demand emission reductions from fuel switching to electricity and natural efficiency.[12]

Table 1: FEI's Customer Emission Reductions in the DEP Scenario Compared to BC's 2019 GHG Emissions Inventory

	BC GHG Emissions Inventory	FEI Emission Reductions	
	2019	2030	2042
	(Mt CO2e)	(Mt CO2e)	
Oil and Gas	13.4	N/A	N/A
Transportation	26.8	-0.42	-0.45
Industry (Excluding Oil and Gas)	14.3	-1.18	-1.80
Buildings and Communities[13]	14.10	-2.42	-3.96
Global LNG	N/A	-1.19	-1.58
Total	**68.6**	**-5.21**	**-7.83**

Note the FEI Emission Reductions values provided in the table above are calculated based on a displacement of other fuels using a lifecycle GHG intensity. Comparison to the 2019 BC GHG

[11] FEI notes that the 7.83 Mt CO_2e GHG emission reductions in Figure 9-6 actually refers to 2042, as the figure title indicates, rather than 2040, as presented in the legend label.

[12] Efficiency improvements that occur through the natural replacement of older, less efficient equipment with newer, more efficient equipment as influenced by market transformation by DSM programs, regulations, and other factors.

[13] Total emission reductions for Buildings and Communities was calculated based on customer emission reductions for FEI's combined commercial and residential customers.

1 Emissions Inventory (end use values) as requested by the intervener is intended for illustrative
2 purposes only.

3

8.0 Reference: Exhibit B-1, FEI 2022 LTGRP Application

Section 9.1, page 9-1, lines 3-11

Topic: Risk Management

Preamble: FEI states:

> "FEI's vision for the future of energy in BC is that of a diverse, integrated and resilient network of energy infrastructure and services, building on the strength and benefits of both the existing gas and electric energy delivery networks in the province. FEI's role in this future is to utilize, grow and strengthen its gas transmission and distribution systems for the continued delivery of safe, secure and reliable energy to customers, while reducing carbon emissions for customers through the four pillars of its Clean Growth Pathway. As FEI proceeds down this pathway, the continued commercialization of existing technologies, advancements in new technology and innovation will enable deeper carbon emission reductions, while putting BC at the forefront of emerging industries such as those that will drive BC's future hydrogen economy." **(Application, page 9-1)**

8.1 Please provide a summary of FEI's analysis of the key risks to its Clean Growth Pathway and Diversified Energy Planning Scenario, including the following:

i. A description of the risks that are assessed as having a severity or likelihood that is moderate to high (for example, risk associated with annual energy demand forecasting, demand side resources, gas supply portfolio, and system resource needs and alternatives);

ii. An analysis of FEI's ability/flexibility to mitigate each of the moderate to high risks identified in (i) above;

iii. A description of the risk clockspeed (the rate at which the information necessary to understand and manage a risk becomes available - for example, slow, moderate, fast, very fast) of the moderate to high risks identified in (i) above;

iv. A heat mapping that provides the moderate to high risk categories and the corresponding severity, likelihood, ability to mitigate, and the risk clockspeed;

v. An analysis of the interconnectivity and potential for compounding of the moderate to high risks identified in (i) above;

vi. A description of FEI's risk capacity, risk tolerance, and risk appetite for each of the moderate to high risks identified in (i) above; and

vii. A summary of FEI's planned strategies to manage each of the moderate to high risks identified in (i) above.

Response:

FEI has assessed the risks relating to the Clean Growth Pathway, and, by extension, the DEP Scenario, which represents the outcome of implementing initiatives outlined in the pillars of the

Clean Growth Pathway, but this risk assessment was conducted in a manner different than that requested in the information request.

FEI's business risks, including risks associated with the four pillars of the Clean Growth Pathway and FEI's actions to mitigate these risks as set out in the response to BCOAPO IR1 1.1. FEI strives to manage these risks through the following actions:

6) Working closely with its customers and other stakeholders to understand their needs and requirements with the goal of increasing customer adoption;

7) Updating the general public, governments and regulators regarding the steps it is taking to cut GHG emissions and explaining the public interest aspect of maintaining safe and reliable gas infrastructure;

8) Performing pilot projects, such as those currently underway for gas absorption heat pumps, and investing in research and development through collaborating with universities and joint industry programs, such as the ongoing hydrogen blending research project with the University of British Columbia's Okanagan campus, to be at the forefront of technological change; and

9) Seeking revenue generation opportunities as well as cost efficiencies.

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 manage them. Some of the pillars of the Clean Growth Pathway, such as investing in DSM, are well-established and are based on the success of the programs and initiatives already implemented in the last few years and, therefore, may involve less risk than other components of the pillars which are in an earlier stage of development and are faced with greater technological, operational and policy risks.

9.0 Reference: Exhibit B-1, FEI 2022 LTGRP Application
Section 9.3, page 9-9
Section 9.4, pages 9-11 to 9-15
Topic: Rate Impact Implications of DEP

Preamble:

Table 9-2 (page 9-15) provides both the cumulative and equivalent annual rate impact of the DEP Scenario for the 20-year period between 2022 and 2042. For the Residential Class, Table 9-2 indicates that the DEP Scenario would result in equivalent annual rate increases of 4.0% for each year of the 20-year period resulting in cumulative rate increases of 118%.

In Figure 9-7 (page 9-13), it appears that the cumulative rate impact for the Residential Class to 2030 is in the range of a 90% increase in rates.

Section 9.4 of the LTGRP provides rate impact calculations for the DEP Scenario but does not provide FEI's assessment of the cumulative rate impacts or strategy or plan to manage/mitigate these rate impacts for customers;

The cumulative effective rate increase by 2042 under the Diversified Energy (Planning) Scenario is driven by increases in all three components – 50 percent due to the delivery rate impact, 41 percent due to commodity related impacts (cost of gas and storage & transport), and percent due to carbon tax increases. **(Application, page 9-15, lines 9-12)**

In Figure 9-8 (page 9-13) FEI estimates that the cumulative rate impacts for Small Commercial customers by 2042 is 102%. In Figures 9-9 and 9-10 (page 9-14), FEI estimates the cumulative rate impacts for Large Commercial customers is 107% and for General Firm Service is 114%.

FEI states: "Table 9-1 illustrates how FEI's investments in decarbonization will support ongoing market transformation across the energy services supply chain." **(Application, page 9-9, lines 18-19)**

9.1 Please provide FEI's assessment and perspectives of the rate impacts for Residential and Low-Income customers under the Diversified Energy (Planning) Scenario. For instance, does FEI view an approximately 90% increase in 8-years and 118% in 20-years as being affordable for these customers.

Response:

FEI is strongly incentivized to ensure that cost continues to be an important consideration in all of its activities. Finding solutions at the most reasonable cost to customers aids in keeping energy

affordable. Since affordability is relative and is defined differently by different customer segments, and even by customers within each segment, FEI views affordability and affordable rates through the lens of FEI's ability to transition to low carbon fuels at the lowest reasonable cost. For example, as discussed in the response to CEC IR1 14.3, FEI seeks to acquire renewable and low carbon gas at the lowest reasonable cost. Given this context, FEI notes that climate policy accounts for approximately 60 percent 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 (CPCNs and other capital) is approximately 2.4 percent for a residential customer.

Decarbonizing BC's energy systems has cost implications as it requires new clean energy (electricity or renewable and low carbon gas) which comes at a higher cost than embedded electrical energy or conventional natural gas (carbon tax not withstanding). Maintaining or increasing throughput on the system through the Diversified Energy (Planning) scenario benefits all customers in mitigating increased energy bills. Typically, customers that switch to alternative energy sources are those that can most afford to do so, as we have seen with the adoption of electric vehicles, which then leaves those remaining, who are not in a financial position to switch, bearing the increased costs. Furthermore, FEI's demand-side management programs, while having the effect of increasing rates, enable customers to invest in energy efficiency upgrades that decrease energy bills for consumers as their energy use declines.

9.2 Please describe and provide any measures and/or targets that FEI has as part of its Strategic Plan to measure affordability for customers in general, and for Residential and Low-Income customers in particular.

Response:

Affordability remains a core concern of FEI as it implements GHG reduction measures to meet provincial GHG reduction targets. As such, FEI is working with the provincial government to understand and inform the proposed GHGRS cap. 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 emissions reduction activities. FEI's Clean Growth Pathway demonstrates a cost-effective alternative to other GHG reduction pathway scenarios. For instance, as shown in Table 9-2 of the Application, a GHG reduction pathway under the Deep Electrification scenario would result in higher costs for customers than the DEP Scenario.

Since the details of the GHGRS are not yet finalized, FEI is unable to determine what measures or targets for affordability would be appropriate.

9.3 Please explain if it is FEI's view that its 2022 LTGRP is expected to be transformational for a number of decades into the future.

Response:

The transition to a low-carbon economy consistent with the provincial government's GHG reduction goals will impact all facets of BC's energy system for decades into the future. The Application, together with other recent regulatory filings, fit within FEI's broader climate strategy (the Clean Growth Pathway) which aims to ensure FEI's infrastructure and practices align with the energy transition.

The Application is a foundational document to further the evaluation of gas supply and system infrastructure options for meeting customer needs. The Application is shaped by the developments in climate change policy in recent years and, in particular, the 2018 CleanBC Plan and the 2021 CleanBC Roadmap to 2030, which set out ambitious targets for reducing greenhouse gas emissions. In response, the Application provides a plan to transition toward distributing renewable and low-carbon gas to FEI's customers. Given that FEI's LTGRPs are generally developed and updated every five years, future resource plans will build on the foundations of the Application as FEI continues to build, transform, and innovate in low-carbon and renewable gas production, supply, and utilization.

9.3.1 Please explain FEI's views in terms of intergenerational equity considerations associated with the rate increases estimated in the first 8-years of the LTGRP (ie: 90% increase for Residential and Low-Income customers to 2030).

Response:

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 referenced that can be deferred and considered over a longer time frame, FEI will consider that in its upcoming regulatory filings, at the time that rate approvals are requested.

9.4 Please provide FEI's perspective with respect to the potential for Residential and Low-Income customers to be impacted by commercial customers passing on cumulative rate increases in excess of 100% to their customers.

Response:

As noted on page 9-11 of the Application and considering FEI's response to BCOAPO IR1 9.3.1, the rate impacts provided in Section 9.4 of the Application represent an overview of the rate implications, as well as a directional, 20-year view of how FEI's rates will be influenced by the different scenarios. The issue of businesses passing costs through to customers is complex and varies from sector to sector, region to region and business to business as well as on the nature of the costs under consideration. FEI does not have further insight or control over whether or in what way businesses will pass along gas or electricity rate increases that result from carbon emission reduction policies and initiatives to customers.

9.5 Please explain if FEI has developed a rate impact mitigation plan associated with its Clean Growth Pathway and DEP Scenario.

9.5.1 If yes, please explain why FEI has not provided the rate impact migration plan as part of its 2022 LTGRP and please provide a summary of the plan.

9.5.2 If not, please explain why not given the magnitude of the rate impacts that flow from FEI's 2022 LTGRP.

Response:

Energy affordability is a key priority for FEI, as embedded in the following LTGRP planning objectives:

10) Ensure cost-effective, secure and reliable energy for customers; and

11) Provide cost-effective DSM and lower carbon solutions.

The purpose of the LTGRP is to provide FEI's 20-year vision for meeting the forecast peak demand and energy requirements of customers with demand-side and supply-side resources and establish an action plan that will implement this vision. 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. As highlighted in Section 9.4 of the Application, the rate impacts provided as part of the LTGRP process, simply provide a directional view over a 20-year period of FEI's rates resulting from the different scenarios.

FEI's rates are reviewed by the BCUC under different rate setting proceedings. For example, the commodity and midstream rates are reviewed by the BCUC through FEI's quarterly gas costs reporting while delivery rates are reviewed through FEI's Annual Review or Revenue Requirement Application (RRA) processes. Any rate impact mitigation strategies are more appropriately explored in these rate setting proceedings where all aspect of FEI's revenue requirements are available for consideration and should not be considered as part of the Application.

9.6 Please explain why the proportion of the cumulative effective rate increases due to delivery rate impacts (50%) is higher than the proportion due to the commodity related impacts (41%) and the proportion due to the carbon tax increases (9%).

Response:

The delivery rate impacts are estimated to have a higher proportion of the overall rate impact than commodity and carbon tax related impacts by 2042 for the following reasons:

12) Delivery rates are influenced by the overall forecast demand for gas, which under the DEP scenario, is forecast to reduce by approximately 12 percent, with the residential demand forecast decreasing by approximately 25 percent by 2042. A reduction in demand will generally result in higher delivery rates because delivery rates (delivery margin) are predominantly made up of fixed system costs that do not vary (cannot be reduced) with decreasing demand. In contrast, commodity related charges and carbon taxes vary directly with demand and decrease with FEI's demand forecast. FEI notes if the reduction in demand forecast under the DEP Scenario were excluded from the rate impact analysis, the proportion of the cumulative effective rate increase due to delivery rates would be reduced to 37 percent, while the proportion due to commodity related charges would be increased to 52 percent and carbon tax to 11 percent;

13) The proportion of the cumulative rate increase due to carbon tax is smaller at 9 percent because, as discussed on page 9-12 of the Application, carbon tax is expected to escalate to $170 per tonne by 2030 and will remain constant thereafter to 2042. In contrast, both the delivery rates (as mentioned above) and the commodity related charges (due to an increasing mix of renewable gas) will continue to increase until 2042.

9.7 Please provide a high-level breakdown of the 50% cumulative rate increase due to the delivery rate impacts between infrastructure, DSM, and other drivers.

Response:

Please refer to the response to BCUC IR1 75.5. FEI clarifies that the 50 percent shown on lines 9 to 12, page 9-15 of the Application is not the cumulative rate increase from 2022 to 2042. Rather, it is the proportion of the cumulative rate increase of 118 percent for residential customers that is due to delivery rate changes (i.e., 59 percent divided by total cumulative increase of 118 percent).

9.8 Please explain if FEI developed a rate impact sensitivity analysis for the DEP Scenario by varying the key parameters in the DEP Scenario that have the most impact on the rate impacts.

9.8.1 If yes, please provide the sensitivity analysis.

9.8.2 If not, please explain why not.

Response:

Rather than completing sensitivity analysis on key parameters within the DEP Scenario, FEI provided sensitivity analysis on various key parameters, resulting in the different scenarios over a 20-year planning period for which FEI has provided directional rate impacts in Section 9.4 of the Application. For example, the Deep Electrification scenario represents a sensitivity analysis on rates for low demand, low customer growth, low LCT demand, and accelerated fuel switching when compared to the DEP Scenario, while the Upper Bound scenario serves as a sensitivity analysis on rates for high demand, high customer growth, high LCT demand, and low natural gas price when compared to the DEP Scenario.

The purpose of the rate impacts shown in Section 9.4 of the Application is to demonstrate the direction of rates over a 20-year period and to show the difference between each scenario. Completing additional sensitivity analysis on key parameters within the individual scenarios would not have changed the comparison between each scenario. For example, if one was to conduct a +5 percent sensitivity analysis on the demand forecast under the DEP Scenario, the same +5 percent sensitivity analysis would also be applied to the Deep Electrification scenario, resulting in the comparison of these two scenarios being the same as presented in Section 9.4 of the Application.

Please refer to Section 4.5 of the Application, specifically Table 4-1 for the different parameters between each scenario explored in the Application. Additionally, please also refer to Section 5.4 for a discussion and sensitivity analysis of a low, medium, and high DSM spending levels.

10.0 Reference: Exhibit B-1, FEI 2022 LTGRP Application

Executive Summary, page ES-19

Section 10, pages 10-1 to 10-9

Topic: Action Plan

Preamble: FEI states:

"The Action Plan describes the activities that FEI intends to pursue over the next four years based on the discussion and conclusions provided in this LTGRP. The specific Action Items include the following:

1. Accelerate the development and acquisition of renewable and low-carbon gas supplies to meet customer energy needs and contribute to provincial emission reduction targets;
2. Pursue approval of DSM funding for the period beyond 2022 by submitting for BCUC approval a DSM expenditure plan in 2022;
3. Continue pursuing FEI's LCT and global LNG initiatives to address market opportunities 10 for load growth in support of customer rates and reducing local and global GHG emissions;
4. Continually improve engagement processes and activities associated with FEI's long-term gas resource planning;
5. Seek BCUC approval for a deferral account to capture the costs of advancing the development of the RGSD project;
6. Continue to develop and implement FEI's Gas System Resiliency Plan;
7. Plan for and prepare CPCN applications for near-term system requirements identified in Section 7 to support safe, reliable and cost effective gas delivery to FEI's customers;
8. Continue monitoring, analyzing, and contributing to the energy planning environment while working with government on policy framework for deep decarbonization;
9. Protect and promote the interests of FEI's customers by securing reliable, cost-effective, long-term gas supplies that include increasing proportions of renewable and low-carbon gas;
10. Continue monitoring for and evaluating system expansion needs across FEI's service regions; and
11. Prepare and submit FEI's next LTGRP." **(Application, ES-19)**

"As discussed throughout this LTGRP, the energy planning environment is rapidly changing and FEI is undergoing an important shift to decarbonize the energy it

delivers to customers. These changes have implications for FEI's services and infrastructure that continue to need further study and discussion as part of the long-term resource planning process. As such, FEI believes the period between filing this LTGRP and filing its next LTGRP should be shorter than the previous interval. FEI anticipates filing its next LTGRP approximately 2 to 3 years following the conclusion of the regulatory process for its 2022 LTGRP. "**(Application, pages 10-8 to 10-9)**

In Section 10 of the Application, for each of the 11 action plan items noted above, FEI provides several bullet points under each action item that provides more detailed action plans.

10.1 Please provide FEI's perspective on whether the 11 action items as summarized in the Executive Summary are consistent with FEI's strategies to implement the Clean Growth Pathway and DEP Scenario.

Response:

FEI confirms that the items in the Action Plan describe the activities it intends to pursue over the next four years based on the DEP Scenario, which is modelled on the Clean Growth Pathway.

10.2 For each of the bullet points provided on pages 10-1 to 10-9 of the Application which represent details of the action plan, please provide the associated milestones (i.e. how FEI knows that a detailed action step has been achieved) and required timeline (i.e. when FEI needs to achieve the detailed action step in order to implement its plan).

Response:

The Action Items set out in Section 10 of the Application are not intended to represent individual projects, and each of the Action Items and supporting activities will vary as to the extent they lend themselves to the identification of milestones and step-by-step project plans. Action Items may involve ongoing activities that do not have defined end dates and receive support from a number of individual projects that work together to further one or more Action Items. For these reasons, FEI internally develops and manages detailed project plans, including timelines and milestones, for individual activities supporting resource plan Action Items. The design and management of these projects, due to their evolving and often granular nature, is not conducive to review through LTGRP proceedings. Those Action Items that require further BCUC approvals will involve project plans that will be reviewed through subsequent application review proceedings. With that in mind, FEI believes that transparency and accountability are important aspects of its Clean Growth Pathway and offers the following additional information.

Business units across FEI are actively engaged in the ongoing implementation of the Clean Growth Pathway as outlined in the Action Items detailed in the Action Plan. Milestones for the Clean Growth Pathway are tracked internally, and progress is published annually in FortisBC's Corporate and Sustainability Report.[14] The current status of each Action Item is commented on below:

1. Accelerate the development and acquisition of renewable and low-carbon gas supplies to meet customer energy needs and contribute to provincial emission reduction targets

As noted in the 2021 Corporate and Sustainability Report, FortisBC's goal is to grow renewable and low-carbon gas supply to 15 percent of total gas supply by 2030.[15] In 2021, FEI increased its annual RNG supply by 184 percent compared to its 2020 supply,[16] and as of the end of 2021, there are 10 active suppliers of RNG providing about 0.7 PJ of energy.[17] FEI is currently in discussions with the Province regarding the accelerated targets of the GHGRS emissions cap and implications to FEI's Clean Growth Pathway implementation plans involving renewable and low-carbon gas supply.

2. Pursue approval of DSM funding for the period beyond 2022 by submitting for BCUC approval a DSM expenditure plan in 2022

FEI submitted its 2023 DSM Expenditures Plan on July 5, 2022,[18] which is currently under review by the BCUC. As noted in the 2021 Corporate and Sustainability Report, recent DSM achievements include reaching a significant investment milestone with close to $107 million invested in FEI's gas efficiency programs.[19] These 2021 investments in energy efficiency are expected to save around 12 million GJ of natural gas over the lifespan of the related upgrades.

3. Continue pursuing FEI's LCT and global LNG initiatives to address market opportunities for load growth in support of customer rates and reducing local and global GHG emissions

As noted in FortisBC's 2021 Corporate and Sustainability Report, recent achievements in pursuing LCT and global LNG initiatives include supporting over 1,000 medium- and heavy-duty vehicles operating on CNG or LNG,[20] delivering more than 1,100 containers of LNG in 2021.[21] In

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[14] FortisBC, Corporate and Sustainability Report (2021) online at: https://www.cdn.fortisbc.com/libraries/docs/wwwfortisbccomsustainabilityreportnewlibraries/default-document-library/22-030-7_sustain-corp_report2021_booklet_press.pdf?sfvrsn=f3ecd232_2.
[15] Page 11.
[16] Page 17.
[17] Page 19.
[18] FortisBC Energy Inc., Demand Side Management Plan (July 5, 2022) online at: https://www.cdn.fortisbc.com/libraries/docs/default-source/about-us-documents/regulatory-affairs-documents/gas-utility/220705-fei-2023-dsm-expenditures-plan-application-ff.pdf?sfvrsn=c0ef272c_2.
[19] Page 21.
[20] Page 19.
[21] Page 20.

late 2021, Seaspan became first Canadian Marine Company to pilot the use of RNG in one of its LNG-powered vessels.[22]

4. Continually improve engagement processes and activities associated with FEI's long-term gas resource planning

FEI will be re-convening the engagement process upon completion of the 2022 LTGRP regulatory process.

5. Seek BCUC approval for a deferral account to capture the costs of advancing the development of the RGSD project

On June 1, 2022, FEI filed an application with the BCUC pursuant to sections 59 to 61 of the *Utilities Commission Act* (UCA) for approval of a new non-rate base deferral account to capture actual development costs incurred for the project. On September 14, 2022, FEI received approval to establish the RGSD Development Account, a non-rate base deferral account to capture actual development costs, with disposition of the deferral account balance to be determined in a future proceeding.

6. Continue to develop and implement FEI's Gas System Resiliency Plan

FEI continues to develop the Gas System Resiliency Plan through ongoing capital project proceedings and business operations. Please refer to the responses to CEC IR1 47 series for a discussion of FEI's Gas System Resiliency Plan considerations.

7. Plan for and prepare CPCN applications for near-term system requirements identified in Section 7 to support safe, reliable and cost effective gas delivery to FEI's customers

Projects outlined in the Action Plan requiring CPCN applications are on-track for submission. Both the Interior Transmission System and the OCU Project CPCN application have been filed and are in different stages of review.

8. Continue monitoring, analyzing, and contributing to the energy planning environment while working with government on policy framework for deep decarbonization

FEI continues to collaborate with all levels of government through the implementation of the Clean Growth Pathway and the proposed GHGRS.

[22] Page 20.

9. Protect and promote the interests of FEI's customers by securing reliable, cost-effective, long-term gas supplies that include increasing proportions of renewable and low-carbon gas

FEI provides this service to its customers through its ongoing business operations as presented in its Annual Contracting Plan filed with the BCUC for acceptance each year.

10. Continue monitoring for and evaluating system expansion needs across FEI's service regions

FEI examines system expansion needs annually as part of its ongoing business operations.

11. Prepare and submit FEI's next LTGRP

The date of the next LTGRP submission will be determined as part of the regulatory proceeding for the Application and upon clarification of the compliance pathway for the proposed GHGRS emissions cap. FEI anticipates filing its next LTGRP approximately 2 to 3 years following the conclusion of the regulatory process for the Application, which FEI expects to be completed towards the end of 2023. Therefore, the filing of FEI's next LTGRP could be in 2025 or 2026.

10.3 Please plot the milestones and the timeline for each of the detailed action steps on a Gantt Chart for the four years of this Action Plan.

Response:

For the reasons set out in the response BCOAPO IR1 10.2, FEI is not able to provide a Gantt Chart for the referenced items.

10.4 Please provide FEI's perspectives with respect to the monitoring activities that the BCUC should direct and undertake related to FEI's execution of the 2022 LTGRP Action Plan in the next two or three years before the filing of FEI's next LTGRP.

Response:

Please refer to the response to BCUC IR1 78.2 which outlines the key parameters FEI will monitor to evaluate the 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.

10.5 Will the action plan be formally updated prior to FEI filing its next LTGRP?

10.5.1 If yes, when and will it be publicly available?

Response:

The Action Plan to the Application will be updated as part of the next LTGRP.