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British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

Attention: Mr. Patrick Wruck, Commission Secretary

Dear Sirs/Mesdames:

Re: FortisBC Energy Inc. ("FEI") 2022 Long Term Gas Resource Plan – Project No. 1599324 - Final Argument

In accordance with the regulatory timetable in the above proceeding, we enclose for filing the Final Argument of FortisBC Energy Inc., dated November 1, 2023.

Yours truly,

FASKEN MARTINEAU DuMOULIN LLP

[Original signed by]

Christopher Bystrom*
*Law Corporation

Encl.

cc (email only): Registered Interveners.

British Columbia Utilities Commission

FortisBC Energy Inc.

2022 Long-Term Gas Resource Plan

Final Argument of

of

FortisBC Energy Inc.

November 1, 2023

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PART ONE: INTRODUCTION

A. OVERVIEW

1. FortisBC Energy Inc. (FEI) respectfully requests that the British Columbia Utilities Commission (BCUC) accept its 2022 Long-Term Gas Resource Plan (2022 LTGRP) as being in the public interest pursuant to section 44.1(6) of the *Utilities Commission Act* (UCA).[1] As with past long-term resource plans, the 2022 LTGRP presents FEI's long-term plan for meeting the forecast peak demand and energy requirements of customers with demand-side and supply-side resources over a 20-year planning horizon (2023 to 2042). Significantly, the 2022 LTGRP also provides a preliminary overview of how FEI plans to transition to a low-carbon energy future and, in particular, how FEI will shift to distribute increasing amounts of renewable and low-carbon gases in its system. In making this transition, the 2022 LTGRP reflects FEI's core resource planning objectives to ensure cost-effective, secure and reliable energy for customers and provide cost-effective demand-side management (DSM) and lower-carbon solutions, in a manner consistent with provincial energy objectives and prior BCUC directives.

2. FEI's 2022 LTGRP has been shaped and designed to align with the developments in climate change policy and, in particular, the Province's 2018 CleanBC plan (CleanBC plan) and the 2021 CleanBC Roadmap to 2030[2] (Roadmap) which set ambitious targets for reducing greenhouse gas (GHG) emissions. In response to these policies and the need to reduce GHG emissions, FEI's planning scenario in the 2022 LTGRP is the Diversified Energy (Planning) Scenario (DEP Scenario), which is based on FEI's Clean Growth Pathway.[3] The DEP Scenario was designed specifically to undertake all available and reasonable GHG emission reduction activities to meet the 2030 proposed Greenhouse Gas Reduction Standard (GHGRS) cap and the 2040 legislated targets.[4] Consistent with FEI's 20-year vision in the Clean Growth Pathway, FEI's DEP Scenario sets a course to meet provincial emission reduction targets through accelerating FEI's renewable and low-

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1 R.S.B.C. 1996, c. 473.

2 Exhibit B-1, 2022 LTGRP, Appendix A-5, CleanBC Roadmap to 2030.

3 Exhibit B-1, Appendix A-1, Clean Growth Pathway to 2050.

4 Exhibit B-6, BCUC IR1 74.1, 74.2.

carbon gas supply, supporting the decarbonization of buildings through DSM activities, growing customer demand in sectors that reduce GHG emissions, and other activities.

3. FEI's Clean Growth Pathway and the DEP Scenario reflect a diversified energy pathway as they sustain the growth and viability of both gas and electricity infrastructure in the Province to support BC's future energy needs in the most cost-effective manner. As described in Guidehouse's report titled Pathways for British Columbia to Achieve its GHG Reduction Goals (Pathways Report),[5] a diversified pathway is a more affordable, resilient and practical pathway for BC than a pathway focused on electrification with a declining overall role for the provincial gas distribution system. While future resource plans will provide increasingly more detail on the mechanics and progress of this transition, the 2022 LTGRP demonstrates FEI's leadership and forward-thinking planning for a diversified energy future that will provide low-carbon, resilient, cost-effective energy delivery to its customers.

4. FEI responds to the Panel's request[6] regarding the impact of the amendments to the *Demand-Side Measures Regulation* (DSM Regulation)[7] in Part Four, Section B, of this Final Submission. As FEI discusses in detail in that Section, the 2022 LTGRP clearly and explicitly demonstrates FEI's plan and intention to pursue adequate, cost-effective DSM as may be required by the DSM Regulation or any other new or amended legislation that may be in place over the 20-year planning horizon. FEI submits that consideration of FEI's intentions to maximize adequate and cost-effective DSM strongly supports acceptance of the 2022 LTGRP.

5. Overall, FEI submits that the 2022 LTGRP meets the requirements of the UCA in a comprehensive, robust and transparent manner, supports BC's energy objectives, maximizes the potential of cost-effective DSM, and is in the interests of present and future customers. Considered on a holistic basis, FEI submits that the 2022 LTGRP has set out a vision for FEI's transition to a low-carbon future that is compelling and offers significant benefits to customers. FEI has not maintained the status quo, but rather is an industry leader in pursuing higher levels

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5 Exhibit B-1, Appendix A-2, Pathways for British Columbia to Achieve its GHG Reduction Goals.

6 Exhibit A-19, Letter dated October 5, 2023 – BCUC requesting matters to be addressed in final arguments.

7 Ministerial Order No. M193 (B.C. Reg. 326/2008).

of DSM, acquiring increasing amounts of renewable natural gas (RNG) supply, and pioneering the market development of other low-carbon gas supply, most notably, hydrogen. FEI therefore submits that the 2022 LTGRP is in the public interest and should be accepted by the BCUC.

B. APPROVAL SOUGHT

6. FEI is seeking an order from the BCUC accepting the 2022 LTGRP under section 44.1(6) of the UCA as being in the public interest. A draft order is attached as Appendix H-1 to Exhibit B-1.

7. For clarity, FEI is not seeking any approval or acceptance in this 2022 LTGRP of a DSM plan or any particular DSM expenditures. Rather, the 2022 LTGRP reflects FEI's clear and explicit intention to pursue adequate, cost-effective DSM over the planning horizon, as may be defined by the DSM Regulation or other legislation that may be in place over the 20-year planning horizon. More particularly, the 2022 LTGRP reflects FEI's plan to pursue the High DSM Setting, which maximizes energy savings potential and therefore the potential to reduce GHG emissions by accelerating building retrofits, high performance new construction and energy efficiency in commercial and industrial processes. FEI's plan to maximize the potential of DSM and pursue adequate, cost-effective DSM over the planning horizon is reflected in FEI's resource planning objectives – "to provide cost-effective DSM and lower carbon solutions"[8] – and is a pillar of the Clean Growth Pathway and the DEP Scenario.

8. FEI is also not seeking approval or acceptance of any specific gas supply contracts or resource projects that are identified within the LTGRP. The 2022 LTGRP serves as a foundation for further evaluation of gas supply and system infrastructure options for meeting forecast customer needs under different scenarios. FEI will further evaluate any specific gas supply opportunities or resource projects that are identified within the LTGRP and file separate applications with the BCUC as needed in the future.[9]

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[8] Exhibit B-1, p. 1-8.

[9] Exhibit B-1, p. 1-2.

C. LEGAL FRAMEWORK FOR REVIEWING FEI'S 2022 LTGRP

9. FEI submits that the BCUC's Decision and Order G-39-19 on FEI's 2017 LTGRP (2017 LTGRP Decision) provides a correct and helpful interpretation of the legal framework for the review and acceptance of FEI's long-term resource plans filed under section 44.1 of the UCA. In the 2017 LTGRP Decision, the BCUC reviewed the legal framework provided by section 44.1 of the UCA, which specifies what a resource plan must include, what factors the BCUC must consider, and that the BCUC must accept the plan if it determines that carrying out the plan would be in the public interest. The BCUC concluded:[10]

> Given the legislative framework outlined above, the key questions for the Panel regarding FEI's request for the BCUC to accept its 2017 LTGRP are as follows:
>
> - Has FEI met the section 44.1(2) filing requirements?
> - Do the section 44.1(8) considerations support acceptance?
> - Is the 2017 LTGRP in the public interest?
>
> . . . The Panel takes a holistic approach to determining if the 2017 LTGRP should be accepted in the public interest by considering harmoniously all of the provisions of section 44.1 of the UCA.

10. FEI submits that the considerations guided by this framework lead to the conclusion that the 2022 LTGRP is in the public interest and should be accepted.

D. ORGANIZATION OF THE REMAINDER OF THIS FINAL SUBMISSION

11. FEI has organized the remainder of this Final Submission around the following points:

- **Part Two:** The Clean Growth Pathway sets the vision for FEI's transition to a low-carbon future, and FEI's selection of the DEP Scenario as the planning scenario for the 2022 LTGRP is reasonable and appropriate and in the public interest.
- **Part Three**: The 2022 LTGRP meets the filing requirements in section 44.1(2) of the UCA in a comprehensive, robust and transparent manner.

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[10] 2017 LTGRP Decision, p. 4.

- **Part Four**: The considerations in section 44.1(8) of the UCA strongly support acceptance of the 2022 LTGRP, including FEI's intent to pursue adequate and cost-effective DSM and the interests of present and future customers.

- **Part Five**: FEI's 2022 LTGRP is in the public interest considered from a holistic perspective.

- **Part Six** concludes this Final Submission.

PART TWO: CLEAN GROWTH PATHWAY AND DEP SCENARIO ARE REASONABLE AND APPROPRIATE AND IN THE PUBLIC INTEREST

12. The heart of the 2022 LTGRP is FEI's Clean Growth Pathway, which represents FEI's 20-year vision and framework to transition to a low-carbon energy future.[11] The Clean Growth Pathway represents the most cost-effective way to reach carbon reduction targets, catalyse energy innovation, and meet BC's growing need for energy over the long term. In addition to achieving provincial GHG emission reductions, the Clean Growth Pathway will help keep rates more affordable for customers and maintain a reliable, resilient energy delivery system in the Province, as well as promote economic development. Following the Clean Growth Pathway, the DEP Scenario modelled in the 2022 LTGRP provides a preliminary overview of how FEI plans to transition to a low-carbon energy future, including how FEI will shift to distributing more renewable and low-carbon gas. FEI submits that its Clean Growth Pathway and its selection of the DEP Scenario as the planning scenario are reasonable, appropriate and in the public interest.

13. In the subsections below, FEI discusses the key benefits of a diversified energy pathway, the four pillars of FEI's Clean Growth Pathway to achieve these benefits, and how the choice of the DEP Scenario as the planning scenario is reasonable, appropriate and in the public interest.

A. CLEAN GROWTH PATHWAY PROVIDES SIGNIFICANT BENEFITS TO FEI'S CUSTOMERS AND THE PROVINCE

(a) The Clean Growth Pathway Provides the Lowest-Cost Path to Reducing GHG Emissions

14. A key benefit of the Clean Growth Pathway is that it provides a more cost-effective method of reducing GHG emissions in the Province. The Clean Growth Pathway is a lower-cost approach than a deep electrification pathway primarily because it optimizes both the gas and electric systems. By using the 50 thousand kilometres of existing energy delivery infrastructure of FEI's gas system, the Clean Growth Pathway avoids the need for a more extensive build-out of the electricity system.[12]

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[11] Exhibit B-1, Appendix A-1.

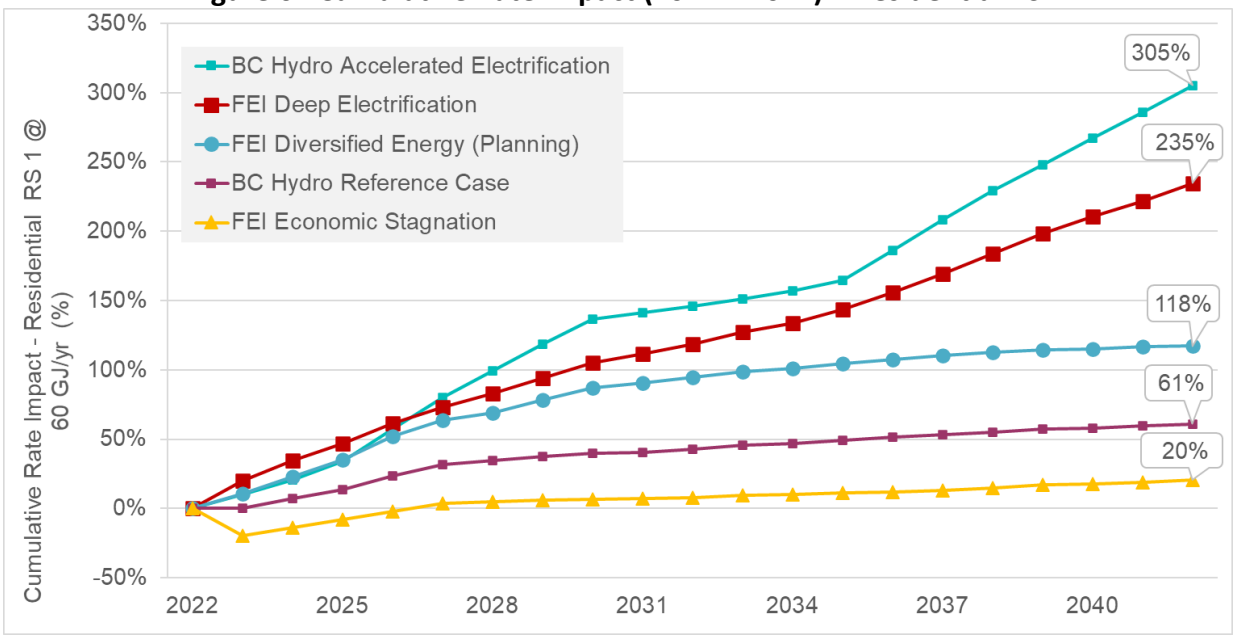
[12] Exhibit B-1, Section 3.2.2.1.

15. This is supported by the Pathways Report[13] by Guidehouse, which compares a Diversified Pathway to an Electrification Pathway, and concludes:[14]

> [T]he Diversified Pathway can achieve the same level of provincial GHG emissions reductions as the Electrified Pathway at a significantly lower cost to British Columbians. Although initiatives are used to different extents, both pathways defined in this study would require transformative changes in every sector of BC's economy. By 2050, the societal value of achieving the Diversified Pathway is expected to be in excess of [$91 billion] higher than the Electrification Pathway.

16. Guidehouse's conclusion in the Pathways Report is borne out in FEI's more recent modelling in the 2022 LTGRP, which shows the DEP Scenario as having lower rate impacts compared to electrification-centric scenarios. For example, the following illustrates a 20-year directional view of the impacts on FEI's residential rates under the DEP Scenario, FEI's Deep Electrification Scenario and BC Hydro's Accelerated Electrification scenario.[15]

Figure 6: Cumulative Rate Impact (2022 – 2042) – Residential RS 1



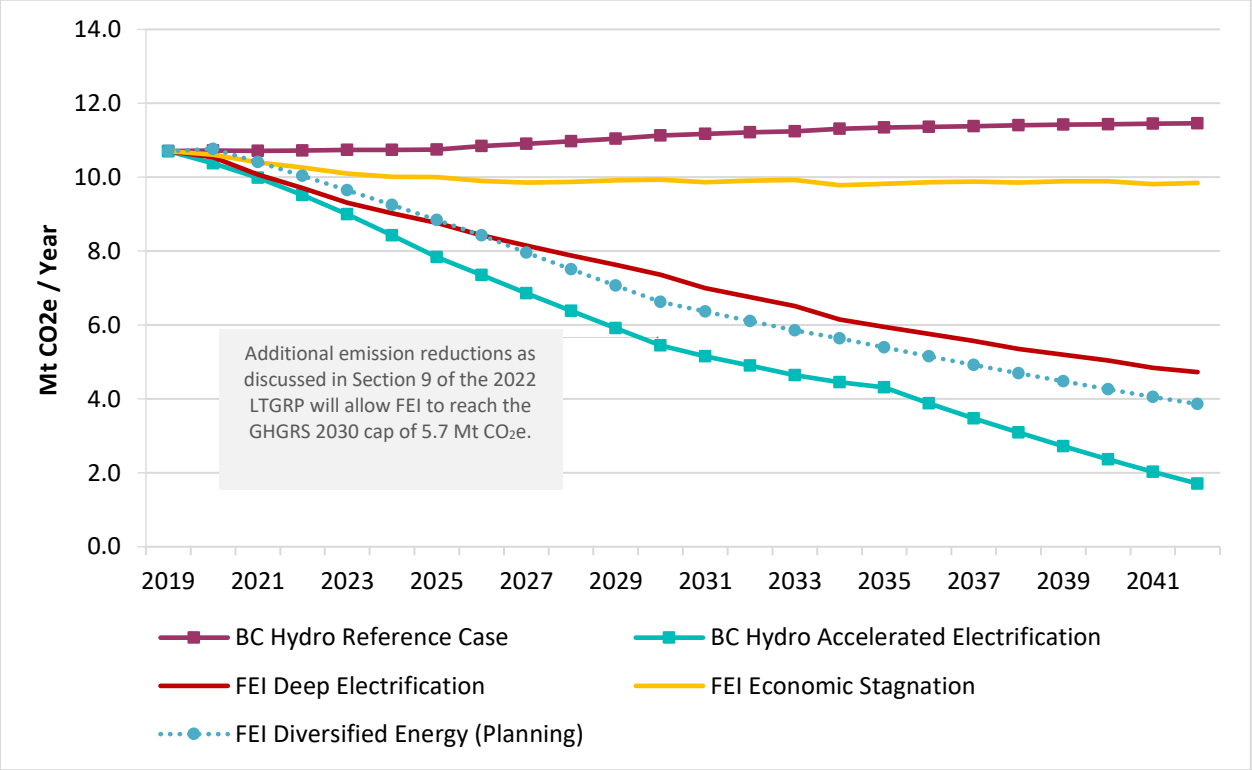
[13] Exhibit B-1, Appendix A-2.

[14] Exhibit B-1, p. 3-3, citing Appendix A-2, p. 27. For discussion of assumptions in the Pathways Report, see Exhibit B-23, BCUC IR2 83 Series. Note that the cost differential between the two pathways was updated during this proceeding whereby Guidehouse identified a typographical error in their analysis. The updated value is provided here as clarified in response to BCUC IR2 83.8 (Exhibit B-23).

[15] Exhibit B-4, FEI Energy Scenarios Stage 2 Submission, p. 20. Also see Exhibit B-32, RCIA IR2 42 Series for further information on FEI's modelling of BC Hydro's Accelerated Electrification scenario.

17. Moreover, as illustrated in the figure below, FEI's DEP Scenario is able to maintain these lower rate impact levels, while still meeting GHG reduction targets.[16] Note that BC Hydro's Accelerated Electrification Scenario has deeper annual emission reductions than FEI's DEP Scenario, because it modelled a rapid decline in gas demand and a transition to renewable and low-carbon gas supply.[17] However, if a deep electrification approach is taken, gas customers would likely not be able to bear the costs of renewable and lower-carbon gas and the increased costs of electricity associated with Deep Electrification, as illustrated by the rate impact analysis above.[18]

Figure 10: GHG Emissions (End-Use) for Residential, Commercial and Industrial Customers



18. FEI further supported the conclusions above through the Kelowna Electrification Case Study (Case Study), which analyzes the impacts of electrification in Kelowna, BC. This Case Study

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[16] Exhibit B-4, FEI Energy Scenarios Stage Two Submission, p. 24. Note that the figure below does not include in the DEP Scenario the additional reductions discussed in Section 9.2.1.4 of the 2022 LTGRP, related to other demand-side measures not modelled in the 2021 Conservation Potential Review (CPR) and higher-than-modelled CCUS implementation.

[17] Exhibit B-4, FEI Energy Scenarios Stage Two Submission, p. 24.

[18] Exhibit B-6, BCUC IR1 30.3, 72.3.

illustrates the extreme scale of impacts on peak electricity demand and the subsequent system upgrade and land requirements for the electric utility.[19] The results show that at 100 percent electrification of gas load and a mean daily temperature of -26 Celsius (C), peak demand in 2040 would more than triple, from 472 megawatts (MW) to 1,429 MW.[20] A high-level indication of the lower bound of cost impacts for FBC customers shows that the capital expenditures for Kelowna alone for 100 percent electrification would result in significant rate impacts to FBC's electric customers of 145 percent by 2042 when compared to the 2023 Approved rates.[21] FEI discusses the Case Study in further detail below in Part Three, Section A(e) of this Final Submission.

(b) The Clean Growth Pathway Will Provide a More Resilient and Reliable System, Lowering Risks for British Columbians

19. A second key benefit of the Clean Growth Pathway is that it leads to a more resilient and reliable energy delivery system for British Columbians by utilizing the strengths of the gas system and preserving two energy delivery systems that complement each other. The resilience of BC's energy system is best achieved through keeping both gas and electric energy systems thriving to ensure British Columbians are not relying on a single energy system. Where one system is experiencing a supply disruption, the other can provide support to meet customer demand in the interim. This ultimately lowers the public health and safety risk for British Columbians by increasing the availability of heat, especially on the coldest days.

20. A diversified approach increases reliability by leveraging the strength of the gas system to meet peak demand, thus lowering risks, including public health and safety risk, to British Columbians. This was illustrated by the exceptionally cold weather on December 27, 2021, when the gas system delivered approximately two times as much energy as the electric system to meet the peak energy needs of British Columbians.[22] A similar cold snap was experienced on December 22, 2022, where, for example, the Kelowna region experienced a daily average temperature of

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19 Exhibit B-6, BCUC IR1 30.3; Exhibit B-20.

20 Exhibit B-20, p. 1.

21 Exhibit B-23, BCUC IR2 120.1.

22 Exhibit B-1, pp. 3-5 to 3-6.

minus 24.4 degree Celsius.[23] During events like these, the ability of the gas system to serve peak demand is an essential service to British Columbians and is the product of decades of investment.

21. Gas transmission and distribution systems also experience significantly fewer outages than electric networks. The vast majority of electric transmission in North America is via overhead power lines, which are more exposed to disruptive events, including: lightning, wind, ice, trees and third-party contacts. On average, a typical 80 km overhead electric transmission circuit is expected to experience one unplanned outage event per year. In contrast, large-diameter, high-pressure pipelines may operate for long periods without experiencing any unplanned outage events. In interconnected gas networks with numerous supply points interspersed with multiple delivery points, a reliable network is a consequential outcome. As load increases on the electric system to support decarbonization such as through the adoption of electric vehicles and as new low or zero-carbon electric generation will be required to service that load, FEI anticipates that maintaining the reliability of that system will be an ever-increasing challenge. The strategies employed through the Diversified Pathway are one component of addressing this reliability challenge. On average, a typical natural gas customer in BC would expect 69 seconds of service outage per year, compared to approximately 2.4 hours per year for a typical FBC electric customer (even with the high standards of reliability and the redundancy built into the electric system). In practice, the vast majority of FEI's customers have never experienced a single natural gas outage, other than for planned reasons such as a meter exchange.[24]

22. A diversified approach is of even greater importance with the advent of extreme weather events caused by climate change, which can catalyze unanticipated system outages. Energy supply disruptions during extremely cold weather, such as the events that occurred in the winters of 2021 and 2022, could have significant customer impacts and result in serious societal harm, as was experienced in the state of Texas during the February 2021 winter storm.[25]

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[23] Exhibit B-27, BCSSIA IR2 19.2.

[24] Exhibit B-1, Appendix E, Gas System Resiliency Plan, pp. 6-7.

[25] Exhibit B-1, p. 2-36.

23. Finally, the need for resilience is even greater as energy supply on both gas and electric systems shifts to incorporate intermittent sources. However, the gas and electric systems can complement each other providing greater overall energy system resiliency. Meeting peak thermal requirements and providing resiliency and reliability from the gas system is essential for moderating electric peak load growth and ensuring an overall smoother low-carbon transition for BC's energy consumers.

(c) Other Significant Benefits of the Clean Growth Pathway

24. Other significant benefits of a diversified pathway include:

- **Maintaining Gas Infrastructure to Reduce GHGs in Difficult-to-Decarbonize Sectors:** A diversified approach preserves gas infrastructure to reduce GHGs in high-emitting but difficult to decarbonize sectors, such as the industrial, low-carbon transportation, and LNG export sectors.[26] While some of the GHG emission reductions in marine fueling and global LNG sales will occur outside of BC, all of the revenues from this activity will benefit FEI's customers by helping to offset the rate impacts of decarbonizing the gas supply.[27]

- **Support for Emerging Technologies and Innovation**: FEI's approach to decarbonizing the gas supply will be through renewable and low-carbon gas production, carbon capture, utilization and storage (CCUS) and other technologies that generate low-carbon gas. Table 9-1 of the 2022 LTGRP describes how FEI's investments will support market transformation.[28] In parallel, there will be continued innovation to the electric system bringing on renewables, and upgrades to transmission and distribution networks.[29]

- **Economic Development in BC**: Clean energy projects to develop renewable and low-carbon gas, increased DSM investment in buildings and industry, investment

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[26] Exhibit B-1, Sections 3.5, 3.6, 9.3 & Table 9-1; Exhibit B-1, Appendix A-1, Clean Growth Pathway to 2050, p. 4; Exhibit B-1, Appendix A-9.3, An EU Strategy for Energy System Integration, pp. 3, 11. In contrast to a diversified pathway such as the DEP Scenario, the conditions present in a deep electrification pathway do not encourage diversified energy solutions, hindering such investments and resulting in minimal carbon reductions for these high energy users that are difficult to decarbonize: Exhibit B-1, p. 9-6. See also: Exhibit B-6, BCUC IR1 10.3, 72.2.1; Exhibit B-7, BCCA-FTFO IR1 1.6.

[27] Exhibit B-6, BCUC IR1 75.5; Exhibit B-32, RCIA IR2 49.1.

[28] Exhibit B-1, pp. 9-10 to 9-11.

[29] Exhibit B-1, p. 3-7.

> in low-carbon and marine transportation and global LNG export will result in higher gross domestic product, tax revenue and jobs in BC.[30]

25. FEI has already achieved significant progress in these areas. For example, CNG demand and the number of CNG customers continues to grow year over year, displacing diesel fuel in on-road transportation uses, with total demand of over 1.4 PJ in 2021.[31] Similarly, LNG is successfully displacing diesel fuel in on-road transportation uses by upwards of 1.5 PJ over the last three years.[32]

(d) Third Party Studies Support the Benefits of a Diversified Pathway

26. The benefits of comprehensive energy system planning akin to that achieved by the Clean Growth Pathway are outlined in a number of studies from BC and other jurisdictions as presented in the 2022 LTGRP.[33] These studies highlight the importance of taking a diversified, complementary systems approach to energy system planning in BC, one in which peak demand and resiliency are incorporated into critical decision-making to serve the energy needs of residential, commercial and industrial customers.[34]

27. FEI highlights four of these studies below:[35]

- **The European Union:**[36] The European Union is envisioning an integrated energy system across Europe as the best path to decarbonization. Their plan proposes "coordinated planning and operation of the energy system 'as a whole', across multiple energy carriers, infrastructures, and consumption sectors – as the pathway towards an effective, affordable and deep decarbonisation of the European economy in line with the Paris Agreement and the UN's 2030 Agenda for Sustainable Development". The report summarizes the complementary energy system approach as follows:

  > Energy system integration will translate into more physical links between energy carriers. This calls for a new, holistic approach for

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30 Exhibit B-1, p. 3-10.

31 Exhibit B-23, BCUC IR2 94.1 and 94.1.1.

32 Exhibit B-23, BCUC IR2 94.2.1.

33 Exhibit B-1, Appendix A-9.

34 Exhibit B-1, pp. 3-25 to 3-28.

35 Exhibit B-1, Appendix A-9.

36 Exhibit B-1, Appendix A-9.3.

> both large-scale and local infrastructure planning, including the protection and resilience of critical infrastructures. The objective should be to make the most of the existing infrastructure while avoiding both lock-in effects and stranded assets. Infrastructure planning should facilitate the integration of various energy carriers and arbitrate between the development of new infrastructure or re-purposing of existing ones. It should consider alternatives to network based options, especially demand-side solutions and storage.

- **Energy and Utilities Alliance – United Kingdom:**[37] A 2021 UK study sponsored by Energy and Utilities Alliance in partnership with Leeds Beckett University reviewed opportunities to decarbonize residential buildings. It concluded that net-zero carbon emissions could only be achieved through complementary energy systems including repurposing gas networks for hydrogen. The study highlighted some of the constraints in electrifying home heating and the benefits of gas-based technologies and a decarbonized gas network.

- **The University of British Columbia's Clean Energy Research Centre (CERC):**[38] The University of British Columbia's Clean Energy Research Centre reviewed the use of clean energy in achieving the GHG emission reductions outlined in the Roadmap to 2030 and to 2050. Economic and population growth will result in increased demand for heating, transportation and industrial production. Energy efficiency and demand reduction to meaningful levels (i.e., 25 percent) will require transformative change. The study found that neither hydroelectric electricity nor bioenergy alone are sufficient to meet demand. The CERC developed a number of models to examine some alternatives, stating in their report as follows:

> Although electrification is seen as a core strategy for GHG mitigation in BC, electricity supply is insufficient to meet the growth in demand inherent in the electrification-centered strategy. Even with Site C and radical demand reduction, about 60 PJ of additional supply will be needed to meet the 2030 target, and 160 PJ for carbon neutrality in 2050. New electricity generation will be needed by 2030 and beyond, comparable in magnitude to the projected output of the current Site C project. This implies installing hundreds of wind turbines and millions of solar panels. The bioenergy-centered strategy is an alternative to a strategy dominated by electrification; it would dramatically increase demand for bioenergy. As the first step, it must fully exploit existing waste biomass, predominantly woody waste. Even then, roughly 250 and 450 PJ of additional primary bioenergy supply will be

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[37] Exhibit B-1, Appendix A-9.4.

[38] Exhibit B-1, Appendix A-9.6.

> needed for 2030 and 2050, respectively. This is well beyond any foreseeable waste supply within BC.
>
> **Hence, strategies that rely solely on either electricity or bioenergy will raise demand beyond sustainable and manageable supplies.** There is no single 'silver bullet' renewable energy source to meet BC's GHG mitigation targets: it is essential to utilize all the available bioenergy and renewable electricity resources and promote a balanced renewable energy portfolio. The limited time frame to 2030 emphasizes the difficulty of securing the renewable energy needed and the urgency of action to reduce demand. For the long-term target of carbon neutrality, the supply problems emphasize the need for a balanced renewable energy strategy. [Emphasis added.]

- **The University of Victoria's Integrated Energy System Department (IESVic):**[39] The University of Victoria compared two pathways to reduce carbon emissions from building heat by (1) replacing natural gas heaters with electric heat pumps or (2) replacing natural gas with renewable gas. Optimal annual system cost and capacity requirements for Metro Vancouver, Canada were assessed for each pathway, under nine different scenarios. The IESVic developed a number of conclusions such as:

  > There remains a challenge in addressing Metro Vancouver greenhouse gas emissions from the building heating sector. The existing natural gas system provides three services that a future low-carbon system will need to replicate. These services include 1) provision of a large quantity of energy that 2) can be stored for long durations at relatively low cost and 3) be dispatched to provide a large quantity of power when cold weather events cause large heat demand. Electrification can technically provide those services, but its ability to accommodate additional demand from natural gas substitution is limited.
  >
  > Variable renewable energy sources like wind and solar power provide energy, but they lack dispatchability and require separate storage capacity installation. In an extended period without wind and solar availability during a historic cold weather event, BC would require a prohibitively high quantity of electric energy storage.
  >
  > The existing hydroelectric energy system of British Columbia provides flexible and low carbon electricity, however the results highlight the value of dispatchable generation capacity and the

[39] Exhibit B-1, Appendix A-9.5.

> cost-sensitivity to increasing peak electricity demand. Electrifying the building heating sector causes peak demand to increase more rapidly than average demand. Policy should support efficient technologies that limit peak increases and enable peak demand management.

28. As supported by studies such as these, FEI submits that it is essential to utilize all the available bioenergy and renewable electricity resources and to promote a balanced renewable energy portfolio. The Clean Growth Pathway does just this, offering significant potential benefits to British Columbians.

B. FOUR PILLARS OF THE CLEAN GROWTH PATHWAY REFLECTED IN DEP SCENARIO

29. There are four pillars of the Clean Growth Pathway:

- Pillar 1: Transitioning to renewable and low-carbon gases to decarbonize the gas supply;
- Pillar 2: Investing in DSM programs in support of energy efficiency and conservation measures to reduce energy use among residential, commercial and industrial customers;
- Pillar 3: Support for low-carbon transportation infrastructure to reduce emissions in this sector; and
- Pillar 4: Investing in LNG to lower GHG emissions in marine operations and global markets.

30. The following subsections discuss the four pillars, the benefits they will achieve, and how they are reflected in the DEP Scenario.

(a) Clean Growth Pathway Pillar 1: Transitioning to Renewable and Low-Carbon Gases

31. The first pillar of the Clean Growth Pathway is the transition to renewable and low-carbon gases, including RNG, hydrogen, syngas and lignin. This pillar is incorporated into all aspects of FEI's resource planning process[40] and reflected as FEI's 2022 LTGRP Action Item 1, which is to "[a]ccelerate the development and acquisition of renewable and low-carbon gas supplies to meet

[40] FEI provides an overview of considerations for integrating renewable and low-carbon gas in Exhibit B-12, CEC IR1 9.3.1 and the impact that these considerations had on the 2022 LTGRP in Exhibit B-28, CEC IR2 60.1.

customer energy needs and contribute to provincial emission reduction targets".[41] FEI intends to purchase all of the cost-effective renewable and low-carbon gas available to it in the short term, while continuing to develop in-BC resources over the long term.[42] Under the DEP Scenario, FEI's transition to renewable and low-carbon gas supplies has the largest impact on GHG emission reductions for residential, commercial and industrial customers. Specifically, acquiring and allocating 60.2 PJ of renewable and low-carbon gas supply by 2030 to these customer groups results in emission reductions of 3.0 Mt CO2e. In 2040, the allocation of 99 PJ of renewable and low-carbon gas to these customer groups results in 4.9 Mt CO2e of GHG emission reductions.[43]

Supply Potential is Sufficient to Meet Targets

32. The LTGRP used the BC Renewable and Low-Carbon Gas Supply Potential Study[44] as one of many inputs in forming the potential supply of future renewable gas in the Province. The study developed two scenarios which create an upper and lower bound for renewable and low-carbon gas production with BC resources by 2050. The study suggests that the supply potential for renewable and low-carbon gas is robust (i.e., multiple streams of renewable gas are available) and expanding, and could range from 103 PJ to as high as 444 PJ by 2050. While barriers would need to be overcome to meet the higher end of the supply projection, the study demonstrates the significant supply potential in BC.

33. FEI plans for RNG to provide most of the growth opportunity in its renewable gas supply portfolio to 2030 and for new supply, hydrogen in particular, to start to grow by 2030 and gain momentum beyond 2030. With RNG and hydrogen supply potential in all regions of BC, and syngas and lignin supply potential in the Vancouver Island and the Interior regions,[45] there is

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41 Exhibit B-1, p. 10-1.

42 Exhibit B-6, BCUC IR1 1.1.2, 52.5; Exhibit B-23, BCUC IR2 79.2; Exhibit B-29, CoR IR2 5.2.

43 Exhibit B-1, Section 9.2.1.3.

44 Exhibit B-1, Appendix D-2.

45 Exhibit B-1, Table 7-2; Exhibit B-6, BCUC IR1 52.5.

adequate supply of renewable and low-carbon gas to serve FEI's demand well beyond FEI's targets.[46]

RNG Figures Prominently in FEI's Decarbonization Strategy

34. FEI's RNG service offerings are an established aspect of FEI's business, and figure prominently in FEI's long-term resource planning. FEI has offered RNG to its customers since 2010, with the regulatory and policy support of the Province and the BCUC.[47] Most recently, the Province amended the *Greenhouse Gas Reduction (Clean Energy) Regulation* (GGRR)[48] in 2021, increasing the acquisition cost cap and volumes and expanding acquisition opportunities.[49]

35. BC has a robust framework for the development of RNG with strong price support for deployment,[50] which has enabled FEI to make significant progress in increasing contracted RNG supply for future deliveries beyond 2022. As of the third quarter of 2022, FEI had over 30 biomethane supply agreements that have been accepted by the BCUC. These projects are in BC, outside BC and outside Canada, and 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.[51] FEI will rely on out-of-province sources to meet its 2030 emissions reduction goals. However, approaching and beyond 2030, FEI anticipates that the BC marketplace will evolve, and FEI will increasingly invest in local projects where reasonable and cost-effective to do so.[52]

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46 Exhibit B-6, BCUC IR1 77.2. For examples of how the components of FEI's renewable and low-carbon gas portfolio could evolve to reach the overall portfolio supply forecasts, please refer to Exhibit B-6, BCUC IR1 52.6.1 and 77.2. Also note that the Clean Growth Pathway is flexible enough to make adjustments to its decarbonization initiatives to meet provincial GHG reduction goals if the development of certain renewable and low-carbon gas supplies is slower than anticipated in the 2022 LTGRP: Exhibit B-6, BCUC IR1 71.8, 72.9, 74.2; Exhibit B-42, CEC IR3 88.1, 88.2.

47 Exhibit B-29, CoR IR2 5.1.

48 B.C. Reg. 102/2012, amended July 20, 2023 by B.C. Reg. 175/2023.

49 Exhibit B-1, Section 3.3.1; Exhibit B-6, BCUC IR1 52.5.

50 Exhibit B-6, BCUC IR1 52.4.

51 Exhibit B-6, BCUC IR1 52.5.

52 Exhibit B-6, BCUC IR1 52.4, 52.8.2, 52.9, 77.2, 77.3; Exhibit B-42, CEC IR3 94.1.

Hydrogen Will Play a Key Role in Decarbonization of Gas System

36. Low-carbon hydrogen will play an increasingly significant role in decarbonizing the gas system, given its potential to be produced at scale and blended into existing infrastructure or into dedicated infrastructure.[53] Hydrogen is a clean-burning molecule that can be used to displace conventional natural gas and liquid fossil fuels to decarbonize a range of end use applications.[54] As the Gas Supply Potential Study demonstrates, hydrogen has the potential to be produced at scale in BC using commercially-available technology.[55] Further, the feasibility of blending hydrogen into both distribution and transmission systems has been borne out in other jurisdictions,[56] whose experience FEI will consider in designing its own strategy to deploy hydrogen.

37. Hydrogen is a particularly attractive option for reducing GHG emissions from high-emitting and difficult-to-decarbonize industrial and transportation end uses, such as medium and heavy duty transportation, cement, pulp and paper and minerals processing, which are among the largest contributors to GHG emissions in BC (the industrial sector represented 21 percent of BC emissions in 2019).[57] These end uses are difficult to decarbonize by electrification, due to the nature of the established processes, equipment replacement and costs.[58]

38. Consistent with this pillar of the Clean Growth Pathway, in the DEP Scenario, FEI expects that the delivery of hydrogen will play an important role in reducing GHG emissions over the planning period, especially beyond 2030.[59]

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53 Exhibit B-6, BCUC IR1 52.5.

54 Exhibit B-1, p. 3-14.

55 Exhibit B-1, Appendix D-2, Section 4.2.

56 For instance, see Exhibit B-41, BCSSIA IR3 20.1 – 20.2.2; Exhibit B-42, CEC IR3 87 Series, 92 Series.

57 Exhibit B-1, Section 3.3.4; Exhibit B-7, BCCA-FTFO IR1 1.6.

58 Exhibit B-6, BCUC IR1 10.3; Exhibit B-7, BCCA-FTFO IR1 1.6; Exhibit B-23, BCUC IR2 112.2.

59 Exhibit B-23, BCUC IR2, 106.13. For discussion of the carbon intensity of hydrogen assumed in the 2022 LTGRP, please refer to Exhibit B-6, BCUC IR1 71.4; Exhibit B-14, MetroVan IR1 1.1, 1.2; Exhibit B-29, CoR IR2 6.1; Exhibit B-42, CEC IR3 94.2.

Hydrogen Acquisition and Distribution Supported by Government Policy and is in the Public Interest

39. FEI's plans to acquire and distribute hydrogen are aligned with and supported by policy and technology developments in BC,[60] Canada[61] and internationally. For example, the Province and the Federal government have both published hydrogen strategies, and a number of leading organizations evaluating global climate action, including the International Energy Agency, have indicated that hydrogen will be an important part of the overall global decarbonization transition.[62] The Province's Hydrogen Strategy specifically highlights the potential for hydrogen to be distributed in BC's existing gas pipeline infrastructure to meet the requirements of the CleanBC plan, and identifies several actions the Province will take to support blending hydrogen with natural gas.[63] This policy direction reflects the finding of the BC Hydrogen Study that hydrogen blending in the gas system will be required to achieve the GHG reductions outlined in the CleanBC plan,[64] and is focused on ensuring that BC benefits from the emerging hydrogen economy, which FEI is putting significant effort into realizing.[65]

40. FEI's acquisition and distribution of hydrogen are specifically supported by the GGRR, which makes FEI's purchase or production of hydrogen a prescribed undertaking under the *Clean Energy Act*.[66] While still costly in comparison to conventional natural gas, the costs of low-carbon hydrogen are expected to decrease over time as production technologies advance and the market matures.[67] Moreover, certain hydrogen supplies already meet the prescribed price limits

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60 See: Exhibit B-1, Appendix A-6, British Columbia Hydrogen Study.

61 See: Exhibit B-1, Appendix A-3: Natural Resources Canada, Hydrogen Study for Canada.

62 Exhibit B-13, GNAR IR1 1.0.

63 Exhibit B-1, Appendix A-4, pp. 13, 19-20.

64 Exhibit B-1, Appendix A-6, p. 27.

65 Exhibit B-6, BCUC IR1 52.4.

66 S.B.C. 2010, c. 22.

67 Exhibit B-1, Appendix D-2, Supply Potential Study, Section 4.4; BCUC IR1 62.9, 71.8.1; Exhibit B-42, CEC IR3 94.4, 94.5, 89.3; Exhibit B-43, MS2S IR3 7 Series. See Exhibit B-6, BCUC IR1 77.5 for a discussion of possible drivers of change in the price of renewable and low-carbon gas supplies in BC.

under the GGRR[68] and FEI plans to acquire only the lowest cost and lowest carbon intensity hydrogen under the GGRR price cap, which will provide the best value for customers.[69]

FEI Will Deliver Hydrogen Safely and Reliably

41. Just as FEI safely and reliably delivers conventional natural gas in its existing infrastructure, FEI will safely and reliably deliver hydrogen. Just as FEI considers the properties of conventional natural gas, FEI will consider the properties of hydrogen in the planning and operation of its gas transportation systems.[70] Therefore, FEI's introduction of hydrogen into its systems for the first time will be preceded by due diligence technical assessments and fitness-for-service studies to ensure the systems and end-use equipment may be safely and reliably operated with the proposed hydrogen blends.[71] This will be confirmed with structured and monitored pilot programs to demonstrate the safe operation of hydrogen blends.[72] Not only is the integrity and safety of FEI's gas infrastructure subject to regulatory standards,[73] oversight and approvals,[74] managing pipeline integrity is already a central aspect of FEI's business, and FEI has the experience, expertise, and systems in place to mitigate pipeline leaks, that will be advanced and adapted to suit the technical properties of the gas it transports.[75]

42. While the integration of hydrogen will require a level of innovation and development of new technologies to overcome initial challenges,[76] hydrogen production, blending, hubs and backbone infrastructure will all be considered in FEI's hydrogen development strategy (Hydrogen

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68 Exhibit B-38, FEI Rebuttal Evidence to MS2S, A7.

69 Exhibit B-43, MS2S IR3 7.2.

70 Exhibit B-16, MS2S IR1 6.4.

71 Including end-user equipment and critical pipeline components: Exhibit B-6, BCUC IR1 61.8; Exhibit B-11, BCSSIA IR1 5.7; Exhibit B-41, BCSSIA IR3 20.2.2, 21.2.2; Exhibit B-42, CEC IR3 91.3; Exhibit B-42, MS2S IR3 2.1; Exhibit B-44, RCIA IR3 58.1. It is expected that upgrading components of the distribution network, if required, would be relatively easy: Exhibit B-14, MetroVan IR1 4.1.1.

72 Exhibit B-16, MS2S IR1 6.2; see Exhibit B-6, BCUC IR1 61.9 for a discussion of FEI's next major steps prior to delivering on-system hydrogen.

73 Exhibit B-38, FEI Rebuttal Evidence to MS2S, A9; Exhibit B-23, BCUC IR2 106.4.

74 Exhibit B-6, BCUC IR1 61.12; see also BCUC IR1 61.3; Exhibit B-13, GNAR, IR1 1.3.

75 Exhibit B-13, GNAR, IR1 1.3.

76 For instance, see discussion in Exhibit B-6, BCUC IR1 52.4.

Roadmap), which FEI has described in detail,[77] and which will build on the extensive research, testing, development and innovation that FEI has already undertaken.[78] The Hydrogen Roadmap will be informed by the BC Gas System Hydrogen Blending Feasibility and Technical Study, which will complete the necessary analysis to determine the risk to FEI's transmission and distribution system pipeline assets from hydrogen blending.[79] FEI's analysis is and will continue to be based on participation and collaboration with Natural Resources Canada codes and standards working groups, research and development institutions, gas industry peers, technical regulators, and standards organizations to identify knowledge gaps and develop standards, procedures, and approval pathways to integrate hydrogen into the gaseous energy supply.[80]

FEI Is Exploring Different Hydrogen Distribution Pathways

43. FEI has undertaken preliminary analysis[81] and is continuing to develop its overall hydrogen deployment strategy.[82] As expanded on further below, there are three main hydrogen distribution pathways that FEI is exploring and that demonstrate potential, namely:

- Directly supplying customers that are hydrogen ready (initially, large commercial and industrial end users);
- Supplying the existing gas grid as a blend with conventional natural gas; and
- Delivering supply to end users through purpose-built pipeline systems (i.e., hydrogen backbone).

Any or all of these pathways may be employed by FEI.

Near Term, Direct-to-Customer Hydrogen Opportunities

44. In the near term, FEI will be considering a number of approaches to locally displace conventional natural gas in the gas system and opportunities to distribute hydrogen directly to

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77 Exhibit B-6, BCUC IR1 61.3.

78 Exhibit B-6, BCUC IR1 61.3; Exhibit B-44, RCIA IR3 56.1.

79 Exhibit B-42, CEC IR3 90.2, 90.5.

80 Exhibit B-6, BCUC IR1 61.3.

81 See, for instance, Exhibit B-6, BCUC IR1 61.3.

82 For a discussion of the activities FEI is taking to develop its hydrogen deployment strategy, please refer to: Exhibit B-6, BCUC IR1 61.3, 61.8, 61.9; Exhibit B-23, BCUC IR2 106.7, 106.9.1, 106.10, 106.11; Exhibit B-41. BCSSIA IR3 21.3.1, 21.4.1; Exhibit B-43, MS2S IR3 5.1; Exhibit B-42, CEC IR3 90.5; Exhibit B-44, RCIA 56.1.

gas customers.[83] For instance, there is currently an opportunity to start transitioning pulp mills and cement manufacturing facilities to using low-carbon hydrogen, with minimal upgrades and process impacts.[84] Indeed, FEI is currently advancing opportunities to work with select industrial customers to trial hydrogen fuel as a complete replacement for conventional natural gas in plant operations, with the goal of demonstrating the use of renewable or low-carbon intensity hydrogen in several industrial end-use applications including as a feedstock and fuel in steam boilers, kilns and smelting operations. FEI expects to progress these efforts and successfully deploy hydrogen in one or more of these applications in the next two to three years, subject to establishing various agreements, permitting, funding and resourcing requirements.[85]

Blending and Hydrogen Hubs to Begin in the Medium Term

45. By 2030, FEI plans to commence the blending of hydrogen across segments of its low-pressure gas distribution system, which constitutes over 94 percent of FEI's total pipeline infrastructure.[86] The distribution system is generally compatible with hydrogen blend concentrations and potentially compatible with of up to 100 percent hydrogen,[87] though initial blending concentrations will be much lower. Further, the distribution infrastructure is downstream of LNG facilities, initially avoiding the need to remove hydrogen from conventional natural gas supplying these facilities pending further study on the implications of doing so.[88]

46. Also by 2030, there is the opportunity to begin to develop initial market nodes or "hydrogen hubs" in the Lower Mainland, Interior, and Northern regions of BC, where localized customers would be served 100 percent hydrogen.[89] This is consistent with the Province's Hydrogen Strategy, which envisions the development of "regional hydrogen hubs where

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83 Exhibit B-1, p. 3-15.

84 Exhibit B-1, p. 3-16.

85 Exhibit B-6, BCUC IR1 52.5.

86 Exhibit B-14, MetroVan IR1 4.1.1. As discussed in Exhibit B-6, BCUC IR1 61.9.1, the first project to pilot and demonstrate on-system hydrogen could be in operation prior to 2025, and subject to successful pilot demonstrations, FEI expects to bring larger hydrogen blending projects online between 2025 and 2030.

87 Exhibit B-38, FEI Rebuttal Evidence to MS2S, A10

88 See Exhibit B-38, FEI Rebuttal Evidence to MS2S, A12, for discussion; see also: Exhibit B-43, MS2S IR3 3.2 and MS2S IR3 5.1.

89 Exhibit B-1, p. 3-14; Exhibit B-16, MS2S IR1 4.5, 8.3; Exhibit B-12, CEC IR1 46.1.

production and demand are co-located".[90] FEI expects that hydrogen hubs will include delivery through short pipeline infrastructure when hydrogen production is located in proximity to high-demand volume customers. Hydrogen may also be transported by road transport for non-pipeline connected customers or customers that need to store hydrogen onsite in liquefied form.[91]

Longer-Term Hydrogen Opportunities

47. Over the longer term, and as demand for hydrogen grows, FEI will retrofit, upgrade and expand existing transmission pipelines, and new transmission pipelines may also be constructed, to transport an increasing share of hydrogen. In particular, a low-carbon "backbone system" would provide the necessary capacity to link hydrogen hubs, producers, and consumers over longer distances and enable a regional market,[92] while obviating the requirement to separate the hydrogen from the gas supply feeding LNG facilities.[93] For instance, beyond 2030, a hydrogen backbone pipeline would likely be required to operate in parallel with the Coastal Transmission System (CTS) pipelines, transporting hydrogen to the distribution systems in the Lower Mainland into which the hydrogen would be blended. This would allow the distribution system to receive a controlled blend of conventional gas, hydrogen and RNG, while leaving the CTS to deliver conventional natural gas and RNG to the LNG facility at Tilbury and the Vancouver Island Transmission System (VITS) supplying the Woodfibre LNG project and the Mt. Hayes LNG facility. This approach to introducing hydrogen along a dedicated "backbone" that connects earlier-established local hubs allows some flexibility to control the increasing demand for and delivery of hydrogen into the system.[94]

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90 At p. 6.

91 Exhibit B-16, MS2S IR1 4.5.

92 Exhibit B-1, p. 3-14; Exhibit B-6, BCUC IR1 61.2-61.7, 61.11, 65.5.1; Exhibit B-14, MetroVan IR1 4.2.1; Exhibit B-16, MS2S IR1 1.3, 6.3; Exhibit B-43, MS2S IR3 2.2, 2.3, 4 Series.

93 For a detailed explanation of the relationship between the transmission, distribution and LNG assets on FEI's system, please see Exhibit B-43, MS2S IR3, 3.2.

94 Exhibit B-1, p. 7-39; Exhibit B-16, MS2S IR1 6; Exhibit B-38, FEI Rebuttal Evidence to MS2S, A13. FEI notes that while the hydrogen backbone can play an important role, it is not a necessary component of FEI's hydrogen strategy at this time; GHG targets could be met through blending and local hydrogen hubs. When and if FEI files for approval to construct and operate such a hydrogen backbone pipeline, FEI will provide the necessary information to support approval of the project: Exhibit B-14, MetroVan IR1 4.2.1.

(b) Clean Growth Pathway Pillar 2: Investing in DSM Programs to Reduce Energy Use among Residential, Commercial and Industrial Customers

48. The second pillar of the Clean Growth Pathway involves continued and expanded investment in energy efficiency and conservation measures across FEI's residential, commercial and industrial customer uses. These activities focus on initiatives to further reduce the provincial GHG emissions attributed to buildings and communities through high performance buildings initiatives such as energy efficiency and energy management. To this end, since 2017, FEI has tripled its annual DSM investment to reach $107 million in 2021. FEI is now piloting next generation equipment, innovative technologies and new approaches to efficiency in the buildings sector such as deep energy retrofits, gas heat pumps, dual-fuel heating systems and buildings controls to leverage new emissions reduction energy technologies.[95]

49. This pillar of the Clean Growth Pathway is reflected in FEI's selection of the High DSM Setting which maximizes the energy savings and GHG reduction potential of DSM. As informed by its latest conservation potential reviews and other studies, FEI's DSM analysis in the 2022 LTGRP provides the outcome of pursuing all cost-effective energy savings potential based on the economic screen used for each scenario. FEI's analysis shows that it can achieve significant energy and GHG emissions reduction over the planning horizon, as illustrated by the following figure illustrating the impact of a range of DSM settings.[96]

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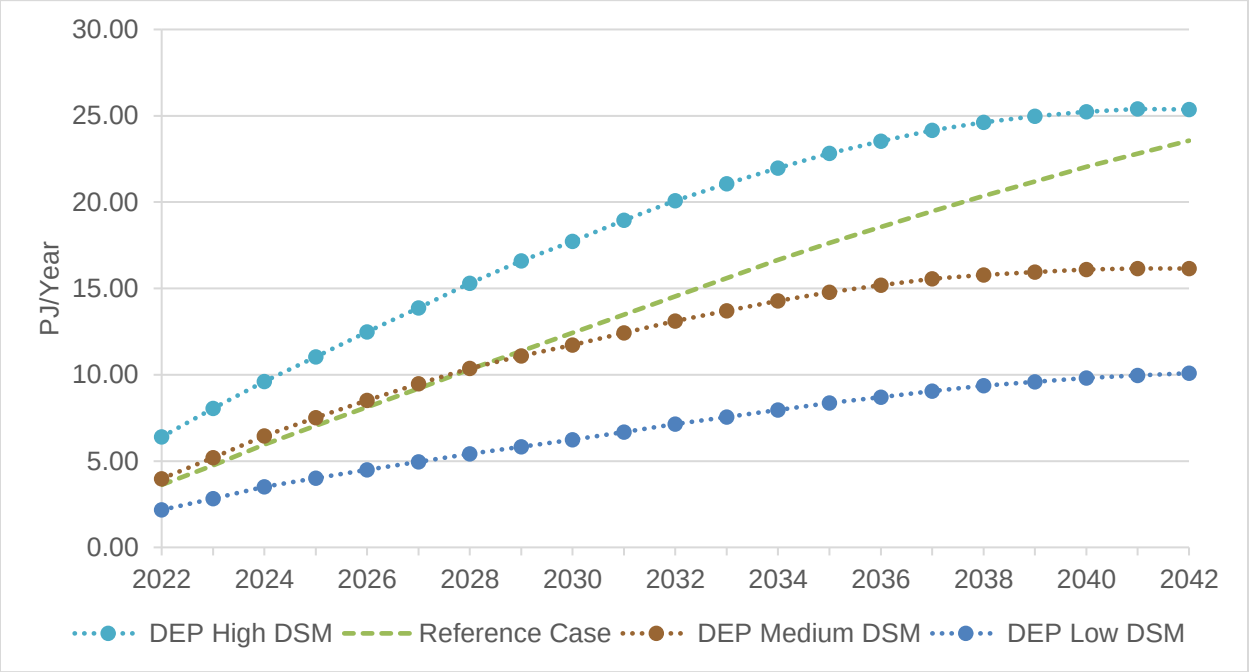
[95] Exhibit B-1, pp. 3-19 to 3-20.

[96] Exhibit B-1, p. 5-42.

Figure 5-2: Diversified Energy (Planning) or DEP Scenario DSM Savings Potential – 3 DSM Settings



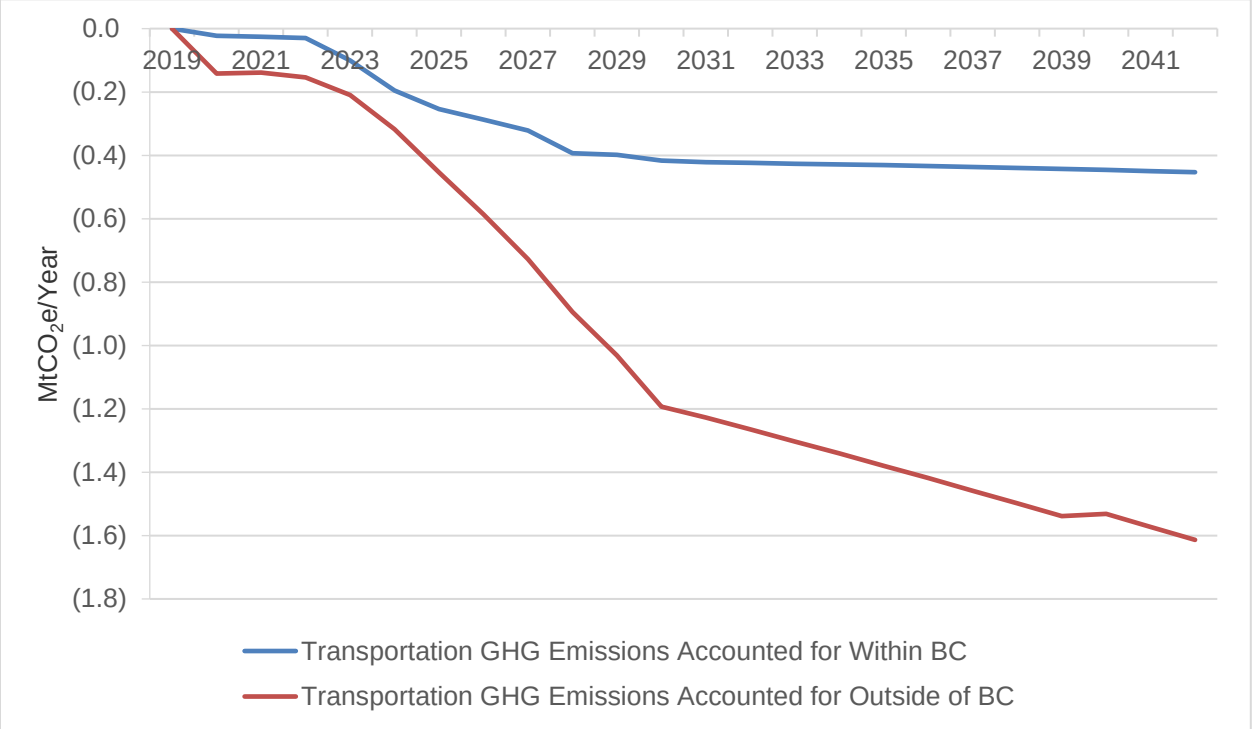
50. As discussed in Part Four, Section B of this Final Submission, FEI's intention to pursue adequate, cost-effective DSM over the planning horizon is clear and explicit, and strongly supports acceptance of the 2022 LTGRP. While the DSM Regulation has been amended, FEI's long-term plan is to continue to file DSM expenditure plans with the BCUC that are guided by the High DSM Setting, meet the adequacy requirements at the time and maximize the potential for cost-effective DSM as defined in the DSM Regulation. Over the 20-year horizon of the LTGRP, there will likely be more changes to the DSM Regulation as well as other legislation, which are impossible to anticipate at this time. However, FEI's intention to continue to comply with legislation that may be in place is clear, as is its intention to maximize the potential for DSM to reduce GHG emissions over the planning horizon.

(c) Clean Growth Pathway Pillar 3: Support For Low-Carbon Transportation (LCT) to Reduce Emissions in this Sector

51. The third pillar of the Clean Growth Pathway involves investment in LCT to address GHG emissions from the transportation industry, which makes up the largest share of overall provincial emissions. FEI is working to convert medium-duty and heavy-duty fleet vehicles and marine vessels to lower-carbon alternative fuels like Compressed Natural Gas (CNG) and LNG, as

well as RNG. In addition to a significant GHG reduction benefit, using CNG and LNG in vehicles and marine vessels can dramatically improve air quality by reducing particulate matter as well as sulfur and nitrogen oxides released into the environment.[97] This pillar of the Clean Growth Pathway has been incorporated into FEI's DEP Scenario and modelled in the 2022 LTGRP.[98] The emissions reductions that will occur from serving this market are illustrated in the figure below,[99] which also shows the reductions from serving Global LNG markets as part of the fourth pillar discussed below. The revenue resulting from LCT sales will benefit FEI's customers.[100]

Figure 9-3: BC and Global Emission Reductions (Life Cycle) in the Diversified Energy (Planning) Scenario from Serving the Transportation and Global LNG Markets[101]



97 Exhibit B-1, pp. 3-20 to 3-21.

98 See, e.g., Exhibit B-1, Section 4.4.2.

99 Exhibit B-26, BCSEA IR2 47.1 regarding the calculation of the GHG reductions from the LCT and Global LNG markets.

100 Exhibit B-6, BCUC IR1 75.5; Exhibit B-32, RCIA IR2 49.1.

101 Exhibit B-1, p. 9-6.

(d) Clean Growth Pathway Pillar 4: Investing in LNG to lower GHG Emissions in Marine Fueling and Global Markets

52. The fourth pillar of the Clean Growth Pathway involves investment in LNG to lower GHG emissions in the marine sector and global markets. While the reductions to GHG emissions will in part occur outside of BC, all of the revenues from this activity will benefit FEI's customers, helping to offset the rate impacts[102] of decarbonizing the gas supply, and the significant improvements in local air quality will benefit British Columbians.[103]

Marine Operations Opportunities in BC Will Reduce GHG Emissions

53. LNG marine bunkering is a key part of FEI's strategy to reduce GHG emissions and positively impact FEI's customer rates. The adoption of LNG as a fuel by the marine sector is being driven by operating cost advantages, sulphur emission limits and GHG emissions targets, as well as local air quality improvement goals in individual ports. FEI anticipates that most of its demand growth for LNG as a marine fuel will come from transoceanic ships calling on the Port of Vancouver,[104] which are predominantly two-stroke vessels with negligible methane slip.[105] When LNG is used as a marine fuel, it displaces higher carbon intensity fuels, such as marine gas oil, marine diesel oil, intermediate fuel oil and heavy fuel oil,[106] and offers air pollutant emissions reductions of SOx emissions by 98 percent, of NOx emissions by 76 percent, of black carbon emissions by 96 percent and of particulate matter emissions by 90 percent.[107] For two-stroke slow speed engines, lifecycle GHG emissions are reduced by 20 to 27 percent compared to heavy fuel oil, when using LNG sourced from BC.[108]

54. The use of LNG as a marine fuel is supported by provincial and federal objectives to become a world leader in LNG bunkering. For instance, the Roadmap aims to "make our ports attractive to global shipping fleets transitioning to LNG as a lower cost, lower GHG transition

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[102] Exhibit B-6, BCUC IR1 75.5; Exhibit B-32, RCIA IR2 49.1.

[103] Exhibit B-38, FEI Rebuttal Evidence to MS2S, p. 24.

[104] Exhibit B-21, Confidential Port of Vancouver Study.

[105] Exhibit B-38, FEI Rebuttal Evidence to MS2S, p. 18, footnote 73.

[106] Exhibit B-1, p. 3-23.

[107] Exhibit B-12, CEC IR1 26.1; Exhibit B-16, MS2S IR1 4.6. See generally: Exhibit B-1, Section 3.6.

[108] Exhibit B-38, FEI Rebuttal Evidence to MS2S, p. 18.

fuel",[109] and the Province of BC announced its plan to partner with the Vancouver Fraser Port Authority and FortisBC to establish the first ship-to-ship LNG marine bunkering service on the west coast of North America, which "will allow B.C. to have a direct impact on global emissions by reducing the amount of greenhouse gas emissions from visiting vessels".[110] Growth in this market has been and is expected to continue to be supported by the provincial government, as the use of LNG by domestic BC customers to displace marine diesel is eligible for credit generation under the British Columbia Low Carbon Fuel Standard (BC-LCFS), and emissions are included in the BC Emissions Inventory.[111]

55. Furthermore, the Province of BC and FEI are strategically positioned to be leaders in the transition to LNG as a marine fuel:[112]

- BC has significant conventional natural gas resources and pre-existing FEI-owned assets and operational expertise to drive market development;[113]
- FEI's bunkering services are conveniently accessible by low-methane-slip transoceanic vessels calling on the Port of Vancouver;[114]
- LNG from FEI's Tilbury facility is 29 percent less carbon intensive than the global LNG supply average, as Tilbury is the only LNG facility currently operating in western North America that powers its liquefaction process with renewable electricity, and BC's upstream conventional natural gas production emissions management regime is one of the most stringent in the world;[115] and
- Advancements in LNG-powered engine technology are increasing the efficiency of LNG-fuelled vessels.[116]

56. Finally, there is credible and reliable evidence that the use of LNG as a marine fuel will continue to rise, including FEI's own successful bunkering experience in BC,[117] recent and

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109 At p. 61; see also: Exhibit B-1, p. 3-22.

110 As cited in Exhibit B-1, p. 3-22, footnote 120.

111 Exhibit B-10, BCSEA IR1 8.5.

112 Exhibit B-1, Section 3.6.

113 Exhibit B-1, p. 3-23.

114 Exhibit B-38, FEI Rebuttal Evidence to MS2S, p. 18.

115 Exhibit B-16, MS2S IR1 4.6; Exhibit B-38, FEI Rebuttal Evidence to MS2S, p. 17; Exhibit B-41, BCSSIA IR3 22.2.

116 Exhibit B-38, FEI Rebuttal Evidence to MS2S, p. 17; Exhibit B1-16, MS2S IR1 4.6.

117 Exhibit B-1, Section 3.6.2 & Figure 3-9; see also: Exhibit B-12, CEC IR1 26.2; Exhibit B-42, CEC IR3 95.1.

independent Port of Vancouver demand forecasts,[118] vessel order data from DNV,[119] and local market research.[120] Notably, there is significant international pressure from the International Maritime Organization (IMO) to displace incumbent fuels,[121] and LNG is the leading candidate to do this. In fact, LNG is currently the only economically feasible, commercially viable, scalable alternative to heavy marine fuels and diesel.[122] The infrastructure for alternative fuels such as hydrogen, methanol and ammonia is not yet sufficiently developed to supply the shipping marketplace.[123]

GHG Emissions Opportunities from LNG Exports

57. The second component of this pillar is serving global markets with LNG from FEI's Tilbury facilities, the well to tank GHG emissions of which are 29 percent lower than global average LNG supply.[124] Overseas customers have expressed interest in purchasing LNG from Tilbury, which can help overseas countries to reduce their reliance on higher-carbon fuels, such as coal, and make immediate emissions reductions more affordably. For example, by replacing conventional coal with LNG, approximately 40 to 45 percent and 26 to 32 percent emissions reductions can be obtained for Chinese textile and chemical industries, respectively. Further, emissions reduction of approximately 60 percent can be obtained when coal is replaced with conventional natural gas from LNG for district heating in other jurisdictions. [125] Therefore, as part of the Clean Growth Pathway, FEI is actively pursuing the LNG market for trans-Pacific exports through the use of International Organization for Standardization (ISO) containers, utilizing the truck loading bays at

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[118] Exhibit B-21, Confidential Port of Vancouver Study.

[119] DNV is an independent expert in assurance and risk management as well as a testing, certification and technical advisory services provider serving the energy value chain marketplace and in particular the maritime industry. Exhibit B-12, CEC IR1 26.2; Exhibit B-13, GNAR IR1 3.5; Exhibit B-24, BCUC Conf IR2 1.4; Exhibit B-38, FEI Rebuttal Evidence to MS2S, pp. 21-23.

[120] For further discussion on the demand potential for LNG as a marine fuel, please refer to Exhibit B-38, FEI Rebuttal Evidence to MS2S, A22 & A23.

[121] E.g., the IMO recently implemented a new strategy to reduce GHG emissions from global shipping. Exhibit B-38, FEI Rebuttal Evidence to MS2S, A23; Exhibit B-1, Appendix B-3, p. 17; Exhibit B-6, BCUC IR1 33.10; Exhibit B-7, BCCA-FTFO IR1 4.1, 4.2.

[122] Exhibit B-12, CEC IR1 26.2; Exhibit B-13, GNAR IR1 3.5; Exhibit B-24, BCUC Conf IR2 1.4.

[123] Exhibit B-38, FEI Rebuttal Evidence to MS2S, A23; Exhibit B-43, MS2S IR3 8.3.

[124] Exhibit B-16, MS2S IR1 4.6; Exhibit B-38, FEI Rebuttal Evidence to MS2S pp. 17, 27; Exhibit B-41, BCSSIA IR3 22.2.

[125] Exhibit B-1, Section 3.6.1.

Tilbury to fill the containers. A non-regulated FortisBC entity is also developing the Liquefaction Facility component of the Tilbury Phase 2 LNG Expansion Project for bulk export.[126]

C. FEI'S CHOICE OF THE DEP SCENARIO AS ITS PLANNING SCENARIO IS REASONABLE AND APPROPRIATE AND IN THE PUBLIC INTEREST

58. Given the benefits of and vision provided by FEI's Clean Growth Pathway, FEI's selection of the DEP Scenario as its planning scenario is reasonable and appropriate and in the public interest. The DEP Scenario sets out a preliminary but feasible pathway for FEI to transition to a low carbon future that is both realistic and compelling, and offers significant benefits to FEI's customers and British Columbians generally.

(a) DEP Scenario Reflects Clean Growth Pathway

59. The DEP Scenario sets the planning context for FEI's 2022 LTGRP and the actions FEI will take over the next four years to ensure it can meet customers' energy needs over the planning horizon and beyond.[127] In the DEP Scenario, FEI models essential elements of the Clean Growth Pathway, such as accelerated acquisition of renewable gas supply, growth in the use of low-carbon gas as a transportation fuel, and electrification initiatives in BC that impact gas demand.[128] In this scenario, FEI undertakes high levels of DSM over the planning horizon, and an aggressive transition to renewable and low-carbon gas takes place early in the planning horizon and continues. Growth in the use of gas as a transportation fuel to reduce carbon emissions in the transportation sector also takes place and is larger in the Lower Mainland than in other regions of the Province, particularly in the marine transportation sector.[129]

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[126] Exhibit B-1, pp. 3-22 to 3-23 and 4-15 to 4-16.

[127] Exhibit B-1, p. 4-18.

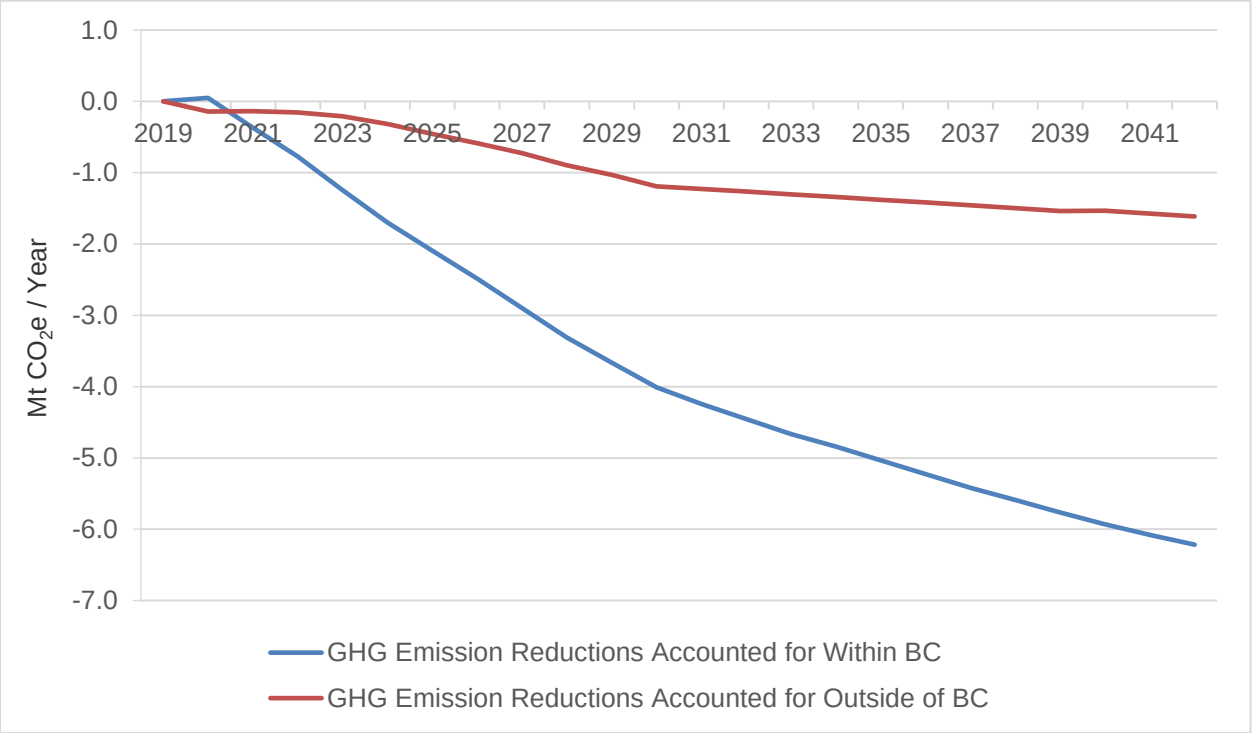
[128] The DEP Scenario is modelled with the assumption that 25% of residential and commercial gas demand, and 10% of industrial gas demand is electrified by 2050, with a straight-line interpolation for each year of the forecast period. Exhibit B-1, p. 4-17.

[129] Exhibit B-1, pp. 4-17 to 4-18. Table 1 in BCOAPO IR1 3.1 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. Exhibit B-9, BCOAPO IR1 3.1.

(b) DEP Scenario Meets GHG Reduction Goals

60. Importantly, it is possible that the DEP Scenario could achieve the goals of the GHGRS or GHG emissions cap on natural gas utilities.[130] In addition to the modelled activities to decarbonize the gas supply, promote DSM programs, and in the LCT and global LNG markets, FEI will undertake additional activities to reduce emissions reductions necessary to meet the expected requirements of the GHGRS.[131] The figure below shows the DEP Scenario total emission reductions.

Figure 9-5: Total GHG Emission (Life Cycle) Reductions for the Diversified Energy (Planning) Scenario – BC and Outside of BC[132]



61. The DEP Scenario also reflects the most cost-effective approach to meeting GHG reduction targets. Increasing energy rates for both gas and electric customers will be unavoidable to fund the capital investments needed for decarbonization.[133] However, for a similar level of GHG reduction by 2042, the alternative Deep Electrification Scenario will result in significantly

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130 Exhibit B-1, Section 9.2.

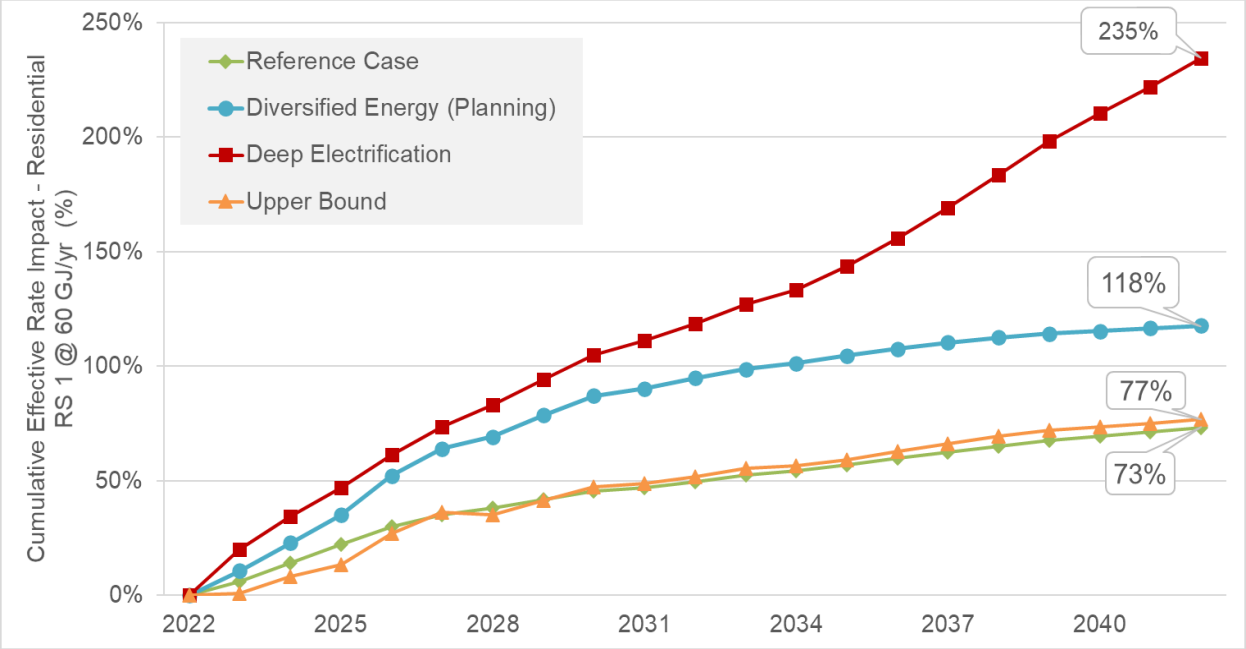
131 Exhibit B-6, BCUC IR1 74.1 and 74.2.

132 Exhibit B-1, p. 9-8.

133 Exhibit B-28, CEC IR2 22 58.1.

higher rate impacts to both gas and electric customers than FEI's preferred DEP Scenario.[134] The FEI rate impacts are illustrated in the figure below for residential customers.

Figure 9-7: Cumulative Effective Rate Impact (2022 – 2042) – Residential RS 1, Avg. UPC 60 GJ[135]



(c) DEP Scenario Reflects the Reality of the Energy Transition

62. FEI's choice of the DEP Scenario is reasonable and appropriate for resource planning as it recognizes that the energy transition is a reality and that the policy environment and operating conditions are rapidly changing. While FEI has not assigned probabilities to the different scenarios, the DEP Scenario best reflects changes in the planning environment, primarily carbon emission regulation and related technology advances, that FEI anticipates will occur over the planning horizon.[136] For example, compared to the Reference Case, the DEP Scenario contains more electrification, increased supply of renewable and low carbon gas, higher demand for LCT

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134 Exhibit B-26, BCSEA IR2 61.1.

135 Exhibit B-1, p. 9-13.

136 Exhibit B-1, p. 4-27; Exhibit B-8, BC Hydro IR1 2.2; Exhibit B-10, BCSEA IR1 7.1.

and LNG, and new, large industrial demand from the Woodfibre LNG facility, all of which are likely to occur.[137]

63. In particular, given the reality of the energy transition and the rapidly changing planning environment, the DEP Scenario is a more appropriate planning scenario than the Reference Case. In contrast to the DEP Scenario, the Reference Case is based only on historical end use patterns, as well as any new changes in law or policy that have been, or are quite certain of becoming, enshrined in legislation, codes, standards or bylaws, in and as of the 2019 base year. The Reference Case keeps these patterns constant throughout the planning period.[138] However, "business as usual" assumptions or conditions will not remain stable throughout the planning horizon as has been assumed in past LTGRPs. Indeed, even over the timeline of this proceeding, significant developments have occurred, such as the introduction of the Zero Carbon Step Code and amendments to the DSM Regulation. Given this context of complex change, relying on an action plan based on "business as usual" conditions and assumptions would be irresponsible.[139]

(d) DEP Scenario Reflects FEI's Leadership Role in Energy Delivery Services

64. Ultimately, while there are factors in FEI's operating environment that are outside of its control, as a key distributor of energy in the Province, FEI is appropriately taking a leadership role and creating and following its vision and framework for a transition to a low-carbon future. Taking this leadership role is especially important given that significant GHG reduction opportunities such as acquiring renewable and low-carbon gas, pursuing cost-effective DSM, and the use of LNG in the LCT and global LNG markets require actions on behalf of FEI. By choosing the DEP Scenario as its planning scenario, FEI can develop the actions it expects to take in the energy transition, contributing to BC's GHG emission reduction goals. As such, the choice of the DEP Scenario as its planning scenario is reasonable and appropriate for long-term planning, and is in the public interest.[140]

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137 Exhibit B-8, BC Hydro IR1 1.3.

138 Exhibit B-1, p. 4-10.

139 Exhibit B-8, BC Hydro IR1 1.7. Also see Exhibit B-10, BCSEA IR1 32.1.

140 Exhibit B-8, BC Hydro IR1 2.2.

PART THREE: 2022 LTGRP MEETS THE SECTION 44.1(2) FILING REQUIREMENTS IN A COMPREHENSIVE, ROBUST AND TRANSPARENT MANNER

65. FEI submits that its 2022 LTGRP meets the filing requirements in section 44.1(2) of the UCA in a comprehensive, robust and transparent manner, that is sufficient for the purposes of providing context for the Panel's determination of whether the LTGRP is in the public interest.[141]

66. By way of summary, Table 1 below outlines the specific elements that are to be included in resource plans pursuant to section 44.1(2) of the UCA and indicates the corresponding sections of the LTGRP that address each element. With respect to section 44.1(2)(g) of the UCA, the BCUC has previously agreed with FEI's view that "any other information required by the Commission" includes: information pursuant to the BCUC's Resource Planning Guidelines (Guidelines) and any information that the BCUC has directed FEI to include in the 2022 LTGRP in previous decisions.[142]

Table 1: Requisite Contents for a Long-Term Resource Plan

Section of the UCA	Requirement Defined in the UCA	Section of LTGRP Addressing Requirement
44.1(2)(a)	An estimate of the demand for energy the public utility would expect to serve if the public utility does not take new demand-side measures during the period addressed by the plan	Demand Forecast scenarios are outlined in Sections 4.6, 4.7 and 4.8.
44.1(2)(b)	A plan of how the public utility intends to reduce the demand referred to in paragraph (a) by taking cost- effective demand-side measures	Demand-side measures are discussed in Section 5 and demand reduction in Section 5.4.2.
44.1(2)(c)	An estimate of the demand for energy that the public utility expects to serve after it has taken cost-effective demand-side measures	Energy demand after DSM is discussed in Section 5.4.3.
44.1(2)(d)	A description of the facilities that the public utility intends to construct or extend in order to serve the estimated demand referred to in paragraph (c)	FEI's System Resource Needs and Alternatives are discussed in Section 7.
44.1(2)(e)	Information regarding the energy purchases from other persons that the public utility intends to make in order to serve the estimated demand referred to in paragraph (c)	FEI's Gas Supply Portfolio and Price Risk Management are discussed in Section 6.
44.1(2)(f)	An explanation of why the demand for energy to be served by the facilities referred to in paragraph (d) and the purchases referred to in paragraph (e) are not planned to be replaced by demand-side measures	FEI's System Resource Needs after DSM are discussed specifically in Sections 7.2.3.1 and 7.3.

141 2017 LTGRP Decision, p. 19.

142 2017 LTGRP Decision, p. 3.

Section of the UCA	Requirement Defined in the UCA	Section of LTGRP Addressing Requirement
44.1(2)(g)	Any other information required by the Commission	FEI has outlined how it has met the BCUC's Resource Planning Guidelines and prior directives in Tables 1-6 and 1-7, respectively.

67. As discussed in the following subsections, the 2022 LTGRP has addressed all of the above elements:

- Section 4 of the LTGRP provides FEI's forecast of annual energy demand using a robust end-use forecasting methodology, satisfying the requirements of section 44.1(2)(a) of the UCA.
- Section 5 of the LTGRP sets out FEI's plan to maximize the potential of cost-effective DSM, satisfying section 44.1(2)(b), (c) and (f) of the UCA.
- Section 6 of the LTGRP sets out FEI's approach to gas supply portfolio planning, satisfying section 44.1(2)(e) and (f) of the UCA.
- Section 7 of the LTGRP discusses FEI's system resource needs and alternatives, satisfying section 44.1(2)(f) of the UCA.
- FEI has adhered to the BCUC's Resource Planning Guidelines where relevant and appropriate, and responded to the BCUC's past directives for the 2022 LTGRP, satisfying section 44.1(2)(g) of the UCA.

A. FEI HAS USED A ROBUST END-USE ANNUAL METHOD TO ESTIMATE A BROAD RANGE OF ANNUAL ENERGY DEMAND FUTURES

68. Section 4 of the 2022 LTGRP sets out FEI's estimate of the annual demand for gas that it expects to serve over the 20-year planning horizon before considering the impact of new, incremental DSM activities, as required under section 44.1(2)(a) of the UCA. FEI submits that its forecast methodologies are sound and have been clearly explained, and that its forecasts present an appropriate range of potential future scenarios, illustrating the potential futures that could unfold over the planning horizon. FEI has supported its annual demand forecasts with the studies and other supporting documents in Appendix B, and has provided detailed and comprehensive responses to numerous information requests.[143]

[143] E.g., Exhibit B-6, BCUC IR1 11 to 33 and B-23, BCUC IR2 84 to 94.

69. In addition to the topics canvassed in Part Two above, FEI highlights the following points in the subsections below:

- The End Use Annual Demand method has been improved, is produced by an external expert, and is consistent with industry standard approaches.
- The End Use Annual Demand Method is straightforward and easily explained, while containing detailed and granular forecasting data using FEI customer information at its base.
- The Reference Forecast provides an important reference point for alternative scenarios.
- The End Use Annual Method has enabled a wide range of future scenarios reasonable for long-term planning.
- The Lower Bound and Deep Electrification scenarios are not plausible.
- The Annual End Use Method appropriately accounts for the impact of critical uncertainties through the end use demand forecast modelling.
- FEI has estimated the impact on the DEP Scenario of the Accelerated Setting for Codes and Standards.
- Dual-Fuel heating systems and a peaking role for the gas system align with the DEP Scenario.
- FEI has contingency plans to monitor for and respond to variances in annual demand from the DEP Scenario.

(a) End Use Annual Demand is Improved, Produced by External Experts, and Consistent with Industry Standard Approaches

70. FEI engaged Posterity Group to support its preparation of the End Use Annual Method forecast for the 2022 LTGRP. Posterity Group prepared an updated end use forecast model for FEI based on learnings from the 2017 LTGRP. Compared to its last LTGRP, Posterity Group has improved the End Use Annual Method to enhance the ability to examine the Reference Case annual demand forecast and analyze how annual demand behaves across alternate future scenarios. Improvements include:[144]

[144] Exhibit B-1, pp. 4-9 to 4-10.

- addition of new critical uncertainties;
- updated end use studies that provide key inputs to the base year data;
- a closer tie between the Conservation Potential Review (CPR) analyses and the end use demand forecasting analyses;
- bringing new market intelligence in the transportation fuels industry to bear on the forecast of CNG and LNG demand; and
- the addition of PowerBI data analytics interface to improve the ability to display and assess forecasting results.

71. The addition of new critical uncertainties is a key improvement that enabled the End Use Annual Method to be used to forecast a range of scenarios that reflect risks over the planning horizon. The critical uncertainties were identified with input from both internal FEI stakeholders and members of the external Resource Planning Advisory Group (RPAG), as well as themes that emerged from the 2022 LTGRP's community engagement workshops.[145] The critical uncertainties represent those future conditions that subject matter experts and other stakeholders expect could have the biggest impact on FEI's business. FEI and Posterity Group explain:[146]

> In response to the complex and partially uncertain planning environment discussed in Section 2 of the LTGRP, FEI has built on the end use forecast method scenario analysis from the 2017 LTGRP and identified a range of critical uncertainties to account for potential changes in the planning environment across the forecast period. These uncertainties include customer growth, natural gas prices, the carbon price, building codes & equipment standards, non-price driven fuel switching, and the impact of emerging markets, such as LCT and the potential impact of LNG export. FEI used a rigorous process for developing the inputs for each critical uncertainty and for implementing these into the 2022 LTGRP forecast model. In doing so, FEI drew on the expertise of its internal LTGRP working groups, its forecast consultant (Posterity Group), and the experience of stakeholders in the RPAG and across FEI's community engagement workshops. The resulting critical uncertainty data accounts for a wide range of possible alternate future scenarios and enables FEI to account for planning environment risks in its 2022 LTGRP analysis. The critical uncertainties also serve as signposts for FEI to evaluate which future scenarios may be unfolding as it proceeds through the planning horizon.

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[145] Exhibit B-1, Appendix B-3, p. 1.

[146] Exhibit B-1, Appendix B-3, pp. 19-20.

72. FEI also engaged Energitix to benchmark FEI's End Use Annual Demand method against the long-term annual demand forecasting methods used by other utilities and energy planning entities. Energitix confirmed that using an end use demand forecasting method remains a common practice among gas and electric utilities, particularly those that are of a similar size and facing similar challenges to FEI. Further, FEI's modelling includes the key components that are common to all of the end use modelling practices examined as part of the study.[147]

73. Energitix also explained that the need to analyze various future scenarios drives the decision to use end-use demand forecasting methods:[148]

> . . . the main driver for using end-use models by most organizations is the ability of end-use models to analyse various scenarios due to energy efficiency policies, codes and standards, and energy policies such as electrification and decarbonization; end-use models provide the level of detail required to assess the impact of energy efficiency standards and regulations as well as different energy policies.

74. Consistent with Energitix's observation above, FEI has adopted its End Use Annual Demand forecast, in contrast to its Traditional Annual Method, in order to be able to forecast a range of potential future scenarios.[149]

(b) End Use Annual Demand Method Is Straightforward and Easily Explained, While Containing Detailed and Granular Forecasting Data Using FEI Customer Information at its Base

75. FEI's End Use Annual Demand forecast methodology begins with a highly granular base year model, calibrated to FEI's actual number of customers and normalized sale of gas.[150] The Reference Case begins with the 2019 base year, which was the latest year possible for the base year given the steps required to produce the LTGRP for filing in the first quarter of 2022.[151] FEI

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147 Exhibit B-1, p. 4-9; see: Exhibit B-1, Appendix B-2, Long-Term Demand Forecasting Benchmarking Study on End Use Methods Industry Practice Review, Table 1, for a comparison of FEI's End Use Model characteristics with those of the other utilities examined in the Proceeding.

148 Exhibit B-1, Appendix B-2, p. 15.

149 Exhibit B-1, p. 4-9.

150 Exhibit B-6, BCUC IR1 31.5.

151 Exhibit B-23, BCUC IR2 87.1 and 87.3.

and Posterity Group built the base year model from customer account and weather-normalized consumption data, as well as FEI's 2021 CPR, FEI's 2017 Residential End Use Survey (REUS), FEI's 2019 Commercial End Use Survey (CEUS), and research and data analysis from the 2017 LTGRP. The resulting 2019 base year model is subdivided as follows, and calibrated to match FEI's actual normalized sales of gas:[152]

- By region: Lower Mainland, City of Vancouver, Vancouver Island, Whistler, Southern Interior, Northern BC;
- By sector: Residential, Commercial and Industrial;
- By segment (i.e., sub-sector):
  - In residential—three dwelling types by detachment type, dominant heating fuel, and vintage;
  - In commercial—seventeen building types, by predominant use and building size (office, retail, school, hospital, etc.);
  - In industrial—thirteen plant types (mining, wood products, non-metallic minerals, etc.);
- By rate schedule: one rate schedule in residential, six rate schedules in commercial, and nine rate schedules in industrial; and
- By end use: ten residential, five commercial and seventeen industrial gas end uses.

76. The End Use Annual Method forecast model provides the forecast consumption values for each forecast year at the same level of granularity as the base year. In each alternative demand scenario, changes to customer numbers and energy consumption patterns are imposed, but the original granularity is maintained for all the future years. For example, in each scenario, there is a specific assumption about the average unit energy consumption in 2030 for gas space heating in attached, primarily gas-heated homes in the City of Vancouver constructed between 1976 and 1985. The high granularity of the model is a significant benefit of the End Use Annual Method, as outputs can be provided at the end-use level and can be rolled up to the region, segment, sector, or other level.[153] In addition, this granularity allows for the assessment of

[152] Exhibit B-6, BCUC IR1 17.4.

[153] Exhibit B-6, BCUC IR1 31.5.

impacts for changes that target specific end uses or building types (i.e., changing equipment standards, or energy codes for new construction in specific regions or municipalities).

(c) Reference Forecast Provides an Important Reference Point for Alternative Scenarios

77. FEI developed the Reference Case forecast by setting critical uncertainties based on observed end use patterns, as well as new changes in law or policy that will affect future demand and were, or were quite certain of becoming, enshrined in legislation, codes, standards or bylaws in and as of the base year. FEI and Posterity Group explained the Reference Case as follows:[154]

> The Reference Case includes those trends, regulations and policies that are known at the time the analysis is undertaken, or are very certain to come to pass. These considerations are then held static through the planning horizon. This condition of the Reference Case therefore provides a reference point from which to model and compare other scenarios, with other Critical Uncertainty settings.
>
> For example, for a given building type, the Reference Case does not include changes in the percentage of customers applying an end use (e.g., the percentage of customers who have a fireplace) or the fuel shares for the end use (e.g., the percentage of fireplaces that burn gas). The effects of Critical Uncertainties that affect fuel choice modelled in other scenarios are more easily seen against this baseline.
>
> However, the unit energy consumption for the end uses is not assumed to be constant since that would ignore both the codes, standards, standard building practices and purchasing patterns in effect. Instead, the Reference Case includes assumed rates of building renovations, equipment stock turnover and replacement by new equipment that meets the standard, and the natural rate of adoption of efficiency measures. The effects of Critical Uncertainties that change codes and standards, or that include increased DSM program activity modelled in other scenarios, are more easily seen against this baseline.
>
> In the Reference Case, new buildings are assumed to have different end use patterns than the corresponding existing buildings. As an example, the Residential End Use Survey data could be segmented by building vintage, enabling FEI to estimate the percentage of new homes with fireplaces and the percentage of those that burn gas, as compared to the values for older existing buildings. The unit energy consumption of most end uses in new buildings also tends to be lower, because of better building envelopes and newer, more efficient equipment. The Reference Case usage per customer is accordingly not static, but rather decreases

[154] Exhibit B-6, BCUC IR1 17.2.

> as more new construction occurs. The Critical Uncertainties that affect new construction in other scenarios can be easily seen against this baseline through variation in use per customer and overall demand.

78. As the Reference Case is based on those trends, regulations and policies that are known at the time the analysis is undertaken, or are very certain to come to pass, it provides an important reference point to understand the impact of changes in the critical uncertainties modelled in the alternative scenarios.[155]

79. While FEI has adopted the End Use Annual Demand method for resource planning purposes, FEI's Traditional Annual Method, which uses historical data to produce a time series forecast, still provides a useful reference point for validating the results of the End Use Annual Method. FEI extended the results of its Traditional Annual Method over the planning horizon to create a "Business as Usual" (BAU) forecast.[156] The BAU forecast is only 5 percent higher than the Reference Case, showing that the results of the End Use Annual Method and the Traditional Annual Method are reasonably aligned. This comparison provides additional confidence that FEI's End Use Annual Method provides a sound approach for examining alternate future scenarios.[157] Given the relative ease to produce to the BAU forecast, FEI intends to continue to use the BAU forecast as a reference point in future LTGRPs.[158]

(d) End Use Annual Method Produces Wide Range of Future Scenarios that are Reasonable for Resource Planning Purposes

80. FEI's End Use Annual Method has enabled FEI to examine a broad range of uncertainties across six different future scenarios, to understand the degree to which these uncertainties will impact future demand, to discuss these uncertainties and findings with stakeholders, and to identify a future scenario on which to plan shorter-term actions.[159]

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155 Exhibit B-8, BC Hydro IR1 1.1.

156 Exhibit B-1, p. 4-8.

157 Exhibit B-1, pp. 4-13 to 4-14.

158 Exhibit B-23, BCUC IR2 89.1.

159 Exhibit B-1, Appendix B-6, High-Level Assessment of the Effectiveness of the Traditional and End Use Methods, p. 1.

81. FEI developed a range of six future scenarios based on the critical uncertainties for annual demand, which represent future conditions that could have the biggest impact on FEI's business.[160] Following a standard scenario planning approach, FEI's scenario analysis proceeded in four steps:

- Evaluating planning environment variables and identifying critical uncertainties;
- Determining the number of outcomes (called settings) and their broad qualitative boundaries for each selected critical uncertainty;
- Determining plausible combinations of outcomes for each critical uncertainty and creating reasonable scenario plotlines for annual demand; and
- Populating quantitative data into the outcomes for each critical uncertainty and iterating with internal and external stakeholder feedback.[161]

82. Table 4-1 of the 2022 LTGRP summarizes the six alternative future scenarios that FEI modeled, including the scenario description and input setting. The parameters for each of the six scenarios is set out in Appendix B-3 of the LTGRP. Appendices B-4 and B-5, respectively, present summary tables and a working MS Excel data file of the End Use Annual Method annual demand results.

83. Figure 4-9, reproduced below, shows the End Use Annual Method demand Reference Case and scenario results for the residential, commercial and industrial demand category across all regions for each of the scenarios. As shown in this figure, the range of annual demand forecast scenarios is broad, with the Upper Bound and Lower Bound scenarios representing the theoretical maximum and minimum annual demand.[162]

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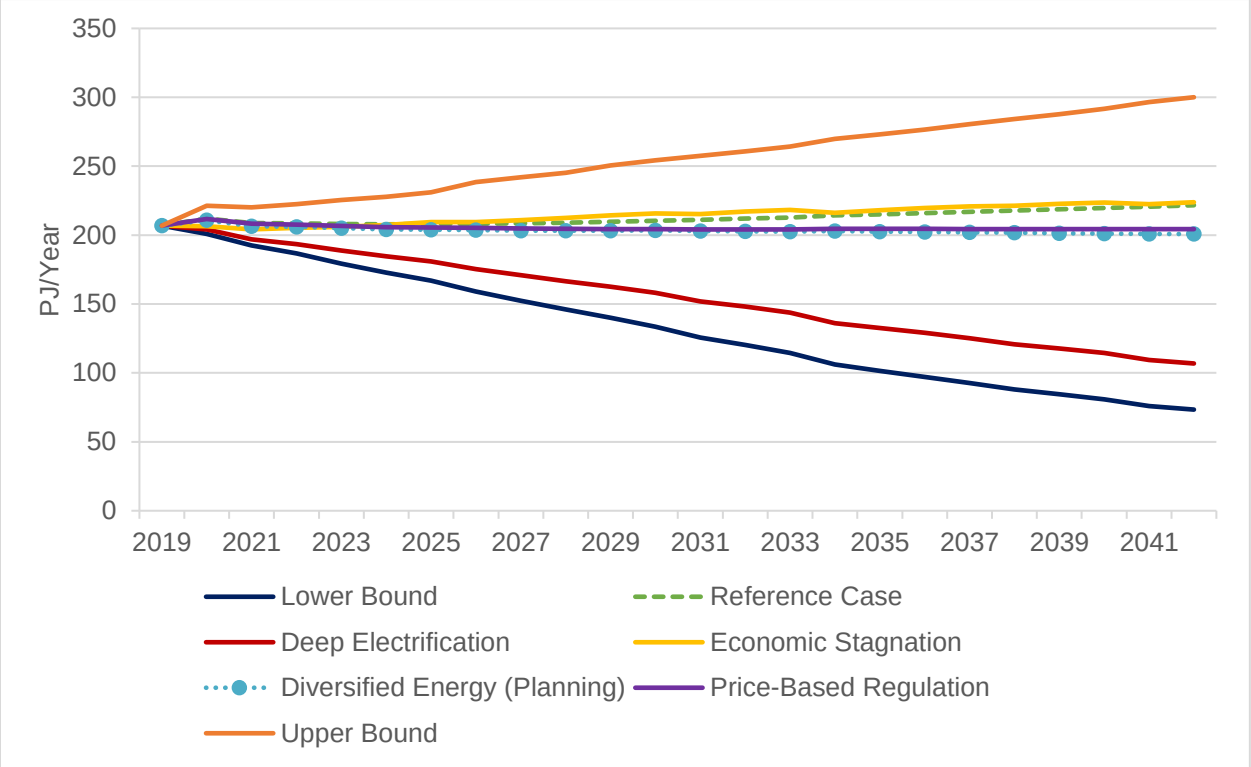
[160] Exhibit B-1, Appendix B-3, p. 1.

[161] Exhibit B-1, p. 4-19.

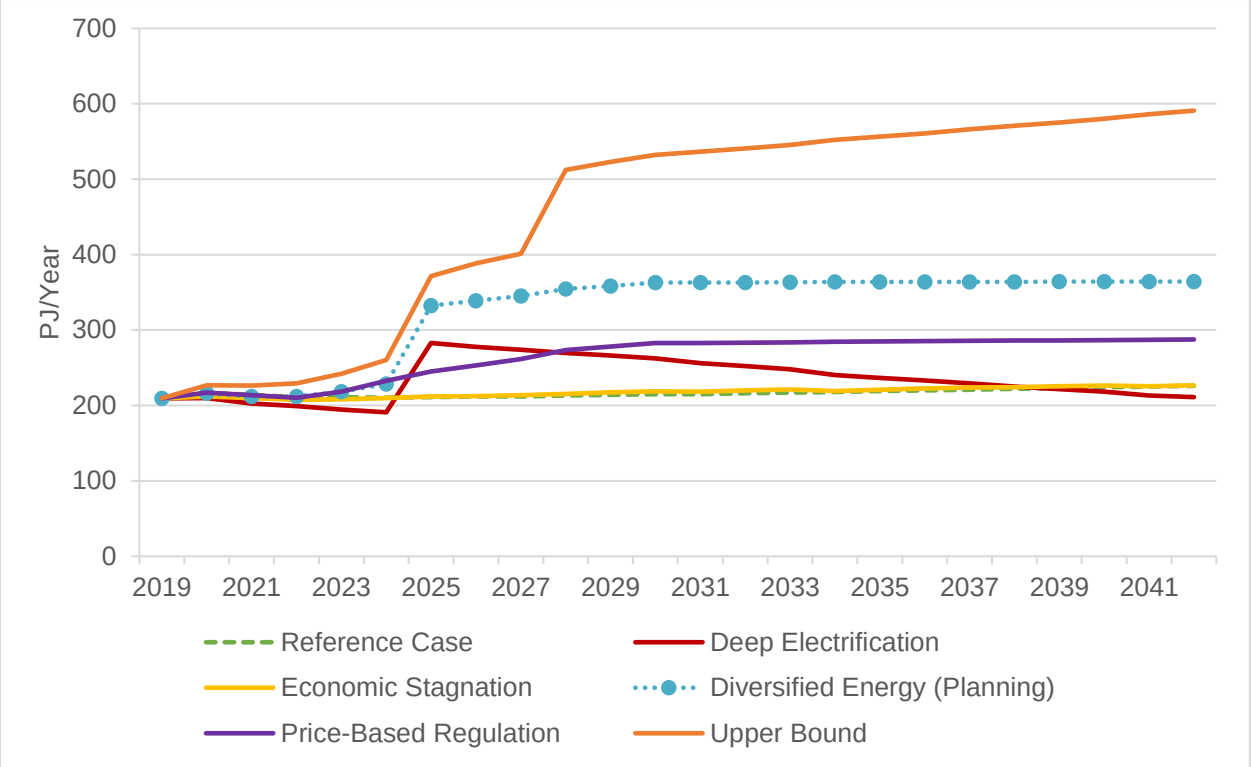
[162] Exhibit B-6, BCUC IR1 30.1.

Figure 4-9: Annual Demand Scenarios – Residential, Commercial and Industrial Sectors



84. Further, after including the LCT and Global LNG annual demand forecast and the New Large Industrial annual demand forecast, FEI forecast its total annual demand over the planning horizon, as shown in Figure 4-20 below.

Figure 4-20: Total Annual Demand Including LCT – All Categories, All Scenarios



85. The broad range of demand between the alternate scenarios is representative of the substantial change and uncertainty in the energy planning environment.[163] FEI submits that this range provides a reasonable and appropriate variety of scenarios by which to consider potential future annual demand over the 20-year planning horizon.

(e) Lower Bound and Deep Electrification Scenarios are Not Plausible

86. Two of the scenarios that FEI modelled, the Lower Bound and Deep Electrification scenarios,[164] involve rapid and extensive declines in annual gas demand and electrification assumptions that are not plausible, as there is no credible fuel switching alternative that can address British Columbia's peak demand requirements over this timeframe.

87. FEI's conclusion that the Lower Bound and the Deep Electrification Scenarios are not plausible is based on FEI's examination of alternative pathways to decarbonize as well as the

[163] Exhibit B-1, p. 4-27.

[164] Exhibit B-1, pp. 4-25 to 4-26.

extensive experience of FortisBC's gas and electric utilities in acquiring, transmitting and distributing gas and electricity to customers in BC. Additionally, there is a lack of clear evidence that these scenarios are plausible when fully considering all of the challenges of completely electrifying buildings and industry in BC.[165] Due to the extreme challenges of converting the peak heating load for more than 1 million gas customers to an alternative energy source and system, namely electricity, within the time required to meet provincial GHG emission reduction targets, the Lower Bound and the Deep Electrification Scenarios would involve high costs and implementation delays that would stall efforts to decarbonize, cause high gas and electric rate increases and potentially place existing energy delivery networks at greater risk.[166]

88. To investigate and support this conclusion, FortisBC conducted the Kelowna Electrification Case Study (Case Study), which analyzes the impacts of electrification in Kelowna, BC. FortisBC selected the City of Kelowna for this Case Study because, as the provider of both electricity and gas in Kelowna, it has full access to information about system constraints, customer energy use and future system costs at both the transmission and distribution levels that are not available to it throughout the majority of the FEI service territory. This Case Study illustrates the extreme scale of impacts on peak electricity demand and the subsequent system upgrade and land requirements for the electric utility.[167]

89. The results show that at 100 percent electrification of gas load and a mean daily temperature of -26 Celsius (C), peak demand in 2040 would more than triple, from 472 megawatts (MW) to 1,429 MW.[168] This amount of peak demand for the City of Kelowna alone is significant, given that FBC's entire electric service territory system peak load record is 835 MW, set in December 2022. The Case Study illustrated that even at 25 or 50 percent electrification of gas load, peak demand in 2040 could more than double to 711 MW and 950 MW respectively, both of which would exceed the current system capacity in Kelowna of 550 MW and result in

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165 Exhibit B-6, BCUC IR1 30.3.

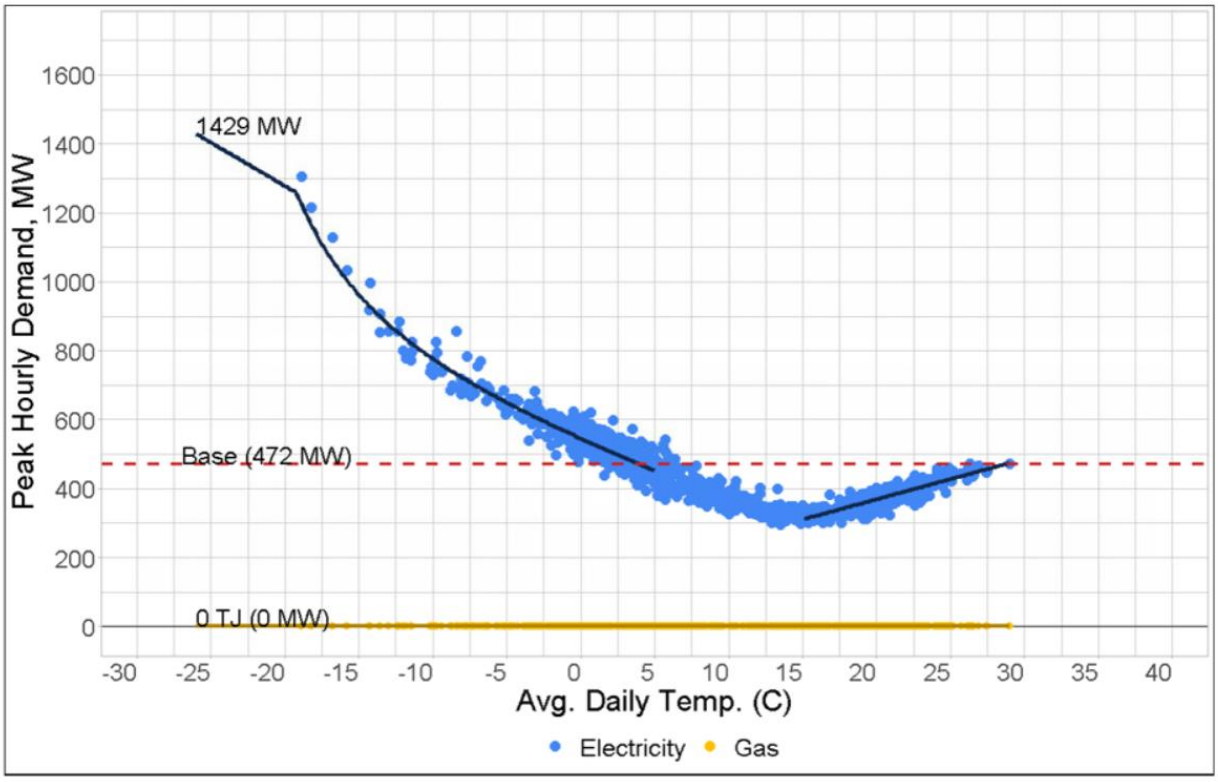
166 Exhibit B-6, BCUC IR1 30.3.

167 Exhibit B-6, BCUC IR1 30.3; Exhibit B-20.

168 Exhibit B-20, p. 1.

more complex system upgrades.[169] The 100 percent electrification scenario is illustrated in the figure below.

Figure 3-5: City of Kelowna - Electricity and Gas Demand by Temperature in 2040 with 100 Percent Electrification[17]



90. With full electrification, it is estimated that expenditures of between $2.6 and $3.4 billion will be required for system upgrades and associated land to transmit and distribute energy to serve FBC's expected electric load growth, handle incremental EV charging, along with the addition of fuel-switching of more than 43,850 gas customers by 2040. For comparison purposes, FBC's total rate base was approximately $1.7 billion in 2023. This cost estimate does not include the total power supply requirement cost on both an annual and peak basis for what would be required to meet the increased demand for Kelowna.[170]

91. For the Case Study, FEI used the RDH BC Cold Climate Field Study for heat pump efficiencies within BC. This is the most recent and available field study, and its results are

[169] Exhibit B-20, p. 12.

[170] Exhibit B-20, pp. 17-18.

comparable to the results of other field studies in Minnesota and the Yukon.[171] FEI believes the highest performing cold weather heat pumps available in the BC market were used for the Case Study, and the analysis was conservative in assuming that all fuel-switching customers installed the highest efficiency heat pump available. FEI conducted a speculative sensitivity analysis for hypothetical heat pump efficiency improvements that may occur before 2040. While the highest performing heat pumps in the BC Cold Climate Field Study have a Coefficient of Performance (COP) of 3.5 at 0 C, if heat pump technology improves to the point where field-measured COP's reach 5.0 at 0 C, and if 100 percent of all FortisBC customers install such equipment before 2040, then the peak load in the 100 percent electrification case could potentially be reduced from 1,429 MW to 1,153 MW (a reduction of approximately 20 percent). This amount of peak demand still dramatically exceeds current system capacity limits and would continue to require most of the infrastructure investments identified in the Case Study.[172] Further supporting details on the assumptions and other information for the Case Study are provided in responses to IRs.[173]

92. A high-level indication of the lower bound of costs impacts for FBC customers shows that the capital expenditures for Kelowna alone for 100 percent electrification would result in significant rate impacts to FBC's electric customers of 145 percent by 2042 when compared to the 2023 Approved rates.[174] At the same time, the Deep Electrification Scenario (100 percent electrification) would have a rate impact of 235 percent for FEI's customers. As shown in the table below, this indicates that both gas and electric customers would benefit from lower rate impacts under a Diversified Pathway instead of an Electrification Pathway (even with just Kelowna electrified). The advantage of the Diversified Pathway is expected to be even greater if the capital costs to electrify FBC's entire service territory (or the entire Province) are considered.[175]

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171 Exhibit B-23, BCUC IR2 119.3.

172 Exhibit B-23, BCUC IR2 119.3.1.

173 Exhibit B-23, BCUC IR2 119-121; Exhibit B-26, BCSEA IR2 55; Exhibit B-27, BCSSIA IR2 16 to 20; Exhibit B-28, CEC IR2 84 to 86; Exhibit B-32, RCIA IR2 51 to 55.

174 Exhibit B-23, BCUC IR2 120.1.

175 Exhibit B-23, BCUC IR2 120.2.

Table 1: Illustrative Rate Impact for Gas (FEI) and Electric (FBC) Customers under 25% and 100% Electrification (with Electric Rate Impacts for Electrification in Kelowna Only)

	Reference	FEI's DEP Scenario (25% Electrification)	FEI's Deep Electrification (100% Electrification)
FEI's Residential Illustrative Gas Rate Impact by 2042	Figure 9-7 of Application	118%	235%
FBC's Residential Illustrative Electric Rate Impact by 2042 (Kelowna Only)	BCUC IR2 120.1	129%	145%

93. Regardless of rate impacts, in Appendix A of the Case Study, FortisBC describes some of the practical challenges involved with electrifying the City of Kelowna, including:

- execution and feasibility for shifting demand and ensuring adequate supply;
- acquiring land for new infrastructure;
- obtaining necessary project permits, approvals, and consent;
- constructing transmission and distribution projects; and
- transitioning customers to electricity.

94. These challenges make the Deep Electrification Scenario in Kelowna (and, by extension, throughout the FortisBC electric service territory) implausible within the time frame required to meet the Province's carbon reduction targets, and even moderate levels of electrification challenging.[176]

95. The results of the Case Study are consistent with Guidehouse's Pathways Report,[177] and the third party studies included in Appendix A-9 of the 2022 LTGRP, which highlight that there are unintended consequences and risks of pursuing an electrification-centric approach.[178] For example, research from the University of Victoria demonstrates that even in the temperate climate of Metro Vancouver, an electrification-only pathway potentially causes resiliency

[176] Exhibit B-20, Appendix A.

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

[178] Exhibit B-1, pp. 3-25 to 3-28.

issues.[179] According to the research, during a hypothetical five-day cold weather event with little variable renewable energy available, space heating demand would exceed hydroelectric production capacity very quickly. This research calculated that Metro Vancouver would need to build approximately 350 GWh of electrical storage in order to meet that demand, which would equate to 35 pumped hydro storage facilities.[180]

96. Ultimately, the results of the Case Study and other research emphasize the need to examine the tools to moderate peak energy demand and leverage the gas and electric systems to work together to support a practical, resilient, and more affordable pathway to lower GHG emissions in the Province. In this regard, FEI has already begun work with FortisBC Inc. (FBC) and has expressed its openness and willingness to work with BC Hydro to further these goals.[181]

(f) FEI's Use of Customer Growth and End-Use Demand to Model Impact of Uncertainties is Clear and Transparent

97. FEI has reasonably and appropriately modelled future uncertainties through customer growth and critical uncertainties that impact end use demand.[182] FEI's and Posterity's objective is to have clear, well defined and understandable assumptions underlying the LTGRP. FEI and Posterity explained how their method of using end-use demand, rather than number of customers, to model the impact of uncertainties provides clear and more transparent results, and avoids double counting:[183]

> FEI and Posterity Group prefer separating whether someone is a customer from what they use energy for, what fuel choices they make, and how much energy they use for each end use. The ability to model each of these considerations as separate model parameters provides a better understanding of what the customer's characteristics are and enhances the examination of changes to those characteristics. If energy use and customer numbers are all blended together into one parameter, understanding and testing the effects of specific changes is more difficult. As well, addressing a critical uncertainty such as fuel switching, for

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179 Exhibit B-1, Appendix A-9.5: Palmer-Wilson, Rowe, Wild, "Decarbonization of the building heating system in Metro Vancouver: comparison of two transition pathways" (May, 2021).

180 Exhibit B-10, BCSEA IR1 32.1.

181 Exhibit B-4, pp. 31-32; Exhibit B-23, BCUC IR2 121.4.

182 Exhibit B-6, BCUC IR1 14.3.

183 Exhibit B-6, BCUC IR1 14.3; Exhibit B-23, BCUC IR2 86.3.

> example, partially using assumptions about customer additions and partially through changes in energy end use patterns, would require additional checks and balances within the modelling to ensure that the impact of fuel switching on demand is not being double counted for any individual or group of customers.

98. It is important to note that aspects of the LTGRP are often a product of the number of customers and other factors controlled by other assumptions and critical uncertainties, such as end-use unit energy consumption, fuel shares, UPCpeak, and emission factors. Therefore, FEI and Posterity Group's method of controlling each of these inputs with their own sets of assumptions and, in some cases, with dedicated critical uncertainties provides greater visibility into their distinct effects on the outcome and adds value to the results. In contrast, using one model lever—the number of customers—to reflect many different critical uncertainties would "bury" their separate influence rather than reveal it, and doing so would not increase the value of the information provided.[184]

99. It is also uncertain if a method currently exists in the energy industry to tease apart the influence of energy pricing and policies on customer numbers versus usage per customer.[185] FEI and Posterity Group explain:[186]

> The literature on customer response to energy pricing signals is relatively limited. Studies that focus on either customer attachment (or detachment) behavior in response to pricing signals may not include the fuel choice behavior of customers that choose to continue. Conversely, studies focusing on fuel choice behavior may not consider the effects of customer attachment and detachment. Posterity Group and FEI are not aware of research that considers both effects together and that tease apart the response to pricing signals into the two effects. As discussed in the response to BCUC IR2 86.2, it is likely that the exercise would be introducing an artificial distinction between them in the model, with no firm foundation in the literature.

100. Finally, an alternative approach using number of customers to model the impact of uncertainties would be unlikely to change the end result (assuming the issue of double counting noted above can be resolved), as the estimated PJ of demand would be close to the same as in

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184 Exhibit B-23, BCUC IR2 86.1.1.

185 Exhibit B-23, BCUC IR2 86.2.

186 Exhibit B-23, BCUC IR2 86.3 and 86.4.

FEI's current set of scenarios. In a scenario with decreasing demand, there would be fewer customers, but the same amount of gas demand would be distributed among this smaller number. In a scenario with increasing demand, there would be more customers but each of them would use somewhat less gas.[187]

101. FEI therefore submits that embedding the impact of critical uncertainties into the customer forecast will not provide more useful (nor as useful) information as the current method. However, FEI is committed to continual improvement in its annual demand forecasting methods, and will consider methods to improve its annual demand forecast method in its next LTGRP.

(g) FEI Has Estimated the Impact of the Accelerated Setting for Codes and Standards on the DEP Scenario

102. FEI's modelling of future gas load under different future scenarios accounts for the impacts of potential future limitations imposed by local governments, although specific municipal actions or bylaws were not defined other than for the City of Vancouver. Specifically, the New Construction Code Critical Uncertainty used to create the load forecast scenarios has an "Accelerated" setting that reflects earlier adoption of steps in the BC Energy Step Code, which includes energy performance requirements. FEI applied the "Accelerated" setting to the Deep Electrification and Lower Bound scenarios.[188] However, the status of municipal policies and bylaws for new construction has progressed since FEI's development of the LTGRP scenarios, including through the adoption of the opt-in Zero Carbon Step Code. As a result, a greater number of municipalities are now more closely aligned with the Accelerated Setting rather than the Reference Setting with respect to new construction codes.[189]

103. While FEI is not able to directly model the impact of applying the Accelerated New Construction Code Critical Uncertainty setting to the DEP Scenario, FEI's estimate of the impact of the potential changes in the BC Building Code and adoption of the Step Code is in the range of 5 to 10 percent reduction in annual demand by 2042. This estimate is based on applying the

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187 Exhibit B-23, BCUC IR2 86.2.

188 Exhibit B-6, BCUC IR1 4.3.

189 Exhibit B-23, BCUC IR2 81.2.

accelerated setting for the codes and standards critical uncertainties to the Reference Case in isolation.[190]

104. FEI intends to make reasonable efforts to model the effect of specific municipal policies and bylaws in the development of the next LTGRP, to the extent they are material to the analysis, just as it has taken into consideration the specific requirements of the City of Vancouver for both the 2017 LTGRP and 2022 LTGRP.[191]

(h) Dual-Fuel Heating Systems and Peaking Role for Gas System Align with DEP Scenario

105. A scenario in which the gas system with technologies such as dual fuel systems is used to serve peak heating requirements, in combination with the electricity system in BC, is more in line with its DEP Scenario and Clean Growth Pathway, than a separate and distinct scenario from those modelled for the 2022 LTGRP.[192]

- FEI considers it unlikely in the time frame of the LTGRP planning period that all FEI's heating customers would convert to hybrid systems. Rather, there is more likely to be some combination of dual fuel heating systems, all electric heating systems and all gas systems that use increasing supplies of renewable and low carbon gas. FEI has already included electrification and renewable and low carbon gas in its DEP Scenario, so that adding higher adoption of hybrid heating systems would not be a major departure from the DEP Scenario.[193]

- Utilizing dual fuel systems still maintains the important role for gas infrastructure to meet peak energy demand and allows deeper integration of the gas and electric systems, which is a key aspect of the DEP Scenario. The role of dual fuel systems and gas-fired heat pumps is an emerging opportunity that has been considered to the degree possible in the DEP Scenario.[194]

- FEI's system is already oriented towards meeting peak heating requirements and the inclusion of higher levels of adoption of hybrid heating systems would maintain this characteristic as in the DEP Scenario.[195]

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190 Exhibit B-23, BCUC IR2 81.2.1.

191 Exhibit B-23, BCUC IR2 81.1.

192 Exhibit B-6, BCUC IR1 9.3.2; Exhibit B-23, BCUC IR2 82.2.1.

193 Exhibit B-23, BCUC IR2 82.2.1.

194 Exhibit B-6, BCUC IR1 9.3.2; Exhibit B-23, BCUC IR2 82.2.1.

195 Exhibit B-23, BCUC IR2 82.2.1.

(i) FEI Has Contingency Plans to Address Variances from the DEP Scenario

106. As discussed in Part Two of this Final Submission, FEI has reasonably and appropriately identified the DEP Scenario as its planning scenario. However, the 2022 LTGRP has examined a broad range of other possible future scenarios that could unfold and identifies the contingency actions to be taken should FEI's demand unfold in a substantially different way than projected in the DEP Scenario.[196]

107. For instance, Items 8 to 10 of FEI's Action Plan include monitoring activities that will enable FEI to identify if a scenario other than the DEP Scenario is emerging and understand what best next steps to take under such circumstances.

- Item 8 of the Action Plan is: "Continue monitoring, analysing and contributing to the energy planning environment while working with government on policy framework for deep decarbonization." This includes continuing to monitor market and policy developments which may impact the procurement and development of clean energy supply, regional gas supply, customer demand and pricing.[197]

- Item 9 of the Action Plan is: "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." Under this action item, FEI will continue to monitor market developments, proactively assess challenges, and identify opportunities to enhance supply security, diversity and resilience in order to meet the LTGRP objectives.[198]

- Item 10 of the Action Plan is: "Continue monitoring for and evaluating system expansion needs across FEI's service regions." This includes monitoring customer and peak demand growth on FEI's system and assessing the implications for capacity related infrastructure requirements.[199]

108. Furthermore, FEI has described how it would respond to changing demand scenarios. For example, Section 6.2.4.3 of the 2022 LTGRP discusses FEI's gas supply contingency plans to address higher or lower than forecast demand uncertainty. Sections 7.2 and 7.3 of the 2022 LTGRP include a discussion of contingencies for either faster or slower demand growth. FEI

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196 Exhibit B-10, BCSEA IR1 7.2.

197 Exhibit B-1, pp. 10-6 to 10-7.

198 Exhibit B-1, p. 10-7.

199 Exhibit B-1, p. 10-8.

continuously monitors these factors that can impact capacity requirements to determine if there is a need to advance or delay proposed capacity expansions. Thus, contingency planning for system capacity requirements is inherently included in FEI's regional system capacity plans.[200]

109. FEI therefore submits that the 2022 LTGRP contains the reasonable and appropriate actions to ensure that FEI is able to respond to the actual future that will unfold over the planning horizon.

B. FEI HAS PLANNED TO LEVERAGE DEMAND-SIDE RESOURCES

110. In Section 5 of the 2022 LTGRP, FEI set outs its plan for implementing cost-effective DSM guided by the High DSM setting, estimates the demand it expects to serve after it has taken these measures, and updates its analysis of opportunities for DSM to reduce or replace infrastructure investments, satisfying sections 44.1(2)(b), (c) and (f) of the UCA. As discussed in Part Two of this Final Submission, investing in DSM to reduce energy use is a pillar of FEI's Clean Growth Pathway. Consistent with the Clean Growth Pathway, the 2022 LTGRP reflects FEI's intention to maximize the potential adequate, cost-effective DSM over the planning horizon. FEI notes for clarity that the 2022 LTGRP represents a long-term forecast and does not include a request for acceptance from the BCUC for specific DSM expenditures.

111. In this section of the Final Submission, FEI addresses the requirements of sections 44.1(2)(b), (c) and (f) of the UCA. In Part Four, Section B of this Final Submission, FEI responds to the Panel's request[201] for submissions on how FEI's 2022 LTGRP meets the DSM Regulation as recently amended, in the context of the BCUC's consideration of section 44.1(8)(c) of the UCA, which requires the BCUC to consider "whether the plan shows that the public utility intends to pursue adequate, cost-effective demand-side measures". As set out in that section of this Final Submission, FEI's intention to pursue adequate, cost-effective demand-side measures in accordance with the DSM Regulation and section 44.1(8)(c) of the UCA is explicit in the 2022 LTGRP and strongly supports acceptance of the 2022 LTGRP.

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[200] Exhibit B-1, p. 7-4.

[201] Exhibit A-19, Letter dated October 5, 2023 – BCUC requesting matters to be addressed in final arguments.

112. FEI's submissions in the subsections below are organized around the following points:

- FEI conducted detailed modelling of DSM scenarios and plans to pursue the High DSM Setting over the planning horizon.
- FEI has estimated its post-DSM annual demand for all scenarios.
- FEI has updated its analysis of opportunities for DSM to replace or defer infrastructure investments as directed by the BCUC in the 2017 LTGRP.
- FEI's Long-Term Plan is to implement adequate, cost-effective DSM activities with the High DSM Setting in mind.

(a) FEI Modelled DSM Scenarios and Plans to Pursue the High DSM Setting

113. As described in Section 5.3 of the 2022 LTGRP, FEI modelled DSM potential savings for the Reference Case and each of the six alternate future scenarios. FEI estimated DSM energy savings potential only for the built environment (residential, commercial and industrial sectors), as DSM programs do not apply to the LCT and Global LNG or New Large Industrial demand categories.

114. The modelling of the DSM impact for the Reference Case and each of the five scenarios was carried out in three key steps.[202] First, the 2021 CPR is the basis for long-term DSM program analysis and reviews the energy efficiency opportunities available to FEI's residential, commercial and industrial sectors. To be clear, the purpose of the 2021 CPR is not to recommend specific programs or targets to be implemented, but to examine available energy efficiency technologies, understand the inventory of energy equipment in a utility's service area, and determine the conservation potential that exists.[203]

115. Second, FEI developed five DSM Settings, from "Taper Off" to "High", based on incentive level, economic screen, and budget to estimate the total energy savings that could be achieved

[202] Exhibit B-1, p. 5-9.

[203] Exhibit B-1, Section 5.3.2.

in the Reference Case and alternate future scenarios.[204] The description of each of the settings are shown in the table below.[205]

Table 5-3: DSM Settings

	Taper Off	Low	Medium UCT	Medium	High
Description	Assumes DSM spending tapers off as the province electrifies	Constrained to include only the most cost-effective measures. Only 50% incentive level is used, and measures must pass TRC > 1 (no MTRC).	Any incentive level is permitted, but measures must pass UCT > 2 and MTRC or TRC >1. This represents more efficient budget spending.	Similar to the 2021 CPR's medium market potential scenario where adoption of measures is based on incentives covering 50% of a measure's incremental cost	Similar to the 2021 CPR's high market potential scenario where adoption of measures is based on incentives covering 100% of a measure's incremental cost

116. The table below shows FEI's choice of DSM Setting for each of the scenarios.[206]

Table 2: Assumptions Regarding the Choice of DSM Setting Applied to LTGRP Scenarios

Scenario	DSM Setting	Assumptions Regarding the Choice of DSM Setting
Reference Case	Medium	• The Reference Case demonstrates the DSM activity that is assumed to occur over the planning horizon based on the continuation of expected trends and implementation of known policies.
DEP	High	• Consistent with the Clean Growth Pathway, the High DSM Setting maximizes energy savings potential and therefore the potential to reduce GHG emissions by accelerating building retrofits, high performance new construction, and energy efficiency in commercial and industrial processes.
Deep Electrification	Taper Off	• As electrification is the primary avenue utilized by the BC government for decarbonization in this scenario, FEI's DSM budgets are constrained. This analysis required an additional iterative process to find the optimal solutions of measures to meet the program budget based on an economic screening threshold in each year that allowed just enough measures to pass the screen based on a specified limit for that year. Budget is limited to 50 percent of 2022 spending in 2023, declining to 25 percent of 2022 spending by 2042.

[204] Exhibit B-1, Section 5.3.3. FEI provided a detailed explanation of its methodology for modelling incentive levels in Exhibit B-6, BCUC IR1 38.1 to 38.6.

[205] Exhibit B-1, p. 5-11.

[206] Exhibit B-6, BCUC IR1 70.1.

Scenario	DSM Setting	Assumptions Regarding the Choice of DSM Setting
Price-Based Regulation	Medium UCT	• Use of price signals instead of carbon regulation within the planning environment creates favourable conditions for FEI's Clean Growth Pathway as represented by the Medium UCT setting where no budget limit is applied, but efficient budget spending is undertaken.
Economic Stagnation	Medium	• As the BC economy tightens, investments in decarbonization are more limited and FEI continues to pursue DSM.
Upper Bound	N/A – no DSM	• This scenario combines all outcomes that would increase demand and therefore no DSM is applied.

117. As indicated above, FEI's selection of the High DSM Setting for the DEP Scenario is consistent with the Clean Growth Pathway. The High DSM Setting maximizes energy savings potential and therefore the potential to reduce GHG emissions. The choice of the High DSM Setting is also consistent with the positive support from the RPAG, the Energy Efficiency Advisory Committee and community engagement sessions for FEI to undertake high levels of DSM.[207]

118. Third, the DSM potential for the Reference Case and each alternate future scenario was calculated based on the 2021 CPR, DSM Settings and the policy and economic conditions assumed in the Reference Case and each scenario. In short, the DSM analysis estimates the potential impact of DSM programs by tailoring the results of the 2021 CPR to the economic and policy considerations reflected in each scenario. This enables FEI to calculate post-DSM annual demand forecasts for each scenario.[208]

119. Under the DEP Scenario with the High DSM Setting, savings from DSM activities are forecast to be about 25 PJ or 13 percent of annual demand in 2042.[209] The table below illustrates for each of FEI's scenarios the choice of DSM setting, the gas savings expressed in PJ and the GHG end-use emission savings in MtCO2e for the milestone years 2019, 2030, 2040 and 2042.[210]

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[207] Exhibit B-1, p. 5-11.

[208] Exhibit B-1, Section 5.3.4. Also see Exhibit B-6, BCUC IR1 39.3 for further explanation.

[209] Exhibit B-1, pp. 5-15, 5-20.

[210] Exhibit B-6, BCUC IR1 70.1.

Table 1: DSM Demand Reductions (End Use Emission Factors) For Residential, Commercial and Industrial Customers for the Reference Case And Alternate Scenarios

DSM Demand Reduction	Reference Case Medium DSM Setting				Diversified Energy (Planning) Scenario High DSM Setting				Deep Electrification Taper Off DSM Setting			
	2019	2030	2040	2042	2019	2030	2040	2042	2019	2030	2040	2042
Demand Reduction Volume (PJ)	0.0	13.0	23.0	24.0	0.0	18.2	25.8	26.0	0.0	12.6	15.1	14.5
GHG Emission Reductions (MtCO2e)	0.0	0.6	1.1	1.2	0.0	0.9	1.3	1.3	0.0	0.6	0.8	0.7
DSM Demand Reduction	**Upper Bound No DSM**				**Price Based Regulation Medium UCT Setting**				**Economic Stagnation Medium DSM Setting**			
	2019	2030	2040	2042	2019	2030	2040	2042	2019	2030	2040	2042
Demand Reduction Volume (PJ)	0.0	0.0	0.0	0.0	0.0	9.4	8.5	7.0	0.0	13.2	21.0	21.9
GHG Emission Reductions (MtCO2e)	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.3	0.0	0.7	1.0	1.1

120. Section 5.4.6 and Appendix C-2 of the 2022 LTGRP provide detail on the cost-effectiveness of the Reference Case and each Scenario, showing that they are cost effective under the total resource cost test (TRC), modified TRC (MTRC), and Utility Cost Test (UCT) based on the DSM Regulation in effect at the time of the filing of the 2022 LTGRP.[211] While FEI used a Zero Emission Energy Alternative (ZEEA) value of $106/MWh based on the last long-run marginal cost value accepted by the BCUC, the DSM portfolio remains cost effective using BC Hydro's updated energy reference price of $65/MWh.[212] As discussed further in Part Four, Section B(d) of this Final Submission below, the amendments to the DSM Regulation now require cost effectiveness to be assessed based on the UCT and generally make DSM activities more cost effective, as the amended DSM Regulation is designed to facilitate advanced DSM measures.

121. Further, FEI emphasizes that the 2021 CPR and the 2022 LTGRP DSM analysis display only a theoretical estimate of DSM uptake in relation to the ratio between incentive levels and measure incremental costs. FEI's DSM expenditure plans will take into account operational program delivery factors, such as staffing levels or specific program eligibility rules, when developing a DSM expenditure plan application, as well as the then-current requirements of the DSM Regulation or other legislative requirements in place at the time of filing.[213]

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211 Exhibit B-1, Appendix C-2, Supplemental Information for Demand Side Resources – DSM Analysis. See Exhibit B-6, BCUC IR1 35.1 for all supporting portfolio assumptions and values used in the calculation of cost effectiveness for the Reference Case and alternate scenarios.

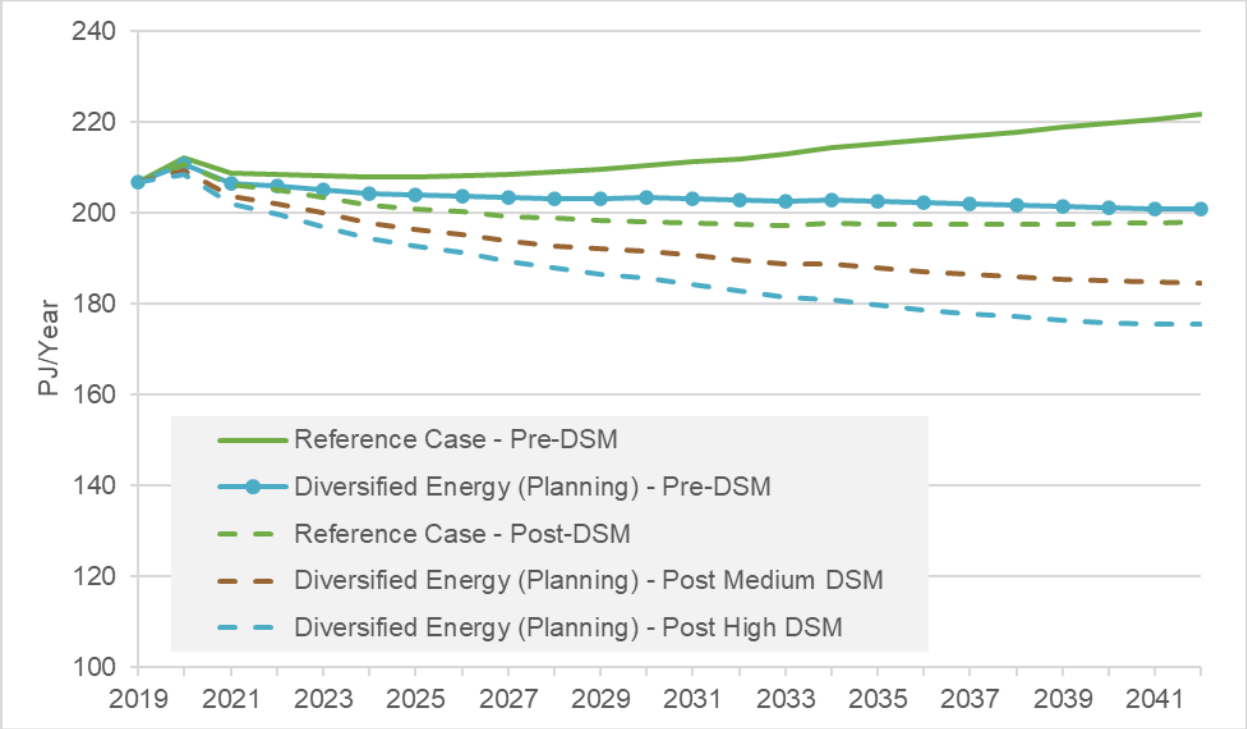
212 Exhibit B-6, BCUC IR1 34.2.

213 Exhibit B-1, pp. 5-13 to 5-14.

(b) FEI has Estimated its Post-DSM Demand for All Scenarios

122. Using the DSM modelling described above, FEI has estimated its post-DSM demand for all scenarios. For example, the figure below illustrates annual energy demand, excluding LCT, before and after estimated DSM energy savings for all sectors combined, for the DEP and Reference Case scenarios. As illustrated below, FEI's DSM analysis shows that significant energy and GHG emissions reduction can be achieved over the planning horizon under the range of alternate future scenarios examined for the 2022 LTGRP. Advanced DSM measures, although modelled in the 2022 LTGRP with conservative savings levels, are anticipated to achieve higher energy savings over the planning period than modelled.[214]

Annual Demand Before and After Estimated DSM Savings (Excluding LCT) – All Sectors Combined[215]



123. FEI notes that in this LTGRP the software model was designed to prioritize reducing demand for conventional natural gas rather than renewable and low carbon gas. The analysis may therefore show curtailed DSM expenditures after 2030 as the proportion of renewable and

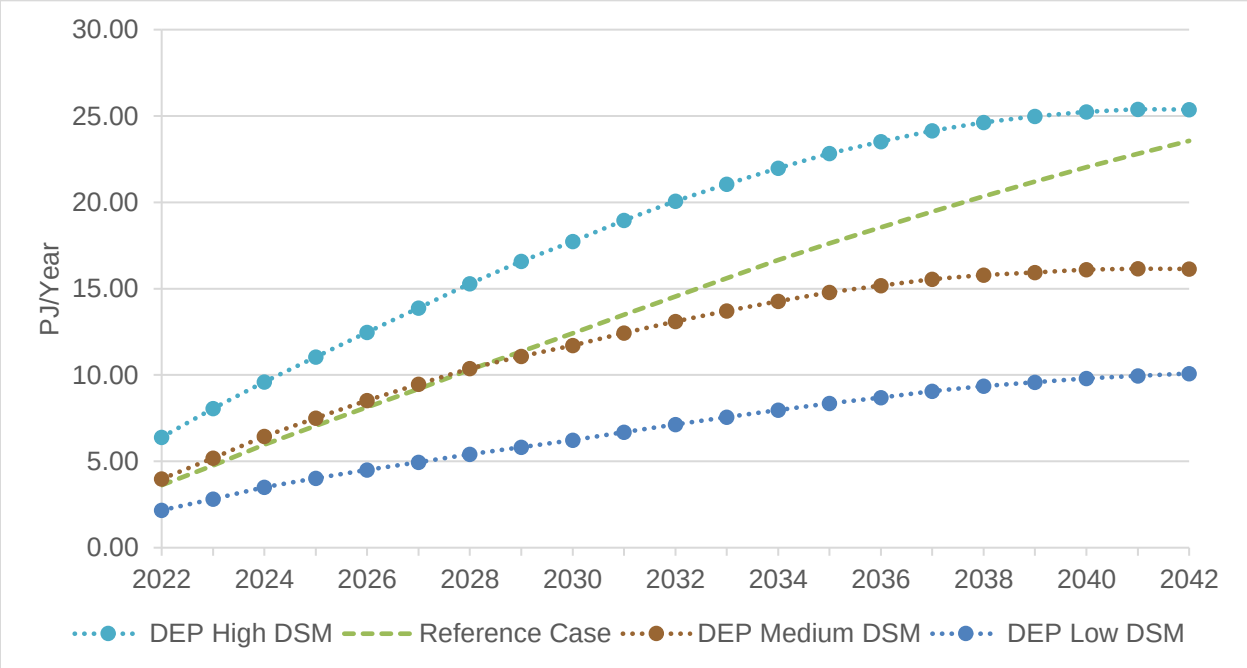
[214] Exhibit B-6, BCUC IR1 46.1. See also: Exhibit B-6, BCUC IR1 46.2, 46.3, 46.4.

[215] Exhibit B-1, Figure 5-9.

low-carbon gas increases and conventional natural gas declines. This is more apparent in the DEP Scenario than the Reference Case due to the higher proportion of renewable and low carbon gas in the DEP Scenario. FEI will assess updating the model for the next LTGRP, so that DSM savings can be applied proportionally to all fuel types including renewable and low-carbon gas, so that savings will not be curtailed as the conventional gas share decreases.[216]

124. As directed by the BCUC in its acceptance of the 2017 LTGRP, FEI conducted additional analysis to understand a broad range of outcomes for DSM potential under the DEP Scenario, which is now the equivalent to the "reference" scenario referred to in the directive. The additional analysis involved applying the Low and Medium DSM Settings to the DEP Scenario to vary the incentive level for measures and develop a range of outcomes, and then comparing to the Reference Case. The results of this analysis are shown in Figures 5-2, 5-3, and 5-4 of the 2022 LTGRP.[217] For example, Figure 5-2 illustrates the energy savings potential of the DEP Scenario when applying the Low, Medium and High Settings:

Diversified Energy (Planning) or DEP Scenario DSM Savings Potential – 3 DSM Settings



[216] Exhibit B-1, p. 5-2; Exhibit B-6, BCUC IR1 39.1 and 44.1; Exhibit B-9, BCOAPO IR1 4.1; Exhibit B-25, BCOAPO IR2 14.1.

[217] Exhibit B-1, Section 5.4.1.

(c) FEI Has Updated Analysis of Opportunities for DSM to Replace or Defer Infrastructure Investments

125. As FEI does not construct its own energy generation resources, FEI's DSM analysis does not weigh the cost of DSM against the need for procuring or constructing upstream energy generation resources to meet demand growth. Instead, FEI's DSM analysis primarily seeks to establish an adequate and cost-effective level of DSM activity and explore the extent to which the peak demand implications of such DSM activity may defer FEI's requirements for downstream infrastructure.[218] In the 2017 LTGRP Decision, the Panel confirmed that it would not require FEI to develop a plan for DSM to reduce peak demand in this LTGRP.[219]

126. Further to Directive 4 from the 2017 LTGRP Decision, however, FEI updated its analysis of opportunities for DSM to be used to cost-effectively replace or defer infrastructure investments. Specifically, FEI commissioned ICF Canada (ICF) to update its review of the state of the North American gas utility industry in exploring opportunities and implementing DSM programs that could potentially replace or defer infrastructure investments.[220] ICF's report highlights that there is only modest experience to date with implementing non-pipe solutions (NPS) projects to address peak demand constraints, but interest is starting to grow, especially in response to decarbonization activities.[221]

127. FEI is supportive of the development of a BC-specific NPS framework that leverages best practices in other jurisdictions, while reflecting the realities of the BC market. The development of a BC-specific NPS framework would provide guidance and direction regarding several important aspects related to the development and deployment of NPS projects in BC. It is, however, too early to speculate on the views or timelines for preparing such a framework as FEI does not have sufficient information to develop such a framework.[222] Notably, FEI currently does not have hourly or daily metering in place for the vast majority of its customers, without which

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218 Exhibit B-1, p. 5-2.

219 2017 LTGRP Decision, p. 17.

220 Exhibit B-1, Appendix C-3, Non-Pipe Solutions Final Report.

221 Exhibit B-1, p. 5-41; Appendix C-3, Section 7.

222 Exhibit B-23, BCUC IR2 101.2.

FEI cannot assess the magnitude of change in peak hour or peak day demand resulting from demand-side measures or validate to what extent peak demand could be reduced reliably.[223]

128. FEI is, however, diligently progressing its work on potential NPS:

- FEI's Advanced Metering Infrastructure (AMI) Project will allow FEI to begin installing meters that can provide more precise consumption information that would aid in validation of the peak demand reductions from demand-side measures.[224]

- FEI is currently assessing means of collecting data to measure the impact of programs or projects on peak demand and is monitoring initiatives in other jurisdictions.[225]

- FEI is undertaking pre-feasibility work for potential future NPS activity and will continue to explore the merits of potential NPS framework during that investigation. This includes exploring demand response natural gas solutions as part of its Innovative Technologies portfolio.[226]

- FEI already has Natural Gas Demand Response programs in place, in the form of interruptible rates for industrial customers, to the extent that is practical and to which the market will bear.[227]

- FEI already explores CNG and LNG NPS, as exhibited by the Gibsons Capacity Upgrade project which employed a local peak shaving CNG unit to avoid a pipeline solution.[228]

- As the gas system is needed to reliably deliver energy for peak winter conditions, FEI is appropriately cautious about demand-side measures that rely on behavioural changes in customers which may not be reliable or effective under extreme peak winter conditions, although FEI continues to study their potential.[229]

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223 Exhibit B-10, BCSEA IR1 20.1.

224 Exhibit B-10, BCSEA IR1 20.1.

225 Exhibit B-6, BCUC IR1 47.2, 47.3, 49.2.

226 Exhibit B-6, BCUC IR1 49.1, 49.2.

227 Exhibit B-6, BUC IR1 50.3. Natural Gas Demand Response programs are a type of NPS technology (Exhibit B-1, Appendix C-3, p. 5).

228 Exhibit B-1, p. 7-33.

229 Exhibit B-10, BCSEA IR1 20.1.

129. FEI submits that it should continue this work and continue to report on its progress in subsequent LTGRPs.

(d) FEI's Long-Term Plan is to Implement Adequate, Cost-Effective DSM Activities with the High Setting in Mind

130. The 2022 LTGRP describes FEI's long-term plan for implementing DSM activities as follows: [230]

> In the long term, based on the 2022 LTGRP DSM analysis, FEI intends that it will design its DSM expenditures plans with the High DSM Setting in mind as DSM represents a key pillar in the Clean Growth Pathway. FEI will continue to offer residential, commercial, industrial, low income, innovative technologies, conservation education and outreach as well as DSM-enabling activities. The measures analysed in the CPR and the LTGRP DSM analysis will inform FEI's future DSM expenditure plans that will be filed with the BCUC for acceptance. In addition, FEI will continue monitoring the cost-effectiveness of its DSM activities and identifying any new measures that can be included in its activities. Over the 2022 LTGRP planning horizon, FEI will operationalize these activities through successive DSM expenditure plans. In these future expenditure plans, FEI's specific program offers will likely change to suit the evolving marketplace, legislative provisions (including future adequacy requirements), end use technologies, and FEI customer needs. FEI will continue to update its long-term DSM analysis through successive future LTGRPs over the planning horizon and will continue to explore non-pipe solutions opportunities.

131. As indicated above, the 2022 LTGRP clearly articulates FEI's intention to continue to bring forward adequate, cost-effective DSM portfolios for acceptance by the BCUC.[231] FEI discusses this topic further in Part Four, Section B, of this Final Submission, below.

C. FEI SECURES COST-EFFECTIVE AND RELIABLE GAS SUPPLY TO MEET DEMAND AND MITIGATE PRICE VOLATILITY

132. Section 6 of the LTGRP sets out FEI's approach to gas supply portfolio planning, satisfying sections 44.1(2)(e) and (f) of the UCA. FEI's gas supply portfolio planning is reasonably and appropriately designed to contract for resources that balance cost minimization, security, diversity and reliability of gas supply in order to meet the Core customer forecast design peak

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[230] Exhibit B-1, Section 5.6.

[231] Exhibit B-1, p. 5-3.

day and annual requirements. Further, FEI prudently develops a gas supply portfolio mix, which incorporates flexibility in the contracting of resources based on short- and long-term planning and evolving market dynamics. FEI submits that it has comprehensively analyzed gas supply risks over the planning horizon, including security of supply concerns, and is responding with prudent action items to ensure that it continues to meet its gas supply objectives for the benefit of customers.

133. FEI's submissions below are organized around the following points:

- FEI is reasonably planning for the integration of renewable and low carbon gas supply consistent with provincial policy and the Clean Growth Pathway.
- FEI's gas contracting flexibility positions FEI to respond to all demand scenarios, including the potential for increases or decreases in annual demand or shifts in seasonality of demand.
- FEI has comprehensively analyzed gas supply and price risks and infrastructure needs and is responding with appropriate action items to mitigate risks for customers.

(a) FEI Is Reasonably Planning for the Integration of Renewable and Low Carbon Gas Supply Consistent with Provincial Policy and the Clean Growth Pathway

134. Consistent with provincial policy and FEI's Clean Growth Pathway, FEI has targeted long-term acquisition of renewable and low-carbon gas supply to meet provincial targets for carbon emission reductions in 2030 and 2050. FEI has discussed the policy support for and feasibility of FEI's plans to transition to renewable and low carbon gas in Part Two, Section D(a) of this Final Submission.

135. Within the context of gas supply, the key points of FEI's modelling of renewable and low-carbon gas supply resources over the next 20 years are as follows:[232]

To 2030:

- RNG and hydrogen from off-system supply sources will be relied on more heavily in the early stages of FEI's carbon reduction transition. Conventional natural gas and RNG will continue to make up the majority

[232] Exhibit B-1, pp. 6-12 to 6-13.

of physical deliveries to customers during this period and will be delivered to FEI by displacement as with conventional natural gas purchases. Physical flows of hydrogen on FEI's gas infrastructure are expected to rise but be limited to smaller amounts and portions of FEI's system until around 2030 as the technologies and infrastructure needed to manage larger volumes are refined and implemented.

- One or more syngas and lignin projects will displace some industrial load, though natural gas may continue to provide firm back-up service for periods when syngas or lignin production is unavailable.

- CCUS is expected to still be in development stages, perhaps available in small amounts through pilot projects, in 2030.

From 2030 to 2042:

- This is the latter part of the planning horizon for the 2022 LTGRP and as such is subject to greater uncertainty. The proportion of FEI customers using conventional methane for space and water heating as opposed to other renewable and low-carbon gas supplies will have decreased, but will still make up a majority of customers. While the development of on-system resources will have grown in the intervening years, FEI anticipates there will still be reliance on off-system supplies.

Beyond 2042:

- The steps taken earlier in the planning horizon will set FEI on a pathway to deep decarbonization by 2050 and well on its way to achieving carbon neutrality on an annual basis. RNG and hydrogen will both be an important part of FEI's resource mix.

136. As RNG volumes continue to increase each year, FEI will monitor and make any adjustments that are required to the remainder of the gas supply portfolio through each Annual Contracting Plan (ACP). Additionally, as FEI begins to integrate other low-carbon gas supply such as hydrogen, syngas or lignin, FEI will annually assess the impact to the portfolio in each ACP.[233]

137. FEI has provided significant detailed evidence supporting its plans to acquire renewable and low carbon gas over the planning horizon. For example, FEI has provided detailed information about its current low-carbon gas supply, the evolution of FEI's low-carbon gas supply program to date, and FEI's plans to expand renewable and low-carbon gas supply in BC through engaging

[233] Exhibit B-1, p. 6-13.

with stakeholders, including local and regional governments and project developers, as well as Indigenous groups and communities. In short, FEI's future renewable and low-carbon gas supply potential is expected to grow, giving FEI more confidence in its total supply and the ability to make progress in reducing BC's GHG emissions while developing cost-effective renewable and low-carbon gas supply for its customers.[234]

138. Further, FEI has identified the key risks associated with the acquisition of renewable and low-carbon and gas and set out the strategies and actions to mitigate these risks, as well as the opportunities that may be gained in accelerating renewable and low-carbon gas projects. FEI concludes:[235]

> In the context of gas supply contracting strategies, FEI will continue to ensure that there are enough secure, diverse, and reliable resources in place to meet Core customers' forecast peak day, seasonal, and annual load requirements through the Annual Contracting Plan. This is one of FEI's main objectives in developing its gas supply portfolio. The issues and risks of increasing renewable and low-carbon gas supply will become an input or a consideration to FEI's overall annual assessment that ensures the objectives of the ACP are met. For example, the contractual volumes of off-system RNG have been increasing over the past few years and will continue to grow in the near future. Given the forecasted growth, FEI's gas supply team recommended having the delivery locations for future RNG contracts to be delivered at AECO/NIT and Station 2 as the preferred option, instead of Huntingdon/Sumas. This was to be consistent with FEI's existing gas supply contracting strategies for conventional gas, and to avoid any undue supply exposure at the Huntingdon/Sumas . . .

139. In addition, FEI provided a detailed illustration of how the components of FEI's renewable and low-carbon gas portfolio could evolve to reach the overall portfolio supply forecast. Although the individual components of that outlook are expected to fall within a range, and the actual amount of each component acquired will vary from year to year, this example illustrates how FEI will continue to make progress towards its GHG emission reductions goals.[236]

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234 Exhibit B-6, BCUC IR1 52.5.

235 Exhibit B-6, BCUC IR1 52.4.

236 Exhibit B-6, BCUC IR1 52.6.1.

140. While FEI did not develop a separate 20-year forecast for each individual component of its renewable and low-carbon gas supplies, FEI will be better positioned to develop separate forecasts in future LTGRPs as more information about the evolving market for renewable and low-carbon gas becomes available. However, the extent to which such information will allow FEI to develop a forecast for all the individual components of its renewable and low carbon supply portfolio for its next LTGRP is unknown at this time.[237]

141. Similarly, a comparison of alternative renewable and low-carbon gas portfolios will only be possible in future LTGRPs once there are sufficient supply resource alternatives from which to develop and assess a robust set of alternative portfolios.[238] There will not likely be any opportunity to develop alternative portfolio option until near or perhaps after 2030, as FEI expects to purchase most of the reasonably priced renewable and low-carbon gas available to it, to meet the GHGRS.[239] In short, FEI does not expect to have the ability to "shop around" for a range of price and purchase condition options until later in the planning horizon.[240]

(b) FEI's Gas Supply Portfolio Planning Positions FEI to Respond to All Scenarios

142. FEI's gas supply portfolio planning process provides significant flexibility for FEI to manage its gas supply in response to changes in annual and peak demand in the short to medium term, including sufficient flexibility to respond to all the annual demand scenarios modelled in the 2022 LTGRP.[241]

143. FEI constructs its gas supply portfolio of resources by matching the resource characteristics to the demand characteristics, including by purchasing:[242]

- firm natural gas commodity volumes and contracting third-party pipeline capacity to address seasonal and base load requirements (i.e., consistent demand for the 151-day winter season and annual demand);

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237 Exhibit B-1, Section 6.2.3; Exhibit B-6, BCUC IR1 1.1.2; Exhibit B-42, CEC IR3 88.4.

238 Exhibit B-6, BCUC IR1 1.1, 1.2.

239 Exhibit B-6, BCUC IR1 1.2.

240 Exhibit B-23, BCUC IR2 79.2, 79.3.

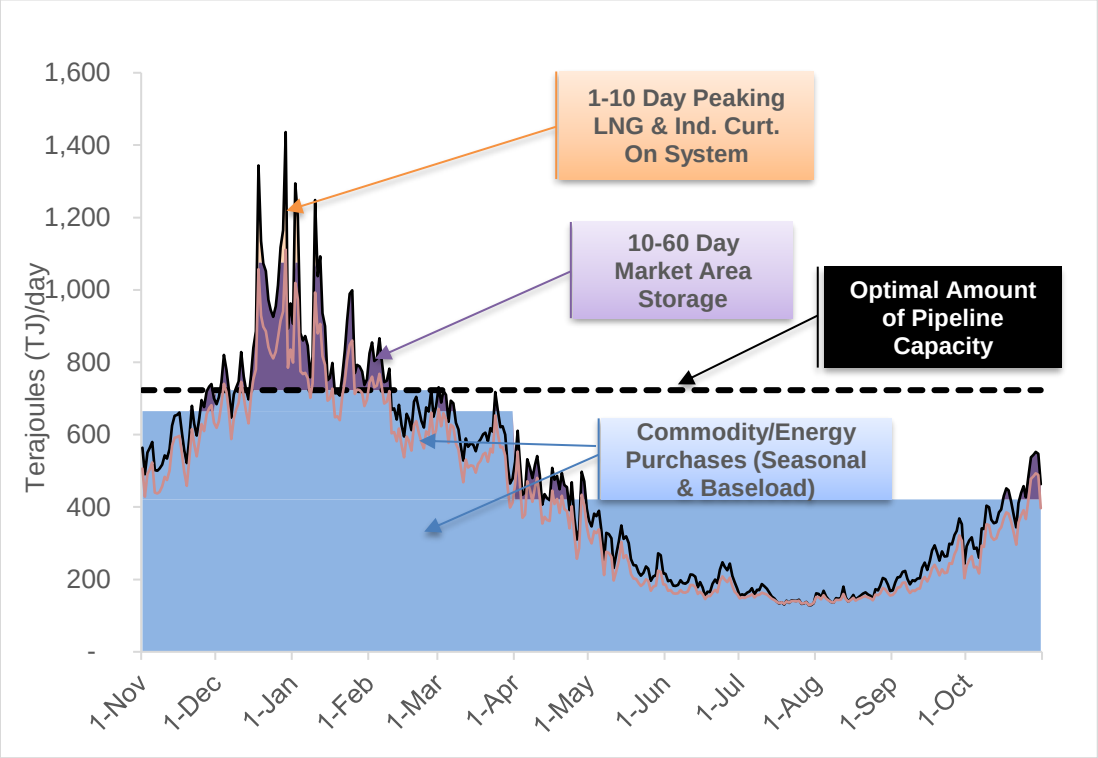
241 Exhibit B-1, pp. 6-20 to 6-21; Exhibit B-6, BCUC IR1 52.2, 53.1; Exhibit B-8, BC Hydro IR1 1.6.3.

242 Exhibit B-1, p. 6-5.

- shorter duration market area storage to provide short- to medium-duration seasonal supply; and
- on-system storage resources for short-duration supply to cover events such as winter demand peaks.

144. The figure below outlines the resources planned to be used in the 2021/2022 gas contract year, illustrating how the duration of FEI's supply resources fits the forecast annual normal and design load for core customers.

2021/2022 FEI Forecast Design and Normal Loads vs. Resources[243]



145. FEI's supply portfolio is flexible enough to accommodate the gas demand forecast for each of the scenarios modelled in the LTGRP, including increases or reductions in annual demand, and shifts in seasonality.[244] The long-term considerations that apply to FEI's energy purchases

[243] Exhibit B-1, Figure 6-1.

[244] Exhibit B-1, pp. 6-20 to 6-21; Exhibit B-6, BCUC IR1 52.2, 53.1; Exhibit B-8, BC Hydro IR1 1.6.

exist regardless of which of the future scenarios is the most likely to unfold or occur.[245] This is largely due to FEI's contingency planning, including:

- Holding excess resources as contingency in the supply portfolio to mitigate the risk of future load growth and supply disruptions;
- Negotiating conventional gas supply purchases primarily on an annual basis and priced based on a market index to allow FEI to reduce or resell the supply if demand declines or is displaced with low-carbon supply;
- The ability to renew transportation and storage capacity;
- The flexibility to de-contract resources in the gas marketplace if FEI encounters a future with lower demand than the DEP Scenario; and
- The development of projects like the Mist storage expansion, Tilbury LNG Storage Expansion (TLSE) and Regional Gas Supply Diversity (RGSD) that would meet gas supply needs, in addition to meeting other system requirements.

146. For instance, FEI can reduce its conventional natural gas supply in response to reduced demand given its contracting flexibility.[246] Further, if a shift in seasonality of demand results in higher peak or winter period demand, this would not change FEI's supply contracting and/or price risk management principles and strategies. For instance, FEI would continue to manage the supply risk and pricing volatility in the region by maintaining access to the supply hubs (Station 2 and AECO/NIT), and evaluate future infrastructure considerations to further optimize its supply portfolio. If a shift in demand resulted in less peak and winter demand, to the extent that FEI's portfolio should be adjusted, FEI could utilize the flexibility in its contracting resources to better fit resources to the demand shape.[247]

147. FEI will continue to monitor demand, including seasonality, and will be studying its implications for supply portfolio planning and management on an ongoing basis.[248] Indeed, most of the action items identified in the Action Plan involve monitoring the planning environment to

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[245] Exhibit B-8, BC Hydro IR1 1.6.1.

[246] Exhibit B-1, p. 6-20.

[247] Exhibit B-6, BCUC IR1 52.2.1.

[248] Exhibit B-6, BCUC IR1 52.3.1.

allow FEI to identify if the conditions in any of the scenarios are emerging, and to take any necessary action regarding its gas supply portfolio.[249]

(c) FEI has Comprehensively Analyzed Gas Supply, Price Risks and Infrastructure Needs and is Responding with Appropriate Action Items

148. Sections 6.2.4 and 6.2.5 describe FEI's assessment of long-term supply risks and pricing risks and its actions to mitigate those risks, while Section 6.3 describes the infrastructure considerations that could further optimize FEI's gas supply portfolio. FEI highlights the following five key points.

149. First, since the October 2018 T-South incident FEI has placed more emphasis on enhancing gas supply resiliency within its portfolio, which includes holding contingency resources for its Core customers using a planning margin of approximately 15 percent, increasing the diversity of supply to mitigate against the risk of a future supply disruption, and taking back capacity on the Southern Crossing Pipeline.[250] FEI developed the AMI Project[251] and identified the new pipeline and storage infrastructure needed to increase resiliency, including the TLSE Project and RGSD Project.[252]

150. Second, given shifting market dynamics, FEI has taken steps since 2014 to ensure it can serve Transportation customers returning to bundled service. Recently, FEI has secured additional T-South capacity to manage the potential for more Transportation customers to return to bundled service in response to pricing volatility at Huntingdon/Sumas.[253]

151. Third, FEI manages volatility in natural gas prices through a variety of actions including maintaining access to supply hubs, utilizing a variety of storage and transportation resources, using different pricing structures and contract terms, minimizing reliance on any supply that is delivered on an interruptible basis, and diversifying the gas supply portfolio. More specifically,

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[249] Exhibit B-8, BC Hydro IR1 1.6.3.

[250] Exhibit B-1, pp. 6-14 – 6-15; Exhibit B-6, BCUC IR1 52.12.

[251] Exhibit B-1, p. 3-10.

[252] Exhibit B-1, pp. 6-25 to 6-27.

[253] Exhibit B-1, p. 6-19.

FEI's gas contracting strategy for its Core customers limits supply exposure to the Huntingdon/Sumas market, including by securing a significant amount of pipeline capacity to acquire supply at Station 2 and at AECO/NIT. This strategy ensures FEI's commodity rate exposure will not be materially impacted due to factors such as Woodfibre LNG coming online.[254]

152. Fourth, FEI has maintained long-term supply contracts to avoid undue exposure and reliance on purchasing large quantities of Station 2 supply on the spot market and on a seasonal or annual term basis. Entering into long-term supply contracts, as well as providing flexibility in pricing arrangements, has allowed FEI to maintain and establish relationships with the producers who continue to develop supply in BC. FEI has maintained a range of long-term supply between 40 percent and 65 percent of its Station 2 Baseload supply requirements, which offers FEI enough flexibility to manage various changes that may occur to the portfolio over the long term. FEI does not target long-term contracts above 65 percent, as it would limit the number of counterparties with whom FEI transacts, as several counterparties are only interested in transactions of one year or less. Maintaining the 40 to 65 percent range may be challenging, however, due to fewer counterparties at Station 2 compared to five years ago, and a high turnover rate of producers in the region. To mitigate this risk, FEI has, for example, has extended the negotiation period for its winter term supply requirements over a 10-month period, which provides additional pricing diversification within the portfolio. Finally, the introduction of more renewable and low-carbon gas into FEI's supply portfolio in the long term or new infrastructure developments in the region may allow FEI to target a lower range of long-term supply commitments.[255]

153. Fifth, FEI is actively managing the risk that NW Natural will recall and cut into the Mist capacity that FEI has historically held.[256] FEI expects that as much as 70 percent of its currently contracted capacity at Mist could be recalled, which would result in up to an 80 TJ shortfall to FEI's peak day portfolio.[257] Absent any new infrastructure, FEI must either secure supply at the Huntingdon/Sumas market or try to secure additional pipeline capacity on the T-South system.

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254 Exhibit B-23, BCUC IR2 95.9.

255 Exhibit B-6, BCUC IR1 52.16; Exhibit B-23, BCUC IR2 95.2.

256 Exhibit B-1, p. 6-24.

257 Exhibit B-23, BCUC IR2 95.5.

Given the price risk associated with these options, FEI is evaluating the potential to contract for long-term capacity with NW Natural, through an expansion of the Mist facility. If the expansion has merit and FEI can reach an acceptable commercial arrangement with NW Natural, FEI will file an application with the BCUC for approval of a Mist storage contract, which FEI expects will be in Q4 2023.[258]

154. Looking out over the planning horizon, to meet demand, and to address security of supply, resiliency, and pathways to zero GHG emissions by 2050, FEI intends to take the following actions:[259]

- Manage supply risk and price volatility in the region by maintaining access to supply hubs (e.g., Station 2 and AECO/NIT), using financial hedging strategies to hedge any supply exposure (e.g., to the Huntingdon/Sumas market),[260] utilizing a variety of storage and transportation resources, and using different pricing structures and contract terms;

- Continue to support the regulatory process for the TLSE Project, which will significantly increase the resiliency of FEI's natural gas system in the event of a critical disruption of regional pipeline supply;

- Evaluate opportunities within FEI's own operating region to improve infrastructure resiliency and supply diversity, such as the RGSD Project, which will support diversity, reliability, and decarbonization over the long term;[261]

- Evaluate opportunities to contract for long-term non-recallable capacity at Mist Storage Facility, which will help manage security of supply concerns in the gas supply portfolio;[262]

- Continue to accelerate the acquisition of renewable and low-carbon gas supplies for inclusion in FEI's gas supply portfolio as part of FEI's Clean Growth Pathway;[263] and

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258 Exhibit B-6, BCUC IR1 52.20, 52.21; Exhibit B-23, BCUC IR2 95.7, 95.8; Exhibit B-17, RCIA IR1 22.3.

259 Exhibit B-1, pp. 10-7 to 10-8.

260 Exhibit B-17, RCIA IR1 23.1.1.

261 Exhibit B-10, BCSEA IR1 19.1, 19.3.

262 Exhibit B-6, BCUC IR1 52.20, 52.21; Exhibit B-17, RCIA IR1 22.3.

263 Exhibit B-6, BCUC IR1 52.5-52.6, 62.5, 71.8; Exhibit B-12, CEC IR1 39.2; Exhibit B-17, RCIA IR1 20.1.2; Exhibit B-25, BCOAPO IR2 15.1-15.4; Exhibit B-23, BCUC IR2 79.2.

- Assess the firmness of renewable and low-carbon gas supplies for year-round delivery to customers and assess the evolving marketplace for opportunities to apply traditional portfolio risk mitigation mechanisms to these renewable and low-carbon supplies.[264]

155. FEI submits that it is taking reasonable and appropriate actions to manage gas supply and mitigate security of supply and price risk for customers.

D. FEI HAS ANALYZED ITS RESOURCE NEEDS AND ALTERNATIVES

156. Section 7 of the 2022 LTGRP sets out FEI's system resource needs and alternatives in detail, addressing the requirements of section 44.1(2)(f) of the UCA. FEI submits that its approach to reviewing system resource needs and alternatives is reasonable and appropriate, in that it clearly and transparently describes FEI's plans to ensure that regional peak capacity of its infrastructure meets the energy demand of its customers, and that infrastructure is developed in the public interest to deliver renewable and low-carbon gases in increasingly larger volumes over the planning horizon. FEI's method of assessing peak capacity is rigorous and understandable, long-term actions and decision-making junctures are comprehensively explained, and security of supply considerations have been sufficiently addressed by a highly detailed examination of security of supply concerns relevant to FEI's system.[265]

157. FEI highlights the following key points in the subsections below:

- The Traditional Peak Method of building demand forecasts remains appropriate and reliable for assessing and addressing system capacity constraints.
- All of FEI's transmission systems could require capacity-enhancing projects to meet peak demand forecasts while enabling FEI's Clean Growth Pathway.
- The 2022 LTGRP deeply engages with security of supply concerns and corollary resiliency considerations in a manner unprecedented for long-term gas resource plans.

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[264] Exhibit B-6, BCUC IR1 52.22; Exhibit B-17, RCIA IR1 20.1.

[265] Exhibit B-1, Appendix E, Gas System Resiliency Plan.

(a) Peak Demand Forecast

158. To address specific local and regional demand, FEI builds regional peak demand forecasts from the bottom up using the Traditional Peak Method, assembling the peak demand from the recent consumption and regional weather history of each customer within the system.[266]

159. FEI's traditional peak demand forecast reflects the end-use factors currently present in customers' measured consumption, but unlike end use demand forecasting, does not reflect potential future changes to existing end use factors or those that may be implemented later in the forecast period.[267] FEI's reliance on the Traditional Peak Method for system capacity planning remains reasonable and appropriate:

- The stakes are high in system planning due to the obligation to serve customers under extreme weather conditions. FEI's peak forecasts must be as accurate and reliable as possible to ensure adequate system capacity, which is essential to the safety and reliability of gas delivery.[268] The Traditional Peak Method, which is based on monthly end use customer data, allows FEI to accurately and reliably forecast peak demand in the short term, thereby minimizing the risk of failing to identify and scope capacity upgrades that would prevent capacity shortfalls.[269]
- The hydraulic models used to estimate peak demand for system planning are highly sophisticated. In contrast, the end use model does not have the geographic granularity to show how demand is distributed along the FEI systems, nor the sophisticated handling of the interaction between pressure, volumes, and energy flow of the hydraulic model currently used for peak demand forecasting.[270]
- The traditional peak demand forecast is refreshed annually, at which time the impacts of critical uncertainties, like policy and regulation, are present in consumption data.[271] The most recent annual forecast will inform decision-making on project timing and scope, including whether to defer the project.[272]

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[266] Exhibit B-1, Section 7.2, see 7.2.3.1 in particular. See Exhibit B-6, BCUC IR1 54.1 for a detailed discussion of the load gathering process for determining UPCpeak values.

[267] Exhibit B-6, BCUC IR1 54.3.1.2, 54.8; Exhibit B-23, BCUC IR2 103.1.1, 103.2, 104.2, 104.6.

[268] Exhibit B-1, pp. 7-3 – 7-4; Exhibit B-6, BCUC IR1 22.1.1; Exhibit B-23, BCUC IR2 104.6.

[269] Exhibit B-6, BCUC IR1 54.3.1.2, 54.4, 54.9.1. FEI is not aware of any natural gas utilities relying on an end use methodology for capacity planning.

[270] Exhibit B-6, BCUC IR1 22.1.

[271] Exhibit B-1, p. 7-8; Exhibit B-6, BCUC IR1 54.10.2.

[272] Exhibit B-1, p. 7-4; Exhibit B-6, BCUC IR1 54.3.1.2; Exhibit B-23, BCUC IR2 103.1.1, 104.7.

- The end use demand forecasting model is currently unable to accurately and reliably model the impacts of critical uncertainties on peak demand, given FEI's lack of hourly end use customer data.[273] Unlike annual demand impacts, peak-hour and peak-day impacts cannot be sufficiently measured and verified with existing metering capabilities.[274]

- A project will only proceed to CPCN applications and more detailed project planning and design if the project need continues to be supported by the most recent peak demand forecast.[275] As a result, there is low risk that capacity upgrades are initiated when they are not required.[276]

160. In the 2022 LTGRP, FEI compared the Traditional Peak Method to a new exploratory method which links peak demand forecasts to the end use scenarios used in the annual demand forecasts.[277] Currently, the exploratory end use method remains theoretical in nature and is unsupported by direct measurement. Therefore, until such time as more granular data from advanced metering infrastructure becomes available,[278] FEI will continue to rely on the Traditional Peak Method for infrastructure planning. The exploratory end use method does, however, provide a means of assessing a range of peak demand forecast possibilities and the impacts on the scope and timing of upgrade projects required for each.[279]

161. Using its Traditional Peak Method, FEI will continue to refine future projects in light of changes in peak demand that may occur. Over the 20-year planning horizon, FEI expects that energy economics, housing renewal increasing the proportion of energy-efficient homes, and DSM programs will all have some impact on peak demand, generally resulting in a reduction in peak demand. FEI is not certain that the impacts to peak demand will be as significant as they will be to annual demand. Regardless, FEI expects that over time future peak use per customer

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273 Exhibit B-6, BCUC IR1 22.1, 22.1.1, 54.4; Exhibit B-23, BCUC IR2 102.6, 104.5, 104.7.

274 Exhibit B-23, BCUC IR2 104.7.

275 Exhibit B-6, BCUC IR1 54.3.1.2; Exhibit B-23, BCUC IR2 103.1.1, 104.7.

276 Exhibit B-23, BCUC IR2 104.6, 104.7.

277 Exhibit B-1, Section 7.2.3.2.

278 Exhibit B-6, BCUC IR1 54.4; Exhibit B-23, BCUC IR2 102.6, 104.5, 104.7.

279 Exhibit B-1, pp. 7-1 to 7-2; Exhibit B-6, BCUC IR1 22.1, 22.1.1, 54.8. The end use forecasts, as discussed in Section 7.2.3.2 and presented in the figures in Section 7.3 of the 2022 LTGRP, do provide a theoretical examination of the effects of DSM, regulation, policy, and anticipated changes in customer consumption on peak demand based on the inputs used in each end use scenario.

will reflect these impacts and FEI will incorporate these changes in the peak demand forecasts. FEI will take into account these year-over-year adjustments to peak demand and refine the scope and timing of future projects.[280]

(b) Capacity-Enhancing Projects to Meet Peak Demand Forecasts & Enable Clean Growth Pathway

162. The Interior Transmission System (ITS) is the only transmission system that FEI expects will require capacity enhancements to meet demand from Core customer growth over the planning horizon; however, capacity expansions on the VITS and CTS will be required to accommodate any load additions from LNG or other large industrial demand in the Lower Mainland or VITS:

- **VITS:** there is no need for capacity expansion on the VITS in the forecast period. However, to accommodate the load addition from the Woodfibre LNG project, there is a need to reinforce the existing VITS with pipeline looping and added compression near Squamish.[281] Woodfibre LNG project's toll will recover all costs associated with the project and will include an additional toll component that will provide revenue that lowers all of FEI's non-bypass customers' rates.[282]

- **CTS:** there is currently no need for capacity expansion on the CTS for the forecast period, including to support the transportation requirements of Woodfibre LNG. Any future capacity expansion requirements for the CTS will be driven by LNG additions or other large industrial demand in the Lower Mainland or VITS, rather than by Core customer growth.[283]

- **ITS:** FEI's proposed Okanagan Capacity Upgrade (OCU) Project is required to address a capacity deficit,[284] and there is also the potential for new industrial load from a power generating plant fuelled by RNG that would drive additional expansion of the ITS.[285]

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280 Exhibit B-6, BCUC IR1 54.9 to 54.10.2.

281 Exhibit B-1, Section 7.3.1.5, Section 10 (Action Item 7); Exhibit B-26, BCSEA IR2 48.1.

282 Exhibit B-6, BCUC IR1 65.1; Exhibit B-16, MS2S IR1 2.1.

283 Exhibit B-1, Section 7.3.2.2. See Section 7.3.2.4 for a discussion of the impact of potential new large industrial loads on the CTS, including some potential CTS expansion phases.

284 Exhibit B-8, BC Hydro IR1 3.2, 3.3; Exhibit B-10, BCSEA IR1 21 Series; Exhibit B-26, BCSEA IR2 53.1.

285 Exhibit B-1, Section 7.3.3.5.

163. As discussed in detail in Part Two, Section D(a), the first pillar of FEI's Clean Growth Pathway is transitioning to renewable and low-carbon gases to decarbonize the gas supply. In the early part of the planning horizon, the system capacity impacts from onboarding renewable and low-carbon gases will remain largely unchanged from what FEI would have otherwise anticipated, as the transmission and distribution systems continue to move conventional natural gas and renewable natural gas, which are chemically interchangeable.

164. Further out in the planning horizon and by 2042, hydrogen is expected to be blended into existing gas distribution systems, and FEI may begin delivering hydrogen supplies through purpose-built systems (i.e., hydrogen backbone). As discussed in Part Two, Section D(a), until the hydrogen market is further developed and production rates and locations are more clearly defined, it is not yet feasible to identify and develop any specific system capacity upgrades to support delivery of these energy supplies. As also noted in Part Two, Section D(a), hydrogen production, blending, hubs and backbone infrastructure will all be considered in developing FEI's hydrogen deployment strategy, which will be informed by the BC Gas System Hydrogen Blending Feasibility and Technical Study.[286]

(c) System Resiliency

165. While FEI has long regarded resiliency as an important system attribute, the T-South incident brought into focus the risk of supply interruption for FEI's customers, [287] which has been raised as an issue by stakeholders in all regions of FEI's service territory.[288] The 2022 LTGRP deeply engages with resiliency considerations in a manner unprecedented for long-term gas resource plans.[289] Indeed, the DEP Scenario inherently reduces resiliency risk for the Province

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[286] For a discussion of the activities FEI is taking to develop its hydrogen deployment strategy, please refer to: Exhibit B-6, BCUC IR1 61.3, 61.8, 61.9; Exhibit B-23, BCUC IR2 106.7, 106.9.1, 106.10, 106.11; Exhibit B-41. BCSSIA IR3 21.3.1, 21.4.1; Exhibit B-43, MS2S IR3 5.1; Exhibit B-42, CEC IR3 90.2, 90.5; Exhibit B-44, RCIA IR1 56.1.

[287] A disruption on the Westcoast T-South system is the greatest supply risk at present: Exhibit B-1, p. 6-14; Exhibit B-12, CEC IR1 47.1, 47.2.

[288] Exhibit B-12, CEC IR1 43.1. Members of the RPAG agreed with using a diversified energy pathway approach to utilizing energy systems to increase overall resiliency: Exhibit B-6, BCUC IR1 67.2.

[289] Exhibit B-9, BCOAPO IR1 5.3.1; Exhibit B-12, CEC IR1 47.1.

overall by leveraging both the gas and electric system in the transition to a low-carbon future,[290] and half of the Action Plan items have fundamental resiliency components.[291]

166. In general, gas transmission and distribution systems experience significantly fewer outages than electric networks. However, the T-South incident highlighted that, although supply emergencies are rare, they do occur. And when they do, they tend to be longer in duration than electrical outages and have the potential to give rise to significant consequences.[292] If there is an interruption to transmission pipeline capacity upstream, large numbers of downstream customers may experience gas outages or shortages. There are three elements that contribute to a resilient gas system, and that FEI has matched with a core resiliency project:[293]

- Diverse pipelines and supply to mitigate the risk of relying on a singular delivery mode (RGSD Project);[294]
- Gas storage to provide immediate access to gas during a critical supply emergency (TLSE Project);[295] and
- Load management capabilities to avoid an uncontrolled shutdown of the gas system in extreme events (AMI Project).[296]

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290 Exhibit B-9, BCOAPO IR1 5.4.1; Exhibit B-12, CEC IR1 3.1, 3.4, 19.4, 19.5; Exhibit B-1, Appendix A-2, pp. 4, 5, 7, 27. An electrification-only pathway, in contrast, potentially *causes* resiliency issues, especially during peak energy events and extreme weather: Exhibit B-1, Appendix A-9.6; Exhibit B-10, BCSEA IR1 32.1; Exhibit B-13, GNAR IR1 4.4; Exhibit B-15, MoveUP IR1 1.1.

291 Exhibit B-1, Section 10. Action Item 5 involves seeking BCUC approval for a deferral account to capture the costs of advancing the development of the RGSD project, which is needed to strengthen system resiliency for FEI and across the PNW. Action Item 6 is to continue to develop and implement FEI's Gas System Resiliency Plan. Action Item 7 is to plan for and prepare CPCN applications for projects that would address capacity shortfalls, pipeline safety factors, and the resiliency of piping during a seismic event. Action Item 9 involves increasing supply security, diversity and resilience. Action Item 10 involves continuing to monitor for and evaluate system expansion needs, including for projects that address and refine reinforcements to maintain system reliability and resilience for Core customers.

292 Exhibit B-1, Appendix E, p. 6, 25.

293 FEI explains how it matches resiliency needs with the characteristics of multiple solutions in Exhibit B-1, Appendix E; Exhibit B-6, BCUC IR1 57.6; Exhibit B-12, CEC IR1 3.2; Exhibit B-23, BCUC IR2 105.8.

294 Exhibit B-1, pp. 7-42 and 7-43; Exhibit B-1, Appendix E, Section 5.3; Exhibit B-6, BCUC IR1 57.2; Exhibit B-23, BCUC IR2 105 Series.

295 Exhibit B-1, pp. 7-42 and 7-43; Exhibit B-1, Appendix E, Section 5.2; Exhibit B-6, BCUC IR1 57.2; Exhibit B-12, CEC IR1 47.2, 47.3; Exhibit B-23, BCUC IR2 105 Series.

296 Exhibit B-1, Appendix E, Section 5.1; Exhibit B-6, BCUC IR1 57.1.

167. None of these assets are a substitute for the other—each separately addresses short-duration and long-duration supply issues and complements the other.[297] For instance, FEI evaluated whether it makes sense to pursue either a pipeline or on-system LNG solution exclusively; however, the analysis indicated that employing only one measure to address all resiliency needs was either too costly or not feasible. Therefore, FEI evaluated multiple solutions and identified a portfolio of investments as the most cost-effective and optimal solution to address its resiliency needs.[298]

168. FEI highlights three aspects of its long-term plan to enhance resiliency:

- The public interest of the RGSD Project is best considered in a separate BCUC proceeding;
- Enbridge's proposed Westcoast T-South expansion does not offer regional resiliency benefits; and
- FEI's Gas System Resiliency Plan provides a comprehensive discussion of system resiliency across all FEI systems and the PNW and will be improved upon for the next LTGRP.

RGSD Project Is Best Considered in the Separate BCUC Proceedings Contemplated in BCUC's 2022 Development Account Order

169. The RGSD Project would mitigate the risk of a no-flow event by offering a separate and distinct pipeline path to the T-South, and by supplying gas from a different basin and market hub.[299] In Order and Decision G-366-21, the Panel stated that the 2022 LTGRP could provide context around the RGSD Project and whether it is in the public interest to explore or pursue this project. FEI has responded to this suggestion in the 2022 LTGRP.[300]

170. However, in light of subsequent developments, the RGSD Project is best addressed in other BCUC processes rather than in the 2022 LTGRP. Since filing the 2022 LTGRP, FEI applied for

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[297] Exhibit B-1, Appendix E, Section 5.4 explains why this portfolio approach is more cost-effective and will provide broader resiliency benefits and improved flexibility to meet a range of potential supply disruptions. See Exhibit B-6, BCUC IR1 57.2, 57.3.2, 57.4.2, 57.5.2, 57.6 and Exhibit B-23, BCUC IR2 105 Series for further discussion.

[298] Exhibit B-6, BCUC IR1 57.6.

[299] Exhibit B-1, Appendix E, Section 5.3.

[300] Exhibit B-1, Sections 3.3.3, 6.3.3, 7.5.1.1, 10 and Appendix E.

and received approval for a deferral account to capture development costs for the RGSD Project.[301] The RGSD Development Account Application recognized that further feasibility and development work was required to inform whether or not FEI should bring a CPCN Application for the RGSD Project.[302] The BCUC's Order approving the account requires FEI to report quarterly to the BCUC on RGSD Project development work completed, anticipated work, and material developments. FEI will apply for recovery of the account balance in due course and, if the development work supports advancing the RGSD Project, FEI will file a CPCN Application.[303]

171. FEI submits that the BCUC should avoid redundant review in this proceeding and the associated risk of inconsistent determinations. The BCUC panel(s) considering the disposition of the RGSD Development Account balance or a CPCN Application will be best positioned to determine the merits of investigating or pursuing the RGSD Project. Those panels will have the benefit of more evidence, including the quarterly reports.

T-South Expansion Does Not Offer Resiliency Benefits to FEI Customers

172. The gas system in BC has a relatively low amount of interconnectedness, decreasing the inherent resiliency of the system. In particular, the system is highly dependent on a single midstream pipeline—Westcoast T-South—for supply, and has minimal on- and off-system storage.[304] Enbridge is proposing to expand its T-South system to increase its capacity by 300 MMcf/day, and this capacity is now fully subscribed. Enbridge anticipates that the expansion could be in-service by Q4 2028 at the earliest, subject to Canada Energy Regulator approval.[305]

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301 Order G-253-22.

302 FEI's application for the RGSD Development Account explained the purpose of the Account as follows: "The proposed RGSD Development Account will enable FEI to commence development work on the RGSD Project by capturing development costs to determine which regional infrastructure option to support as being in the best interest of FEI and its customers, and whether it is appropriate to bring forward an application for a Certificate of Public Convenience and Necessity for the RGSD Project, as discussed in the Application."

303 Order G-253-22: "The recoverability and disposition of any costs recorded in the RGSD Development Account will be subject to BCUC review and determination in a future application, such as a subsequent FEI annual review or in a CPCN application for the RGSD Project."

304 Exhibit B-1, Appendix E, Section 4.1.2.

305 Exhibit B-10, BCSEA IR1 19.2.

173. The T-South expansion comes with little, if any, benefit to FEI and its customers in terms of resiliency.[306] Therefore, it would not negate the need to continue developing and assessing other resiliency projects. For these reasons, and because it would come at significant cost increase to FEI's customers (as the largest shipper on T-South), FEI did not make a firm commitment to Enbridge's expansion.[307]

Pending Overhaul of FEI's Resiliency Plan Based on Recent BCUC Guidance Makes Further Review of 2022 Resiliency Plan in this LTGRP Unnecessary

174. In Order C-2-21, the Panel directed FEI to address resiliency in a comprehensive manner in the 2022 LTGRP. The 2022 LGTRP accordingly addresses resiliency (notably in Sections 3, 6, 7, 9) and includes FEI's initial 2022 Gas System Resiliency Plan as Appendix E.[308] FEI plans to update its resiliency plan on an iterative basis going forward, and intends that the latest version of the resiliency plan will be included in future LGTRPs for BCUC review. Nevertheless, for the reasons set out below, FEI submits that the BCUC should refrain from commenting on the 2022 Resiliency Plan in this proceeding. It will be far more effective and efficient for the BCUC to assess the next iteration of the Resiliency Plan—a far more comprehensive and robust analysis that reflects recent BCUC guidance—in the ongoing TLSE Project CPCN proceeding.

175. Since FEI filed the 2022 LTGRP, the topic of resiliency has been canvassed extensively in the TLSE Project CPCN proceeding. The TLSE Project Application included much of the content of the 2022 Resiliency Plan. In Decision and Order G-62-23 (dated March 23, 2023), the BCUC identified a number of shortcomings in the 2022 Resiliency Plan and adjourned the TLSE Project proceeding pending FEI filing (among other things) a more expansive resiliency plan. In particular, the BCUC noted (on page 48 of the Decision):

- There is no assessment of the type or severity of the risks to the resiliency of the FEI system, the probabilities of these risks occurring and the resultant consequences of these risks materializing.

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306 Exhibit B-10, BCSEA IR1 19.3; Exhibit B-23, BCUC IR2 105.1.

307 Exhibit B-26, BCSEA IR2 51.1.

308 Exhibit B-1, Appendix E, Gas System Resiliency Plan.

- There is no analysis of costs and related benefits. In conclusion the resiliency plan asserts that "the TLSE project will be the most cost-effective resource to respond immediately to withstand a short-term critical emergency that disrupts supply to FEI's Lower Mainland system, such as in phase 1 of the T-South Incident." However, the citation for this statement references "Appendix E – Gas System Resiliency Plan" and no further discussion of costs is contained in the plan.

- While there is an assessment of two concurrently planned projects – the AMI and RGSD Projects – there is no consideration of other potential projects. Further, the resiliency plan does not set out any alternatives to the TLSE Project for on-system LNG storage that can serve the Greater Vancouver area.

- The resiliency plan states: "Finally, FEI intends to further develop its resiliency criteria for the distribution system, which it intends to include in a subsequent resource plan."

- The resiliency plan distinguishes between resiliency measures on the distribution system and the transmission system. Regardless of that distinction, resiliency measures are all funded by the same ratepayer and the plan fails to prioritize resiliency investments in a way that allows us to understand the impact on rates of varying levels of investment.

- The resiliency plan states that the RGSD Project "would allow FEI to split the optimal amount of pipeline capacity between T-South and RGSD Project, thereby reducing FEI's current heavy dependence on the T-South system." However, IR responses filed in both proceedings suggest that reduced dependence on the T-South System has little to no impact on the TLSE Project. In any event, due to uncertainties in the scope of the RGSD Project, we noted in Section 4.1 of our Decision that we are unable to make any finding regarding how the RGSD Project may or may not impact the need for the TLSE Project.

176. FEI acknowledges the value in preparing a more robust Resiliency Plan. Since the adjournment decision, FEI has spent months preparing a new Resiliency Plan (2024 Resiliency Plan) that is responsive to the BCUC's commentary. Among other things, the work has included (1) a holistic scan of FEI's system and supply vulnerabilities that expose FEI to a material customer outage; (2) a consequence and probability-based risk assessment of identified vulnerabilities; (3) consideration of whether the risk assessment might change in the future; (4) consideration of

potential options to address identified resiliency gaps; and (5) an assessment of whether mitigation steps should be taken, having regard to risk and cost.

177. FEI expects to complete the 2024 Resiliency Plan in Spring 2024, at which point it will be filed as supplementary evidence in the TLSE Project proceeding.

178. In light of the ongoing extensive overhaul of the 2022 Resiliency Plan based on the BCUC's recent guidance, and the need for FEI to file the 2024 Resiliency Plan shortly in support of the TLSE Project Application, it is reasonable for this Panel to refrain from further evaluation of the 2022 Resiliency Plan. FEI ultimately envisages the Resiliency Plan as being iterative, and a key component of future LTGRPs. As such, FEI will reflect further BCUC guidance on the 2024 Resiliency Plan in the next LTGRP.

E. 2022 LTGRP ADHERES TO THE BCUC RESOURCE PLANNING GUIDELINES WHERE RELEVANT AND APPLICABLE AND RESPONDS TO BCUC DIRECTIVES

179. FEI has adhered to the BCUC's Resource Planning Guidelines (Guidelines) where relevant and appropriate and responded to the BCUC's past directives for the 2022 LTGRP, satisfying section 44.1(2)(g) of the UCA.

(a) Resource Planning Guidelines

180. Table 1-6 of the 2022 LTGRP outlines the key elements of the Resource Planning Guidelines and the sections of the 2022 LTGRP in which they are addressed. The Guidelines are sufficiently high level to accommodate the diversity of utilities that must submit resource plans, providing "general guidance regarding Commission expectations of the process and methods for utilities to follow in developing plans that reflect their specific circumstances."[309] The Guidelines do not, however, distinguish between utilities that provide generation, transmission or distribution services; therefore, some items (such as supply-side portfolio analysis) are more relevant to integrated electric utilities. As indicated in the Guidelines: "The Commission will review resource plans in the context of the unique circumstances of the utility in question".[310]

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[309] Resource Planning Guidelines, p. 2.

[310] Resource Planning Guidelines, p. 2.

Consistent with this, FEI adheres to the BCUC's Resource Planning Guidelines where relevant and applicable to FEI's operating context. In FEI's view, no material issue was raised in the proceeding with respect to FEI's adherence to the Guidelines.

Table 1-6: BCUC Resource Planning Guidelines

Resource Planning Guideline	Section of 2022 LTGRP Addressing Guideline
1. Identification of the planning context and the objectives of a resource plan	Objectives and context are discussed in Section 1.4, and Planning Environment Section 2.
2. Development of a range of gross (pre-DSM) demand forecasts	Demand forecasts (pre-DSM) are discussed in Section 4.
3. Identification of supply and demand resources	Supply and demand resources are discussed in this LTGRP as follows: • The Planning Environment, Section 2, provides context for existing resources and dynamics concerning new resources; • The Annual Demand Forecasting, Section 4, presents the future load that FEI is planning for in this LTGRP; • The amount of future demand that can be met through DSM is considered in Demand-Side Resources Section 5; and • Sections 6 and 7 discuss the need for new gas supply and system infrastructure resources respectively.
4. Measurement of supply and demand resources	Measurement of supply and demand are outlined in Sections 4, 5 and 6.
5. Development of multiple resource portfolios	FEI is not a vertically integrated utility, and does not develop and compare multiple integrated resource portfolios. Rather, in the 2022 LTGRP, FEI plans to the Diversified Energy (Planning) Scenario. However, in the future, this may change as FEI transitions to renewable, low-carbon gas and community solutions, which may require future resource plans to examine alternative supply resource portfolios. Background for this discussion is found in Demand-Side Resources Section 5, Gas Supply Portfolio Planning Section 6 and System Resource Needs and Alternatives Section 7.

Resource Planning Guideline	Section of 2022 LTGRP Addressing Guideline
6. Evaluation and selection of resource portfolios	FEI plans to the Diversified Energy (Planning) Scenario that represents the Clean Growth Pathway. As FEI transitions to renewable and/or low-carbon gas and community solutions, it may be positioned as a vertically integrated utility. In this case, future resource plans may examine alternative supply resource portfolios. Background for this discussion is found in Demand Side Resources Section 5, Gas Supply Portfolio Planning Section 6 and System Resource Needs and Alternatives Section 7.
7. Development of an action plan, including contingency plans	The 2022 LTGRP Action Plan is provided in Section 10.
8. Solicit stakeholder input during the planning process	The 2022 LTGRP stakeholder, Indigenous groups, and community engagement initiatives are described in Section 8.
9. Seek regulatory input from Commission staff	FEI has received and considered input from the BCUC and BCUC staff through: • BCUC decisions and directives from prior LTGRP filings; • regulatory proceedings on various FEI filings that have implications for long range planning; • periodic discussions with staff concerning various regulatory filings and proceedings; and • the BCUC request for Integrated Resource Plan modelling of common future scenarios for FEI and BC Hydro. In addition, BCUC staff participated as observers in FEI's external RPAG.
10. Consideration of government policy	The 2022 LTGRP provides an overview of policy considerations in the Planning Environment in Section 2.2 and Section 9.
11. Regulatory review once a resource plan is filed	The regulatory review process will be determined by the BCUC in consideration of FEI's recommendations provided in Section 1.7.

(b) FEI has Responded to BCUC Directives for the 2022 LTGRP

181. FEI has responded to previous BCUC directives from the 2017 LTGRP Decision, as well as directives and suggestions from the BCUC's Decisions in the Pattullo Gas Line Replacement Project CPCN proceeding and FEI's Annual Review for 2022 Delivery Rates proceeding. FEI submits that it has fully addressed the directions from the BCUC for the 2022 LTGRP and no

material concerns were raised with respect to FEI's compliance with the directions in this proceeding.

182. The table below describes the BCUC's directions from the 2017 LTGRP Decision and describe how they are addressed in the 2022 LTGRP.[311]

[311] Exhibit B-1, Table 1-7.

	BCUC Directive from 2017 LTGRP Decision	Section of LTGRP Addressing Directive
1.	In the next LTGRP filing, FEI is directed to: • Update the information filed in this proceeding to respond to the BCUC's directive in the 2014 LTRP Decision to provide an analysis of FEI's End Use Method as compared to other end use methods, including an assessment of the of FEI's method compared to other models that incorporate some form of end use modelling combined with econometric modelling; • Provide a detailed explanation of any changes to its demand forecast methodology as it evolves between now and the next LTGRP filing; and • Include high level assessment of the effectiveness of the Traditional and End Use Models compared to actual results.	FEI submitted an updated analysis of its End Use Method compared to other end-use models in the Energitix Benchmarking Study. Energitix confirmed that FEI's modelling includes the key components that are common to all of the end use modelling practices examined as part of the study.[312] FEI has explained the improvements made to its demand forecast methodology, including: addition of new critical uncertainties; updated end use studies that provide key inputs to the base year data; a closer tie between the CPR analyses and the end use demand forecasting analyses; bringing new market intelligence in the transportation fuels industry to bear on the forecast of CNG and LNG demand; and the addition of PowerBI data analytics interface to improve the ability to display and assess forecasting results. FEI has provided a high level assessment of the Traditional and End Use Methods compared to actual results,[313] and plotted gas consumption against the range forecast by the end-use demand scenarios in the 2014 and 2017 LTGRPs.[314] FEI's End Use Method has performed well, having enabled FEI to examine a broad range of uncertainties across different future scenarios, to understand the degree to which these uncertainties will impact future demand, to discuss these uncertainties and findings with stakeholders, and to identify a future scenario on which to plan shorter-term actions.[315]

[312] Exhibit B-1, Appendix B-2, Long-Term Demand Forecasting Benchmarking Study on End Use Methods Industry Practice Review.

[313] Exhibit B-1, Appendix B-6, High-Level Assessment of the Effectiveness of the Traditional and End Use Methods.

[314] Exhibit B-6, BCUC IR1 22.2.

[315] Exhibit B-1, Appendix B-6, High-Level Assessment of the Effectiveness of the Traditional and End Use Methods, p. 1.

	BCUC Directive from 2017 LTGRP Decision	Section of LTGRP Addressing Directive
2.	FEI is directed to continue use of its Traditional Method as a comparison to test its End Use Method until such time as the BCUC approves a new demand forecast methodology.	The results of the Traditional Method as in this reference are included in Section 4 as the End Use Method. The name has been changed from Traditional to Business as Usual (BAU) forecast to better represent the nature of the forecast as discussed in Section 4 (Annual Demand).
3.	The Panel directs FEI to continue to provide the following information, in the next LTGRP: • DSM funding scenarios, reflecting the results of the most recent Conservation Potential Review, that include a "reference" DSM funding scenario with "high DSM" and "low DSM" scenarios that are relative to the reference scenario; • An analysis of each DSM scenario, at a portfolio level and for each DSM category (residential, low-income, commercial etc.), including: ○ Total Resource Cost/modified Total Resource Cost test results; ○ Utility Cost Test result, expressed as a ratio and $/GJ;	An overview of FEI's approach to the LTGRP DSM analysis, DSM funding scenarios ranging from high to low budgets, and energy savings estimates and cost-effectiveness test results are provided in Section 5 (DSM). Appendix C-2 provides further detail on cost-effectiveness for DSM categories comprising sectors (residential, commercial and industrial). FEI notes that the 2022 LTGRP was necessarily based on the legislation in existence at the time of filing, including the adequacy and cost effectiveness requirements of the DSM Regulation at that time. However, the 2022 LTGRP's long-term plan for DSM is for FEI to file DSM expenditure plans with the BCUC that meet the legislative requirements at the time, including adequacy and cost effectiveness standards in the DSM Regulation, as it may be amended from time to time over the 20-year planning horizon.
	○ Delivery rate impact; ○ Estimated total bill impact (including delivery and commodity), expenditures ($'s) and percentages (%'s), with residential split between high and low use gas customers;	Details regarding delivery rate impacts and total bill impacts are provided in Sections 5 (DSM) and 9 (Outcomes).
	○ Estimated gas (GJ) and GHG emission reductions.	Details regarding gas and GHG emission reductions estimates resulting from DSM (Section 5) and other GHG reduction initiatives over the planning horizon are provided in Section 9 (Outcomes).
4.	The Panel directs FEI to provide an update of its analysis of opportunities for DSM to be used to cost-effectively replace or defer infrastructure investments in its next LTGRP.	An update on FEI's efforts to explore the potential for DSM programs to replace or defer infrastructure investments is presented in Section 5 (DSM). Appendix C-3 provides the study that examines the state of the gas utility industry in considering and implementing non-pipe solutions to provide peak energy savings and other customer benefits.

	BCUC Directive from 2017 LTGRP Decision	Section of LTGRP Addressing Directive
5.	In the next LTGRP, the Panel directs FEI to address the implications for FEI's long-term resource and conservation planning of the 2018 CleanBC plan released by the Government of BC on December 6, 2018 and to provide an update on its analysis of GHG targets. In particular, the Panel expects that FEI should address the long-term impacts to FEI of the following points:	The 2022 LTGRP 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. The latter Provincial policy has in some respects eclipsed the 2018 CleanBC Plan. After the release of the CleanBC Roadmap in October 2021, FEI modelled key policies of the Roadmap at a high level, where reasonable to do so, like the proposed GHGRS, as part of the LTGRP process by updating the Diversified Energy (Planning) Scenario with greater ambition.[316]
	• Initiatives targeting more energy efficient buildings, in terms of gas demand and FEI's DSM activities	Initiatives targeting opportunities to decarbonize buildings are provided in Sections 3 (Clean Growth Pathway), 5 (DSM), 9 (Outcomes) and 10 (Action Plan).
	• Requirements for 15 percent of natural gas consumption to be from renewable gas	Initiatives related to the acceleration of renewable and low-carbon gas supply are provided in Sections 3 (Clean Growth Pathway), 6 (Gas Supply), 7 (System) and 9 (Outcomes). FEI has also addressed the increased renewable and low-carbon gas consumption targets outlined in the Roadmap.
	• Industrial electrification, with respect to demand for natural gas	Considerations related to industrial electrification are provided in Sections 4 (Annual Demand), 5 (DSM), and 9 (Outcomes). FEI has incorporated different assumptions about electrification percentages for all sectors into each of the future scenarios examined in the LTGRP.
	• How 2018 CleanBC's plans for clean transportation affect FEI's forecast for its low-carbon transportation (LCT) programs	Considerations related to FEI's LCT forecasts are provided in Sections 2.2.2.3.2 where the Low-Carbon Fuel Standard and Greenhouse Gas Reduction Regulation for Transportation are discussed. Demand forecasts for LCT are discussed further in Sections 4 (Annual Demand) and 9 (Outcomes).

[316] Exhibit B-23, BCUC IR2 90.2, 90.3; Exhibit B-1, Section 2.

	BCUC Directive from 2017 LTGRP Decision	Section of LTGRP Addressing Directive
	• Other initiatives to be developed by the Government of BC over the next 18 to 24 months	FEI has incorporated the implications of the Roadmap and other recent initiatives including the GGRR, emissions cap for natural gas utilities (GHGRS), provincial and federal hydrogen strategies, BC Carbon Tax and electrification strategy and other policy impacts in Section 2 (Planning Environment). The implications of government initiatives on FEI's long-term plan are discussed throughout the LTGRP.
6.	The Panel directs FEI to address security of supply concerns in its next LTGRP.	Security of supply and resiliency considerations are provided in Sections 2 (Planning Environment), 3 (Clean Growth Pathway), 6 (Gas Supply), 7 (System), and 9 (Outcomes). Refer to Appendix E for FEI's Gas System Resiliency Plan.
7.	The Panel directs FEI to file its next LTGRP on or before March 31, 2022. By letter dated April 28, 2022 the BCUC granted an extension to file on May 9, 2022.	2022 LTGRP filed on May 9, 2022.

183. The table below describes directions or suggestions from other BCUC decisions related to the 2022 LTGRP and how they have been addressed.

Directive #	BCUC Directive	Section of LTGRP Addressing Directive / Suggestion
Order C-2-21	The Panel directs FEI to address resiliency in a comprehensive manner in its 2022 Long-Term Gas Resource Plan.	FEI's resiliency considerations are provided throughout the LTGRP and addressed specifically in Sections 3, 6, 7, 9. Appendix E provides FEI's Gas System Resiliency Plan as a consolidated and comprehensive overview. However, please refer to Part Two, Section D(c) of this Final Submission, for why FEI's resiliency plan is now best considered in separate proceedings.
Order C-2-21	The Panel suggests FEI may address pathways to zero GHG emissions by 2050 in its upcoming LTGRP.	FEI's Diversified Energy (Planning) Scenario provides FEI's decarbonization transition plan to 2042, which may be extrapolated to 2050. However, both FEI and BC Hydro have suggested that they would not extend resource plan scenarios to 2050 based on the uncertainties that lie beyond a twenty-year horizon.

Directive #	BCUC Directive	Section of LTGRP Addressing Directive / Suggestion
Order G-366-21	Provide context around the Regional Gas Supply Diversity (RGSD) project and whether it is in the public interest to explore or pursue this project. This would allow the BCUC a more holistic view of how the project aligns with BC's energy objectives as set out in Section 2 of the *Clean Energy Act*, and how in combination with other infrastructure and energy purchase plans the RGSD would meet future load forecasts.	The RGSD project is explored in many aspects in the LTGRP, including sections 3.3.3 (Clean Growth Pathway), 6.3.3 (Gas Supply Portfolio Planning), 7.5.1.1 (System Resource Needs and Alternatives), 10 (Action Plan) and Appendix E (Gas System Resiliency Plan). However, please refer to Part Two, Section D(c) of this Final Submission, for why the RGSD is now best addressed in separate proceedings related to that project.

PART FOUR: SECTION 44.1(8) CONSIDERATIONS SUPPORT ACCEPTANCE OF THE 2022 LTGRP

184. In this Part, FEI submits that the section 44.1(8) considerations support acceptance of the 2022 LTGRP. In determining whether the LTGRP is in the public interest, the BCUC must consider whether the following considerations under section 44.1(8) of the UCA support acceptance of the LTGRP:

> (a) the applicable of British Columbia's energy objectives,
>
> (b) the extent to which the plan is consistent with the applicable requirements under sections 6 and 19 of the Clean Energy Act,
>
> (c) whether the plan shows that the public utility intends to pursue adequate, cost-effective demand-side measures, and
>
> (d) the interests of persons in British Columbia who receive or may receive service from the public utility.

185. As sections 6 and 19 of the *Clean Energy Act* only apply to electric utilities,[317] section 44.1(8)(b) is not relevant to the 2022 LTGRP. With respect to the remaining considerations, FEI submits that the 2022 LTGRP:

- Is aligned with and supports BC's energy objectives;
- Demonstrates that FEI intends to pursue adequate, cost-effective demand-side measures; and
- Is in the interests of persons in BC who receive or may receive service from FEI.

186. Each of these considerations is addressed in the subsections below.

A. THE 2022 LTGRP IS ALIGNED WITH BC'S ENERGY OBJECTIVES

187. FEI submits that the 2022 LTGRP is aligned with BC's energy objectives as set out in section 2 of the *Clean Energy Act*. The table below, based on Table 1-5 of the Application, sets out the relevant objectives and how they are supported by the 2022 LTGRP.

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[317] Section 6 of the *Clean Energy Act* addresses electricity self-sufficiency, while section 19 concerns prescribed targets in relation to clean or renewable energy. FEI is not a prescribed public utility as defined in section 19.

Applicable CEA Objectives Supported by the LTGRP[318]

CEA Section	CEA Objective	Supported in the 2022 LTGRP
2(b)	To take demand-side measures and to conserve energy, including the objective of the authority reducing its expected increase in demand for electricity by the year 2020 by at least 66%.	Based on its analysis of DSM scenarios in section 5 of the LTGRP, FEI intends that it will design its DSM expenditures plans with the High DSM Setting in mind as DSM represents a key pillar in the Clean Growth Pathway. Under the Diversified Energy (Planning) Scenario with the High DSM Setting, savings from DSM activities are forecast to be about 25 PJ or 13 percent of annual demand in 2042. FEI will continue to offer residential, commercial, industrial, low income, innovative technologies, conservation education and outreach as well as DSM-enabling activities.[319]
2(d)	To use and foster the development in British Columbia of innovative technologies that support energy conservation and efficiency and the use of clean or renewable resources.	Sections 3, 5, and 9 address FEI's actions to support innovative and clean or renewable energy technologies in addition to portfolio analysis throughout the LTGRP. FEI highlights the following key points: Section 3.2.2.4 describes how FEI's Clean Growth Pathway supports emerging technologies and innovation in BC. Section 9 describes the outcomes of these efforts, such as hydrogen production and distribution. FEI's DSM analysis in section 5 includes support for the use and development of innovative technologies. As described in Section 5. 2.1.5, FEI's Innovative Technologies Program Area identifies pre-commercial and market-ready technologies that are not yet widely adopted in BC, and which are suitable for development or inclusion in the portfolio of ongoing DSM programs in other program areas. In Section 10, FEI's Action Item 1 includes: "Continue to seek out partnerships with Indigenous groups and others to develop and implement innovative, clean energy solutions as part of FEI's Clean Growth Pathway."

[318] Exhibit B-1, Table 1-5.

[319] Exhibit B-1, pp. 5-41 and 5-42.

CEA Section	CEA Objective	Supported in the 2022 LTGRP
2(g)	To reduce BC GHG emissions: (i) by 2012 and for each subsequent year to at least 6% less than the level of those emissions in 2007, (ii) by 2016 and each subsequent calendar year to at least 18% less than the level of those emissions in 2007, (iii) by 2020 and for each subsequent calendar year to at least 33% less than the level of those emissions in 2007, (iv) by 2050 and for each subsequent calendar year to at least 80% less than the level of those emissions in 2007, and (v) by such other amounts as determined under the *Climate Change Accountability Act*.[320]	The LTGRP demonstrates that FEI's Clean Growth Pathway is key to helping the province meet BC's GHG emission targets. FEI recommendations include transitioning the gas supply to renewable and low-carbon sources, DSM programs, zero and low-carbon transportation and LNG marine bunkering. Section 9 addresses GHG emissions and emission reductions from FEI's forecast energy demand and initiatives. FEI's transition to renewable and low-carbon gas supplies has the largest impact on GHG emission reductions for residential, commercial and industrial customers. Acquiring and allocating 60.2 PJ of renewable and low-carbon gas supply by 2030 to these customer groups results in emission reductions of 3.0 Mt CO_2e. In 2040, the allocation of 99 PJ of renewable and low-carbon gas to these customer groups results in 4.9 Mt CO_2e of GHG emission reductions.[321] The reductions from serving residential, commercial and industrial, and low-carbon transportation and global LNG customers throughout the planning horizon are shown in Figures 9-5 and 9-6 based on life cycle emission factors.[322]

[320] Formerly the *Greenhouse Gas Reduction Targets Act*. See Exhibit B-1, 2022 LTGRP, p. 2-7.

[321] Exhibit B-1, p. 9-2.

[322] Exhibit B-1, pp. 9-7 to 9-9.

CEA Section	CEA Objective	Supported in the 2022 LTGRP
2(h)	To encourage the switching from one kind of energy source to another that decreases greenhouse gases in British Columbia.	Sections 3, 4, 5 and 9 address FEI's fuel switching initiatives such as using CNG and LNG as a transportation fuel to displace higher carbon fuels such as diesel and marine bunker fuel. Figure 9-3 of the LTGRP presents the emissions reductions that result from growth in FEI serving low-carbon transportation fuels and global LNG exports in the Diversified Energy (Planning) Scenario. These emission reductions are separated into those that would occur within BC, and so would contribute to reductions in BC's GHG emissions inventory, and those that are either in other inventories other than BC or, though occurring, are not captured in any inventory.[323] Fuel switching from natural gas to hydrogen as contemplated in the 2022 LTGRP is a promising solution for decarbonizing difficult-to-decarbonize industries due to the nature of the established processes and equipment involved.[324] The potential for fuel switching from gas to electricity has also been considered in the development of the plan.
2(i)	To encourage communities to reduce greenhouse gas emissions and use energy efficiently.	Section 3 presents FEI's Clean Growth Pathway. Section 5 discusses energy conservation through FEI's DSM activities and the associated GHG emission reductions. Section 8 addresses FEI's community outreach. Section 9 addresses GHG emissions and emissions reductions from FEI's forecast energy demand and renewable and low-carbon supply initiatives.
2(j)	To reduce waste by encouraging the use of waste heat, biogas and biomass	Sections 2, 3, 5, 6, 7 and 9 discuss FEI's RNG and other bioenergy resources including syngas and lignin opportunities, DSM programs including waste heat recovery and portfolio analysis related to decarbonization throughout the LTGRP.

[323] Exhibit B-1, pp. 9-6 to 9-7.

[324] Exhibit B-1, Section 3.3.3.

CEA Section	CEA Objective	Supported in the 2022 LTGRP
2(k)	To encourage economic development and the creation and retention of jobs	FEI's Clean Growth Pathway, discussed in Section 3, highlights opportunities for economic development and job creation. Section 9 summarizes FEI's 2022 LTGRP analysis results in light of BC's energy objectives. The LTGRP encourages the development of renewable and low-carbon gas projects, DSM activities, low-carbon transportation, and expansion of gas service to marine operations and the global LNG market that will contribute to BC's economic development and job creation.
2(l)	To foster the development of First Nation and rural communities through the use and development of clean or renewable resources.	FEI will consider opportunities with Indigenous groups and local communities in the development of clean energy projects (see Sections 3, 5, 8 and 9)
2(m)	To maximize the value, including the incremental value of the resources being clean or renewable resources, of British Columbia's generation and transmission assets for the benefit of British Columbia.	LTGRP provides a framework for partnerships and strategies that maximize value as FEI transitions to a low-carbon energy future (see Sections 3, 5, 6, 7 and 9).

188. FEI submits that no material issue was raised during the proceeding regarding the alignment of the 2022 LTGRP with BC's energy objectives.

B. 2022 LTGRP DEMONSTRATES THAT FEI INTENDS TO PURSUE ADEQUATE, COST-EFFECTIVE DEMAND-SIDE MEASURES

189. As a pillar of its Clean Growth Pathway, FEI's 2022 LTGRP shows how FEI anticipates expanding its existing DSM activities over the planning horizon to reduce GHG emissions to meet provincial GHG reduction targets. As required by the DSM Regulation,[325] FEI will carry out these activities by continuing to bring forward adequate, cost-effective DSM portfolios for acceptance by the BCUC.

190. In its letter of October 5, 2023,[326] the Panel requested that parties provide submissions on how FEI's 2022 LTGRP meets the DSM Regulation as recently amended, in the context of the BCUC's consideration of section 44.1(8)(c) of the UCA, which requires the BCUC to consider

[325] B.C. Reg. 326/2008 as amended by Ministerial Order No. M193 on June 27, 2023.

[326] Exhibit A-19, Letter dated October 5, 2023 – BCUC requesting matters to be addressed in final arguments.

"whether the plan shows that the public utility intends to pursue adequate, cost-effective demand-side measures". The adequacy and cost-effectiveness tests applicable to 44.1(8)(c) of the UCA are defined in sections 3 and 4, respectively, of the DSM Regulation. FEI submits that the 2022 LTGRP clearly demonstrates its intention to pursue adequate, cost-effective DSM, even considering the amendments to the DSM Regulation of June 27, 2023.[327]

191. FEI organizes its submissions on this topic around the following key points:

- The legal test in section 44.1(8)(c) of the UCA is "intends to pursue" adequate, cost-effective DSM.
- FEI's plans to continue an adequate, cost-effective DSM Portfolio are supported by clear and explicit statements in the 2022 LTGRP and backed up by FEI's actual DSM expenditure plans filed with the BCUC since the 2022 LTGRP was filed.
- FEI's DSM portfolio described in the 2022 LTGRP meets the adequacy requirements of the DSM Regulation, as amended.
- The 2022 LTGRP demonstrates FEI's intention to pursue DSM that is cost effective within the meaning of the DSM Regulation.

(a) The Legal Test in Section 44.1(8)(c) is "Intends to Pursue"

192. Section 44.1(8)(c) of the UCA states that the BCUC must consider "whether the plan shows that the public utility intends to pursue adequate, cost-effective demand-side measures". [Emphasis added.] Importantly, section 44.1(8)(c) does not state that FEI's LTGRP must "meet" the requirements of the DSM Regulation. Rather, the requirement is that the LTGRP must show that FEI "intends to pursue" adequate cost-effective demand-side measures. Thus, in its 2017 LTGRP Decision, the BCUC Panel's conclusion was as follows:

> The Panel finds that for the purposes of this LTGRP, FEI has demonstrated that it intends to pursue adequate, cost-effective demand-side measures, pursuant to section 44.1(8)(c) of the UCA, and sections 3 and 4 of the DSM Regulation.[328]

193. FEI submits that this conclusion is equally apparent for the 2022 LTGRP. That is, the 2022 LTGRP clearly demonstrates FEI intends to pursue adequate, cost-effective DSM. As FEI explicitly

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[327] Ministerial Order No. M193 (B.C. Reg. 326/2008).

[328] 2017 LTGRP Decision, p. 25. Emphasis in original removed.

states in the 2022 LTGRP: "Over the planning horizon, FEI will maintain an adequate, cost-effective portfolio of DSM activities that will continue to contribute to energy savings, GHG emission reductions and a culture of conservation in British Columbia."[329]

(b) FEI Intention to Pursue Adequate, Cost-effective DSM is Clear and Explicit

194. FEI's intention to pursue adequate, cost-effective DSM measures is apparent on the face of the 2022 LTGRP. Explicit statements in the 2022 LTGRP make plain FEI's intention to pursue adequate, cost-effective DSM as may be required by the DSM Regulation over the planning horizon:

> Over the 2022 LTGRP planning horizon, FEI's specific program offers will likely evolve to suit the evolving marketplace, legislative provisions outlined in the Roadmap, other future policy and legislative updates and FEI customer needs. In accordance with the UCA, FEI will continue to bring forward adequate, cost-effective DSM portfolios for acceptance by the BCUC.[330]
>
> . . .
>
> The DSM expenditures and cost-effectiveness results discussed in the following sections are based on current regulation. Any future regulatory amendments that are in effect before the next LTGRP will be captured at that time.[331]
>
> . . .
>
> These results do not take into account the following factors which flow into DSM expenditure plans and DSM annual reports to the BCUC . . . Future DSM Regulation changes, and their impact on FEI's DSM portfolio, which could enable more DSM or result in fewer DSM program offerings.[332]
>
> . . .
>
> "[FEI intends to c]ontinue to work with federal, provincial and municipal governments and other potential partners to explore and identify ways in which FEI's DSM activities can continue to help meet government objectives while ensuring benefits for FEI and its customers. This activity will include examining and

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329 Exhibit B-1, p. 5-8.

330 Exhibit B-1, p. 5-3.

331 Exhibit B-1, p. 5-25.

332 Exhibit B-1, p. 5-26.

> understanding the impact of any new changes to the DSM Regulation on FEI's DSM programming if and when such changes are enacted.[333]

195. As indicated above, the 2022 LTGRP explicitly states that FEI's DSM programs will evolve in response to legislative updates, including changes to the DSM Regulation, and that FEI will bring forward adequate, cost-effective DSM portfolios. Please also refer to Part Four, Section B, for further evidence of how the 2022 LTGRP demonstrates FEI's intent to pursue adequate, cost-effective DSM.

196. FEI's intention to pursue adequate, cost-effective DSM that meets evolving legislation is also demonstrated by the DSM Plans that FEI has filed since the 2022 LTGRP was filed. First, FEI filed a DSM expenditure schedule for 2023, which the BCUC accepted and concluded was cost effective. In Decision and Order G-45-23, the Panel stated:[334]

> In reaching its decision the Panel considers that FEI's proposed 2023 DSM Expenditure Schedule aligns with BC's energy objectives by taking demand-side measures, fostering the development of innovative technologies, implementing initiatives to encourage communities to reduce greenhouse gas initiatives and encouraging job creation. The Panel considers the 2023 DSM Expenditure Schedule to be in alignment with FEI's 2022 LTGRP.
>
> The Panel considers the 2023 DSM Expenditure Schedule to be cost-effective and supports the use of a portfolio-wide assessment of cost-effectiveness. The Panel's consideration of the cost-effectiveness of FEI's 2023 Expenditure Schedule included a review of the Total Resource Cost (TRC) and Modified Total Resource Cost (mTRC) tests through which FEI applied approximately 67% and 33% of the total DSM portfolio expenditures respectively, and which comply with the requirements of the DSM Regulation. The Panel considers the residential New Home and Home Renovation Rebate programs to be cost-effective based on the mTRC, despite their failure to pass the Utility Cost Test (UCT). The Panel is satisfied that the FEI evidence supports these programs.

197. Second, the BCUC can take notice of the fact that, since the DSM Regulation was amended, FEI has filed a DSM expenditure schedule for 2024 to 2027 (2024-2027 DSM Plan). While the 2024-2027 DSM Plan is still being considered by the BCUC at the time of writing this

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333 Exhibit B-1, p. 5-42.

334 BCUC Decision and Order G-45-23, p. i, online at: https://docs.bcuc.com/documents/other/2023/doc_70456_g-45-23-fei-2023-dsm-expendituresplan-decision.pdf.

Final Submission, the BCUC can take notice of the fact that the 2024-2027 DSM Plan reflects the adequacy and cost-effective requirements of the amended DSM Regulation, including the phasing out of incentives for conventional gas space and water heating equipment with efficiencies less than 100 percent and the pursuit of advanced DSM.

198. Therefore, FEI submits that its intention to pursue adequate, cost-effective DSM as set out in the DSM Regulation, as it may be amended from time to time, is apparent from clear and explicit statements in the LTGRP, which have been backed up by FEI's actual DSM plans that have been filed since the 2022 LTGRP was filed in May 2022.

(c) FEI's DSM Portfolio Meets the Adequacy Requirements of the DSM Regulation

199. FEI has described its portfolio of DSM activities in detail in Section 5 of the 2022 LTGRP, including how it meets the adequacy requirements of section 3 of the DSM Regulation. Specifically, Table 5-2 lists the adequacy requirements, as they read at the time of filing the 2022 LTGRP, and how FEI's DSM portfolio meets those requirements.[335] No issue was raised through this proceeding with respect to FEI's meeting of these requirements.

200. The amendments to the DSM Regulation of June 27, 2023 made one key change to the adequacy requirements in section 3 of the DSM Regulation, which was to require a demand-side measure intended specifically to reduce energy consumption in any of the following:[336]

> (i) housing owned or operated by an Indigenous governing body or located on reserve land; and
>
> (ii) a public building owned or operated by an Indigenous governing body.

201. FEI's DSM portfolio meets this requirement. For example:

- FEI's Low Income Program Area includes service to Indigenous housing;[337]
- In the residential and commercial buildings sector, FEI is incorporating a broader, high performance, whole-buildings approach that will likely involve activities

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335 Exhibit B-1, pp. 5-7 to 5-8.

336 Ministerial Order No. M193 (B.C. Reg. 326/2008), Section 3(h).

337 Exhibit B-1, p. 5-4.

beyond traditional equipment-focused DSM activities for both retrofit and new construction. These activities broadly include customized programs to support Indigenous communities;[338]

- FEI's New Home and Commercial New Construction Program provides tiered incentives for BC Energy Step Code including a customized offer for Indigenous groups;[339] and
- FEI's conservation education and outreach initiatives include fostering energy literacy and a culture of conservation among FEI's Indigenous customers.[340]

202. FEI's consultation with Indigenous groups also shows FEI's continued support for Indigenous communities through DSM activities: [341]

> In dialogue and engagement with Indigenous groups, FEI received positive feedback on its Conservation and Energy Management programs. FEI was advised to continue expanding opportunities for energy efficiency collaboration with local communities as a means to reduce high energy bills, and to support local housing improvements and community development projects. Cost and affordability were noted as key priorities, as many community members deal with high electricity and natural gas bills. The costs of decarbonizing BC's economy will need to be balanced with the needs for communities who are struggling with energy poverty.

203. FEI therefore submits that it has demonstrated an intent to pursue "adequate" DSM as per the amended DSM Regulation.

(d) FEI Intends to Pursue Cost-Effective DSM per the DSM Regulation

204. The 2022 LTGRP also demonstrates FEI's clear intention to pursue DSM that is *cost effective* per the DSM Regulation.

205. Section 4 of the DSM Regulation prescribes how cost effectiveness of DSM is to be considered. The 2023 amendments to the DSM Regulation made two key changes with respect to cost effectiveness:

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338 Exhibit B-1, pp. 3-19 to 3-20.

339 Exhibit B-1, p. 5-8.

340 Exhibit B-1, p. 5-6.

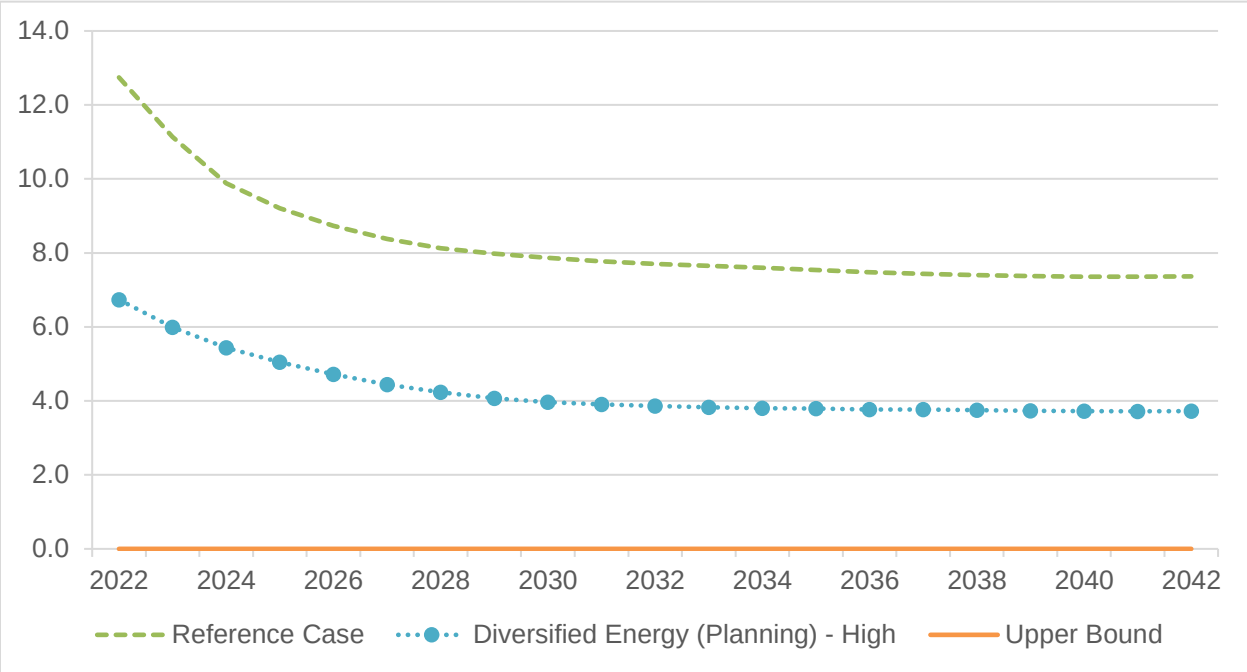
341 Exhibit B-17, RCIA IR1 15.1.

- The BCUC is required to make determinations of cost-effectiveness using the UCT with the avoided cost of renewable and low-carbon gas stipulated in the GGRR. This change is to support a transition to advanced DSM, such as gas heat pumps, dual fuel hybrid heating systems and deeper retrofits.[342]

- A of January 1, 2024, support for conventional gas space and water heating equipment with efficiencies less than 100 percent is effectively deemed to be not cost effective.

206. First, FEI's DSM portfolio in the 2022 LTGRP remains cost effective under the UCT. As reproduced below, Figure 5-20 shows that the DEP High scenario is cost-effective under the UCT. While this UCT uses a lower avoided cost, this only means that the portfolio would be more cost effective using the avoided cost required by the DSM Regulation as amended.

Figure 5-20: Estimated UCT Results by Scenario – All Sectors Combined



207. Furthermore, when presenting the cost-effectiveness results for the scenarios, FEI explicitly noted:[343]

[342] Advanced DSM are described, for example, in Exhibit B-6, BCUC IR1 46.1.

[343] Exhibit B-1, p. 5-34.

> The cost-effectiveness results are based on current DSM regulation. Any future regulatory amendments that are in effect before the next LTGRP will be captured at that time.
>
> [Emphasis added.]

208. Second, the fact that FEI's DSM portfolio in the 2022 LTGRP does not contemplate the phasing out of support for conventional gas space and water heating equipment is only reflective of the timing of filing of the 2022 LTGRP in May 2022, well before the amendments to the DSM Regulation in June 2023. At the time of filing the 2022 LTGRP, DSM for conventional gas space and water heating equipment with efficiencies less than 100 percent had been a core part of FEI's DSM portfolio for many years and were cost effective under the DSM Regulation. FEI's inclusion of these measures, therefore, is consistent with FEI's intent to pursue cost-effective DSM per the DSM Regulation.

209. FEI also provided information to enable the BCUC to consider the impact of the DSM Regulation changes. FEI has provided revised CPR exhibits, showing the potential DSM savings, incentive costs and gas savings, market potential, if space and water heating equipment with efficiency less than 100 percent is excluded.[344] FEI has also provided an analysis of the potential impact on FEI's forecasted DSM savings if incentives for gas-fired space and water heating equipment with less than 100 percent efficiency are phased out.[345]

210. In this context, it is important that the 2022 LTGRP is intended to provide only directional information about how the utility intends to pursue adequate, cost-effective DSM. The BCUC recognized this in its 2017 LTGRP Decision, as follows: [346]

> The Panel recognizes that in the development of expenditure schedules filed under section 44.2 of the UCA, FEI undertakes more detailed program design, including the implementation of programs that will address the adequacy requirements of section 3 of the DSM Regulation in practice, and more refined cost-effectiveness testing calculations than are feasible for the 20 year outlook of a long term resource plan where cost estimates are necessarily much more

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344 Exhibit B-6, BCUC IR1 36.3, 36.4, 36.5.

345 Exhibit B-6, BCUC IR1 45.1.

346 2017 LTGRP Decision, p. 25.

> speculative and prone to changes. It is therefore appropriate that the level of detail provided in the respective filings is different.

211. Thus, FEI's choice of the High DSM Setting must be understood as reflecting FEI's intent to maximize the GHG reduction potential of adequate, cost-effective DSM and that FEI will "design its DSM expenditures with the High DSM Setting in mind".[347] As FEI states on page 5-38 of the 2022 LTGRP: "FEI's future DSM expenditure plans will be informed by the measure data from the 2021 CPR and 2022 LTGRP's DSM analysis and will represent program design and delivery decisions that are in accordance with changing customer needs, regulatory requirements, and technology evolution." Thus, FEI's actual DSM plans and implementation of DSM programs will be on a more detailed level than the 2022 LTGRP, and will evolve to adapt to evolving circumstances, including changes to the DSM Regulation.

212. In summary, pursuant to section 44.1(8)(c), it is FEI's "intent" that is determinative. FEI submits that there can be no doubt from the content of the 2022 LTGRP that it intends to continue to carry out its DSM activities by pursuing cost-effective DSM per the DSM Regulation. FEI observes that over the 20-year planning horizon there is likely to be many more changes to legislation, including to the DSM Regulation. By focusing on the intent behind the 2022 LTGRP, the UCA is not requiring FEI to demonstrate compliance with legislation over a 20-year period, which would be an impossible standard. Rather, FEI must only demonstrate its intent to do so. In FEI's submission, the 2022 LTGRP clearly demonstrates its intention to deliver adequate, cost-effective DSM.

C. 2022 LTGRP IS IN THE INTERESTS PERSONS WHO RECEIVE OR MAY RECEIVE SERVICE FROM FEI

213. Pursuant to section 44.1(8)(d), the BCUC must consider "the interests of persons in British Columbia who receive or may receive service from the public utility." This consideration requires the BCUC to focus on the interests of FEI's present and potential gas customers. FEI submits that this particular consideration is an essential part of the BCUC's deliberations and supports acceptance of the 2022 LTGRP.

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[347] Exhibit B-1, p. 5-41.

214. FEI highlights the following key factors that indicate that the 2022 LTGRP is in the interest of persons in BC who receive or may receive gas service from FEI:

- The Clean Growth Pathway, as modelled through FEI's DEP Scenario, will provide British Columbians with the most reliable, resilient, and cost-effective pathway to meet the emissions reductions required by government policy, as well as provide other important benefits for customers.
- The 2022 LTGRP is sufficiently flexible to adapt to the uncertainty of the energy transition.
- The 2022 LTGRP is deeply informed by stakeholder consultation, including of current and potential customers, and stakeholders support a diversified energy pathway.

(a) The 2022 LTGRP Charts a Course for A Diversified Energy Future that is in the Best Interests of FEI Customers

215. As set out in detail in Part Two of these submissions, planning to FEI's DEP Scenario will:

- Result in an actionable pathway to transition BC to a low carbon future through FortisBC's Clean Growth Pathway as explained in Part Two of this Final Argument.
- Meet GHG emission reductions targets, which the Province has legislated in the public interest,[348] in part by providing customers with access to renewable and low-carbon gas.
- Maintain a strong focus on DSM activities by being guided by the High DSM Setting, meeting customer needs, lowering GHG emissions, and providing opportunities for customers to lower their bills.
- Meet current and future customer demand through prudent gas supply portfolio planning and price risk management strategies.
- Result in lower costs to customers than a scenario where electrification is the primary pathway to meeting GHG emission reduction targets.
- Ensure its system resources have sufficient capacity to provide safe and reliable service to customers.

[348] Exhibit B-6, BCUC IR1 74.1. The other alternate scenarios did not set the GHGRS cap as a limitation and so further emission reductions would be required to meet the cap in those scenarios.

- Maintain and plan FEI's system to ensure that current and future customers continue to receive safe and reliable energy service from FEI as set out in the objectives of the 2022 LTGRP.

- Maintain the reliability and resilience of FEI's system, safeguarding the interests of customers in receiving dependable and uninterrupted service.

- Lower rates for customers and reduce atmospheric emissions where customers live by developing LCT and marine bunkering markets.

216. These outcomes are clearly in the best interests of FEI's current and potential customers. This was reflected in the feedback received from RPAG members, who expressed their general support for the selection of the DEP Scenario as FEI's planning scenario.[349]

(b) 2022 LTGRP Sets Out an Action Plan that Gives FEI the Flexibility to Protect and Promote Customer Interests in Any Alternative Future

217. Given the pace of change in the planning environment, FEI has ensured that the 2022 LTGRP is sufficiently agile to adapt to the dynamic policy and market forces that may impact its forecast demand and corollary supply and system resource requirements. This has been achieved by:

- The range of the scenarios that FEI modelled using its end-use annual demand forecast method, which captures and analyzes the potential impact of shifting trends in customer behaviour, economic conditions and energy consumption, that may come to fruition in the future.[350] FEI modelled the potential for the demand for gas to be higher or lower than the DEP Scenario in the alternative scenarios. The BCUC has historically been cognizant of the range of FEI's scenario analysis: in the 2017 LTGRP Decision, the Panel noted that FEI's scenario analysis sufficiently captured the possibility of accelerated non-price carbon action impacting demand.[351]

- The 2022 LTGRP offers flexibility for meeting customers' energy needs as it maintains a role for both the electricity and gas systems. Unlike the Deep Electrification Scenario, which would lock the Province into that future by phasing down gas infrastructure, pursuing the DEP Scenario and the 2022 LTGRP Action

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[349] Exhibit B-6, BCUC IR1 67.2; Exhibit B-9, BCOAPO IR1 6.1; Exhibit B-12, CEC IR1 13.2.

[350] Exhibit B-6, BCUC IR1 7.1.1; 29.7, 29.5; Exhibit B-10, BCSEA IR1 7.2; Exhibit B-8, BC Hydro IR1 1.3.

[351] 2017 LTGRP Decision, p. 24.

Items in the near-term would not lock FEI or the Province into one path over the long-term.[352]

- The 2022 LTGRP identifies contingency actions to be taken should FEI's demand unfold in a different way than projected in the DEP Scenario in order to ensure that customers' energy needs are met.[353] Most of FEI's Action Items involve monitoring the planning environment to allow FEI to identify if conditions in any of the alternative scenarios are emerging, and Action Item 10 in particular sets out the monitoring activities that will help to identify if a scenario other than the DEP Scenario is unfolding and if contingency actions need to be implemented.[354]

218. FEI submits that the 2022 LTGRP is a flexible long-term resource plan that is in the best interests of customers, as it ensures that FEI can adapt to any manner of change in the planning environment. Activities such as FEI's decarbonization initiatives are subject to change as a result of government policy direction, market conditions, customer adoption of low-carbon energy, technological innovation, and economic and population growth.[355] Since the likelihood of accurately predicting actual future conditions is low, FEI identifies and implements a set of cost-effective resources to meet the planning scenario and establishes contingency plans for meeting the scenario range of potential future annual demand.[356] FEI will continuously scan the planning environment and progress on actions that will alert FEI to adjust its individual actions and specific resource projects as they are identified.[357]

(c) The 2022 LTGRP is Supported by Comprehensive and In-Depth Consultation with Customers

219. The 2022 LTGRP, including FEI's selection of the DEP Scenario as FEI's planning scenario, reflects FEI's extensive stakeholder, Indigenous and community engagement. Connecting with customers, communities, Indigenous groups, and other stakeholders on long-term planning

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[352] Exhibit B-10, BCSEA IR1 32.2.

[353] Exhibit B-1, 6.2.4.3 discusses how FEI's existing portfolio of resources is prepared for managing demand outcomes either higher or lower than the DEP Scenario, should they arise in the short to medium term, and outlines the contracting flexibility of the gas supply portfolio. Section 7.2 discusses the contingencies in system resources planning for either faster or slower demand growth. See also: Exhibit B-6, BCUC IR1 29.7, 52.2; Exhibit B-8, BC Hydro IR1 1.6.1; Exhibit B-10, BCSEA IR1, 7.2, 32.3.

[354] Exhibit B-9, BCOAPO IR1 10.2, 10.4

[355] Exhibit B-6, BCUC IR1 78.3.

[356] Exhibit B-1, Section 4.9.

[357] Exhibit B-6, BCUC IR1 29.7; Exhibit B-25, BCOAPO IR2 17.2.

issues is of critical importance to FEI, and is addressed in detail in Section 8 of the Application. Stakeholder engagement serves as a means by which FEI can ensure that its resource planning is in the interest of its current and potential customers.

220. FEI undertook a number of initiatives to offer interested participants, from areas within and outside of FEI's service area,[358] the opportunity to contribute to the discussions that informed the 2022 LTGRP and FEI's Clean Growth Pathway Initiatives.[359] FEI's stakeholder activities which contributed to the 2022 LTGRP included:

- **Resource Planning Advisory Group (RPAG) Workshops**:[360] FEI engaged strategic representatives of municipalities, government, customers, associations, and organizations with interest, experience and/or significant industry knowledge in energy planning in the development of the LTGRP. The RPAG members offered their support for FEI's selection of the DEP Scenario as its planning scenario for the 2022 LTGRP. [361] The workshops assisted FEI in updating and solidifying its demand scenarios and in providing instructive feedback on FEI's decarbonization strategy. Much of the discussion focused on receiving feedback on FEI's analysis of the gas utility's long-term role as a key component of the critical infrastructure required to meet BC's long-term clean energy needs. FEI has taken the RPAG feedback into consideration in developing the LTGRP,[362] and in developing the Outcomes of FEI's Clean Growth Pathway,[363] and the Action Plan.[364] Notes from all engagement sessions were provided back to participants in draft form to provide an opportunity for errors and omissions to be considered and corrected where necessary.

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358 Exhibit B-12, CEC IR1 8.2.

359 Exhibit B-6, BCUC IR1 66.1-66.3 and 110.1; Exhibit B-9, BCOAPO IR1 6.2, 6.3; Exhibit B-12, CEC IR1 13 Series

360 The outcomes of the RPAG Workshops and how they were incorporated into the 2022 LTGRP are discussed in: Exhibit B-1, Section 8.2; Exhibit B-6, BCUC IR1 30.5, 67.2, 67.3, 67.4, 68.2, 68.3; Exhibit B-9, BCOAPO IR1 6.1, 6.2, 7.1; Exhibit B-11, BCSSIA IR1 1.1, 2.2.3 Exhibit B-12, CEC IR1 8.1.2, 43 Series; Exhibit B-13, GNAR IR1 5.0, 5.2; Exhibit B-17, RCIA IR1 15.1; Exhibit B-23, BCUC IR2 111.1

361 Exhibit B-6, BCUC IR1 67.2 provides an overview of the RPAG notes highlighting discussions supportive of the DEP Scenario and FEI's decarbonization activities.

362 Exhibit B-1, Table 8-3.

363 Exhibit B-1, Section 9.

364 Exhibit B-1, Section 10.

- **Indigenous Community Engagement Sessions**:[365] Indigenous community participant feedback was aligned with the 2022 LTGRP objectives of ensuring cost-effective, secure and reliable energy for customers, providing cost-effective DSM and lower carbon solutions, and ensuring consistency with provincial energy objectives. Based on the feedback received during these engagement sessions, Action Item 4 outlines future actions FEI will take to engage with Indigenous community representatives on energy planning. While FEI views its engagement with Indigenous communities on long-term resource planning as ongoing and not limited to taking place only within the timing of one LTGRP, this Action Item will support future FEI resource plans and will ensure FEI is engaging meaningfully with Indigenous communities on long-term energy planning initiatives.
- **Community Engagement Workshops**:[366] Robust and customer-focused discussions suggested that FEI's long-term planning considerations align with stakeholder expectations. The workshops highlighted the importance of considering diverse community perspectives and energy planning needs at the local level, with respect to developing BC's energy future and FEI's role in the energy transition across its service territory.[367] Again, notes from all engagement sessions were provided back to participants in draft form to provide an opportunity for errors and omissions to be considered and corrected where necessary.
- **Other Engagement Activities**:[368] Current and potential customers, as well as advisory groups, government, industry, and associations, provided feedback through engagement activities associated with its customer service initiatives and project applications. This feedback both directly and indirectly informed the resource planning process. For example, FEI engaged and consulted with all levels of government throughout the development of the Pathways Report examining the benefits of the Clean Growth Pathway in the low-carbon transition.[369] Further, FEI's solutions to achieving the province's GHG reduction initiatives as outlined in the 2022 LTGRP were informed by feedback from 41 organizations, including 21 industry stakeholders, 5 provincial government departments, and 15 local government advisors.[370] In addition to these formal engagement initiatives, FEI's

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[365] Exhibit B-1, Section 8.3 & Section 10, Action Item 4. For a description of how FEI integrated feedback from Indigenous community representatives in the 2022 LTGRP, please refer to Exhibit B-6, BCUC IR1 66.3. See also: BCUC IR1 66.2, 66.3; Exhibit B-12, CEC IR1 8.1.2, 13 Series; Exhibit B-17, RCIA IR1 15.1; Exhibit B-23, BCUC IR2 110.1, 111.1

[366] Exhibit B-1, Section 8.4; Exhibit B-12, CEC IR1 8.1.2, 13 Series, 43 Series; Exhibit B-17, RCIA IR1 15.1

[367] Exhibit B-12, CEC IR1, 13.1-13.3; 43.2.

[368] Exhibit B-1, Section 8.5.

[369] Exhibit B-1, Section 8.5.2.

[370] Exhibit B-1, Section 8.5.3.

> Market Research Team surveys customers and stakeholders on a regular basis to gain feedback on customer satisfaction and energy preferences.[371]

221. The information gathered through these activities was incorporated throughout the LTGRP, and the key elements of the 2022 LTGRP, such as the Clean Growth Pathway and the DEP Scenario, were developed in a manner that addresses the issues raised through stakeholder engagement and aligns with the public interest.[372]

222. Long term resource planning is an ongoing process, with ongoing consultation and engagement. FEI encourages all stakeholders to participate in the complex discussions and considerations required for the decarbonization of BC's energy system and economy,[373] and the 2022 LTGRP demonstrates that FEI is committed to incorporating stakeholder input into its future resource planning processes.

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[371] Exhibit B-6, BCUC IR1 7.1.

[372] Exhibit B-9, BCOAPO IR1 6.3; Exhibit B-25, BCOAPO IR2 16.1-16.3.

[373] Exhibit B-9, BCOAPO IR1 6.2.

PART FIVE: 2022 LTGRP IS IN THE PUBLIC INTEREST

223. Under subsection 44.1(6) of the UCA, the BCUC must accept a long-term resource plan if the BCUC determines that to carry it out would be in the public interest. In the 2017 LTGRP Decision, the BCUC stated: "The Panel takes a holistic approach to determining if the 2017 LTGRP should be accepted in the public interest by considering harmoniously all of the provisions of section 44.1 of the UCA."[374] FEI submits that a holistic consideration of all the relevant factors strongly indicates that the 2022 LTGRP is in the public interest.

224. FEI highlights four broad points.

A. SECTION 44.1(2) REQUIREMENTS SUPPORT ACCEPTANCE IN PUBLIC INTEREST

225. The 2022 LTGRP does not simply meet the filing requirements of section 44.1(2), but does so comprehensively, robustly, and transparently. FEI has:

- Followed a rigorous process in modelling a broad range of potential demand futures;
- Thoroughly evaluated and incorporated the potential for demand reduction by using cost-effective DSM;
- Carefully canvassed its system resource needs and alternatives to ensure that regional peak capacity meets the demand of its customers and the need to deliver renewable and low-carbon gases in increasing volumes over the planning horizon;
- Provided a highly-detailed description of its gas supply portfolio planning, explaining how FEI's plans enable it to secure cost-effective and reliable supply and mitigate market price volatility for customers;
- Meaningfully engaged with the Resource Planning Guidelines in its resource planning process, providing the public with comprehensive context on FEI's policy and planning environment and stakeholder feedback, which inform its Action Plan; and
- Thoughtfully complied with the BCUC prior Directives for the 2022 LTGRP, ensuring that information identified by the BCUC as useful to its determination on the public interest is readily available and clearly articulated.

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[374] 2017 LTRP Decision, p. 4.

B. SECTION 44.1(8) REQUIREMENTS SUPPORT ACCEPTANCE IN PUBLIC INTEREST

226. The mandatory considerations set out in section 44.1(8) strongly support acceptance of the 2022 LTGRP. The LTGRP is firmly aligned with BC's Energy Objectives as set out in the *Clean Energy Act*, as FEI has:

- Not only demonstrated its intention to take DSM and to conserve energy, but also demonstrated that it further intends to design its DSM expenditures plans with its most aggressive setting, the High DSM Setting, which is estimated to save around 13 percent of annual demand in 2042.

- Demonstrated pioneering thought leadership in using and fostering innovative technologies and the use of renewable and low-carbon gas to reduce demand and decarbonize the gas supply, while engaging with communities on efficiency, encouraging economic development and providing employment opportunities, and collaborating with Indigenous groups and local communities in the development of clean energy projects.

- Designed its long-term plan by centering the *Clean Energy Act* objective of reducing BC GHG emissions to targets determined by the Legislature. FEI designed the Clean Growth Pathway, around which FEI's long-term plans revolve, on the imperative to assist the Province in meeting BC's GHG emissions targets. The outcomes of the Clean Growth Pathway, as described in Section 9 of the Application, are in fact aligned with the outcomes targeted by the Province.

- Provides a framework to partner and strategize with other utilities to maximize the value of the existing energy system to transition BC to a low-carbon energy future.

227. FEI has not only clearly demonstrated its intention to pursue adequate and cost-effective DSM, but plans to maximize the potential for such DSM in response to government policy direction to reduce emissions. In the long term, based on the 2022 LTGRP DSM analysis, FEI intends to design its DSM expenditures plans with the High DSM Setting in mind. Consistent with the Clean Growth Pathway, the High DSM Setting maximizes energy savings potential and therefore the potential to reduce GHG emissions by accelerating building retrofits, high performance new construction and energy efficiency in commercial and industrial processes. FEI correctly recognizes that DSM is the most cost-effective way to reduce emissions and therefore reasonably planned to maximize its potential.

228. The 2022 LTGRP sets FEI on a trajectory to provide significant benefits to current and future customers, as it:

- Is the product of extensive stakeholder, Indigenous and community engagement;
- Is aligned with public policy known at the time of filing;
- Is sufficiently flexible to adapt to the uncertainty of the energy transition;
- Sets out a pathway for FEI to meet the emissions reductions required by the GHGRS cap on natural gas utility emissions in the Roadmap for the Buildings and Industrial Sectors;
- Protects and promotes 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; and
- Plans for a diversified energy future that will keep rates more affordable for customers and provide cost-effective, reliable and resilient service for customers.

C. THE 2022 LTGRP IS PART OF FEI'S ITERATIVE RESOURCE PLANNING PROCESS

229. When considering whether the 2022 LTGRP is in the interests of customers, FEI submits that the BCUC should take into account that long-term resource planning is an iterative process,[375] and, to a certain extent, each resource plan can only represent a snapshot in time. This is especially true in the context of the 2022 LTGRP, where the planning environment is rapidly changing and in which FEI is experiencing more planning uncertainty than seen in resource planning processes over the past two decades or more.[376] It is in the best interests of FEI's customers to achieve certainty on the outcome of the 2022 LTGRP Proceeding as efficiently as possible, so that FEI may focus its efforts on the next iteration of the plan, that will engage with the changes that have occurred since FEI submitted its 2022 LTGRP in May of 2022.

230. Resource planning in a changing policy environment is especially challenging due to the length of time it takes for the utility to prepare a resource plan and the time it takes for the BCUC

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[375] Exhibit B-1, p. 1-5, 8-7; Exhibit B-6, BCUC IR1 71.7; Exhibit B-23, BCUC IR2 81.2.1.

[376] Exhibit B-1, p. 4-1.

to review the resource plan, all while the planning environment continues to change. With respect to the timing of this 2022 LTGRP in relation to the pace of policy developments:

- FEI began its resource planning process for the 2022 LTGRP in 2019[377] and it was filed in May 2022.[378] FEI's planning process involves several iterative steps in identifying resource options to meet expected demand, beginning with examining the planning environment, which encompasses the external factors that influence future demand.[379] While FEI was preparing the 2022 LTGRP, important planning environment developments occurred late in the process, most notably the release of the CleanBC Roadmap, which FEI was able to respond to a large extent by updating its planning scenario with greater ambition.[380]

- At the time of filing this Final Submission, the regulatory process to review the 2022 LTGRP will have spanned 18 months. Over this time, policy changes have continued to occur, including the introduction of the Zero Carbon Step Code and amendments to the DSM Regulation.

- Emerging markets and technologies are being advanced in response to government policy and global action on climate change. Given that BC is on the forefront of the energy transition, FEI is consistently evaluating and developing nascent technologies and markets to deeply decarbonize its system. This work has continued to progress while the review of the 2022 LTGRP has been ongoing.

231. Given these timing challenges, it is expected that some assumptions underlying resource plans will lose their currency between submission of the original application to the BCUC and the BCUC's determination. Because of their susceptibility to macroeconomic policy shifts, utility resource plans are submitted on relatively regular and frequent intervals,[381] and on the

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[377] In particular, the demand forecast is one of the earliest steps in the resource planning process and these values and selections are based on the planning environment that prevailed when those steps were taken. For the 2022 LTGRP, this work was undertaken in late 2019 and 2020, as described in Exhibit B-1, Appendix B-3. For further discussion, see: Exhibit B-6, BCUC IR1 29.1.

[378] For a non-exclusive list of the activities FEI undertakes to monitor all aspects of the planning environment for its successive LTGRPs, please refer to Exhibit B-8, BC Hydro IR1 3.1.

[379] FEI describes each step in its planning process in Exhibit B-1, Section 1.2. This process is consistent with the steps included in the BCUC's Resource Planning Guidelines.

[380] Exhibit B-1, Section 2, Exhibit B-6, BCUC IR1 1.1; Exhibit B-23, BCUC IR2 90.2.

[381] Exhibit B-28, CEC IR2 61.2.

understanding that changes in the planning environment that occur after the cut off point for the present resource plan will be captured in the next LTGRP.[382]

232. Therefore, FEI submits that the 2022 LTGRP must be assessed against the policy environment at the time it was prepared, the general thrust of the plan and FEI's intentions to continue to plan as expressed in the record in this proceeding. As discussed by the BCUC in the context of considering the relevance of the 2018 CleanBC Plan to the 2017 LTGRP, "[p]rocedural fairness, though, dictates that the Panel base its decision on whether to accept the 2017 LTGRP on the evidence filed and tested in this proceeding only."[383] Accordingly, policy developments that occur outside of the LTGRP procedural window will be understood and planned for in the context of future plans.

D. HOLISTIC CONSIDERATION SUPPORTS ACCEPTANCE IN PUBLIC INTEREST

233. The 2022 LTGRP demonstrates leadership and forward-looking thinking by selecting an ambitious pathway forward for the utility in response to the energy transition and its attendant significant policy changes. FEI has not maintained the status quo, but rather is an industry leader in pursuing higher levels of DSM, acquiring increasing amounts of RNG supply, and pioneering the market development of other low-carbon gas supply, most notably, hydrogen. While ambitious and innovative, FEI's decision to plan for a diversified energy future, as modelled by the DEP Scenario, is also timely. As described throughout the 2022 LTGRP, FEI has supported its decision with in-depth analysis in all areas of its business, including analysis commissioned from third party experts. For instance:

- The Clean Growth Pathway to 2050 Report[384], the Pathways for British Columbia to Achieve its GHG Reduction Goals report,[385] and research from the Institute for Integrated Energy Systems at the University of Victoria[386] conclude that a pathway

[382] Exhibit B-23, BCUC IR2 112.1; see also: Exhibit B-6, BCUC IR1 17.8.2, 29.5 and 29.7 and Exhibit B-10, BCSEA IR1 7.2. This also includes the impact of regulatory decisions, such as the impact of the BCUC's future decision in the RG Program Application proceeding on future customer demand (see Exhibit B-23, BCUC IR2 97.5 for further discussion).

[383] 2017 LTGRP Decision, p. 24.

[384] Exhibit B-1, Appendix A-1.

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

[386] Exhibit B-1, Appendix A-9.5.

in which both the gas and electric systems leveraged to reduce GHG emissions is in the interests of British Columbians in terms of energy reliability and resilience, cost-effectiveness, and GHG emissions reductions.[387]

- The BC Renewable and Low-Carbon Gas Supply Potential Study[388] has shown that there is more than enough renewable and low-carbon supply potential to be sourced from within BC.

234. Resource plan scenarios are intended to explore possible alternative futures to support decision making. Since FEI's planning environment for energy services continues to rapidly change and present uncertainty, "business as usual" assumptions or conditions will not remain stable throughout the planning horizon. Accordingly, the 2022 LTGRP is both ambitious and prudent, in that it explores how different permutations of key factors can yield different outcomes through its scenario analysis.

235. The 2022 LTGRP is supported by depth of knowledge and experience. FEI's responses to information requests in this proceeding have been comprehensive, detailed and responsive, demonstrating the depth of knowledge and expertise that lies behind the 2022 LTGRP. For example, while hydrogen development is at an early stage, FEI's IR responses unequivocally demonstrate that it has the knowledge and expertise to stand behind its plans to integrate hydrogen, and that doing so is reasonably feasible and practically achievable.

236. Finally, and overall, the 2022 LTGRP is comprehensive and detailed, meaningfully informed by stakeholder consultation, aligned with policy, and provides the broad resource planning overview that is needed for a utility at this time. Through the resource planning process, FEI has meaningfully engaged in questions central to the broader public interest of British Columbians, even commissioning studies on the tradeoffs of alternative decarbonization pathways[389] and collaborating with FortisBC's electric utility to understand the practical challenges of decarbonization,[390] and FEI selected a planning scenario that is designed to

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387 For further discussion of these and other third-party reports that support the benefits of a diversified pathway to decarbonization, please refer to Part Two, Section A(d) of these Final Submissions.

388 Exhibit B-1, Appendix D-2.

389 Exhibit B-1, Appendix A-2, Pathways for British Columbia to Achieve its GHG Reduction Goals.

390 Exhibit B-20, Kelowna Electrification Case Study.

maintain the safe and reliable operation of BC's overall energy system in the public interest. While policy developments continue to occur and resource planning is necessarily an iterative process, the 2022 LTGRP provides a clear pathway forward that can guide the utility as it responds to government policy and the energy transition.

237. Therefore, FEI submits that the 2022 LTGRP is in the public interest and should be accepted by the BCUC.

Part Six: CONCLUSION

238. FEI submits that its 2022 LTGRP is in the public interest and should be accepted by the BCUC pursuant to section 44.1 of the UCA. The 2022 LTGRP has fully met the requirements of the UCA and the required considerations in section 44.1(8) strongly support acceptance of the Plan. For the reasons set out in this Final Submission, FEI submits that a holistic consideration of all factors supports the conclusion that the 2022 LTGRP is beneficial and in the public interest and should be accepted by the BCUC.

239. In recognition of the public interest in the BCUC's timely oversight of utility resource plans, and the challenges that the energy transition poses for all stakeholders in remaining current, FEI intends to file its next LTGRP even earlier than usual, within approximately 2-3 years of the conclusion of this Proceeding. Filing the next LTGRP earlier will provide FEI with the opportunity to absorb the policy and technological changes that have occurred since the submission of the 2022 LTGRP and update the BCUC on any associated impacts to FEI's long-term planning.[391] In particular, it would be important to file the next LTGRP after the Province clarifies the compliance pathways to meet the GHGRS emissions cap, such that FEI can calibrate its long-term resource planning to the Province's long-term goals for GHG emission reductions.[392] 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.[393]

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391 Exhibit B-1, pp. 10-8 – 10-9.

392 Exhibit B-9, BCOAPO IR1 10.2.

393 Exhibit B-6, BCUC IR1 29.7; Exhibit B-25, BCOAPO IR2 13.3.

240. In the meantime, the 2022 LTGRP inherently provides flexibility for policy uncertainty, and incorporates strategies that will enable FEI to respond to actual demand that is higher or lower than anticipated.[394]

ALL OF WHICH IS RESPECTFULLY SUBMITTED

Dated:	November 1, 2023	***[original signed by Christopher Bystrom]***
		Christopher Bystrom Counsel for FortisBC Energy Inc.
Dated:	November 1, 2023	***[original signed by Courtney Gibbons]***
		Courtney Gibbons Counsel for FortisBC Energy Inc.

[394] As discussed in Part Four, Section C(b).