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November 10, 2021

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

Attention: Ms. Leigha Worth, Executive Director

Dear Ms. Worth:

Re: FortisBC Energy Inc. (FEI)

Application for a Certificate of Public Convenience and Necessity (CPCN) for the Tilbury Liquefied Natural Gas (LNG) Storage expansion (TLSE) Project (Application)

Response to the British Columbia Public Interest Advocacy Centre representing the British Columbia Old Age Pensioners' Organization, Active Support Against Poverty, Disability Alliance BC, Council of Senior Citizens' Organizations of BC, and the Tenant Resource and Advisory Centre *et al.* (BCOAPO) Information Request (IR) No. 2

On December 29, 2021, FEI filed the Application referenced above. In accordance with the regulatory timetable established in British Columbia Utilities Commission Order G-185-21 for the review of the Application, FEI respectfully submits the attached response to BCOAPO IR No. 2.

Treatment of Confidential Material

Due to the commercially-sensitive and confidential nature of some of the information in the Application, FEI is filing a portion of Attachment 2.1 under separate cover on a confidential basis pursuant to Section 18 of the BCUC's Rules of Practice and Procedure regarding confidential documents, as set out in Order G-15-19. FEI's treatment of commercially-sensitive information in these responses is consistent with BCUC Order G-161-21 and the Revised Confidential Application (Exhibit B-1-3). The unredacted portion of Attachment 2.1 will be available to interveners who have previously signed and provided the BCUC Confidentiality Declaration and Undertaking form (Undertaking).

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

cc (email only): Commission Secretary
Registered Parties

1. Reference: Project Need

Exhibit B-15, Response to BCUC IR's 1.1, 1.1.1

Redundancy/Resiliency

Preamble: FEI states: "The T-South system consists of two looped gas transmission pipelines operating as a single system with various interconnection points to FEI's delivery system…The T-South system has some inherent local redundancy along the pipeline and at compressor stations… At compressor stations, Westcoast would have some excess and/or redundant compression capacity to accommodate the failures of individual compressor units. As such, should a compressor unit fail, Westcoast would likely be able to continue uninterrupted gas flow for most times of the year with its excess and/or spare compressor(s).…The two lengthy pipelines comprising the T South system are located in the same right-of-way, tied together by common headers and compressor stations, and hence are operated as a single pipeline…Therefore, a major incident on one of the pipelines could affect both, as was made evident during the T-South Incident. Further, a capacity reduction at any compressor station or pressure reduction of any segment of a pipeline between two valve stations reduces the capacity that can be delivered by the system. As such, the two looped pipelines on the T-South system provide some redundancy on the days of the year when the regional system load is less than the capacity of the T-South system when accounting for any compressor capacity or any pipeline pressure reductions…"

1.1 What is FEI's understanding of the purpose and intent of the addition of the second pipeline built in 1972[1]?

Response:

It is FEI's understanding that the second pipeline was constructed in 1972 to provide increased transportation capacity on the Westcoast T-South system.

[1] Jana Corporation Report dated September 9, 2021, page 2.

2. Reference: Project Need

Exhibit B-15, Response to BCUC IR 1.5

Probability Analysis

Preamble: FEI states: '…However, FEI retained JANA Corporation (JANA) to conduct an independent, expert probabilistic analysis of a pipeline incident occurring on the Westcoast T-South system…'

2.1 Did FEI engage the JANA Corporation through a formal bidding process? If yes, please provide the Terms of Reference as documented in the Request for Proposals.

2.2 Please provide the date the JANA Corporation was retained by FEI[2] to undertake the independent, expert probabilistic analysis.

2.3 Please discuss the purpose of JANA Corporation's retainer and the objectives of the analysis as provided by FEI to JANA Corporation.

2.4 Please provide a copy of the FEI retainer for Jana Corporation related to the probability analysis review/white paper (with commercially sensitive information redacted as appropriate)?

Response:

FEI contacted JANA on August 31, 2021 to discuss the development of a probabilistic rupture analysis for the Westcoast T-South system. JANA has provided pipeline quantitative risk expertise to FEI for many years, and as noted in the response to BCUC IR1 1.5, has appeared before the BCUC in two FEI pipeline integrity CPCN applications. Given FEI's familiarity with JANA, their recognized industry expertise, and the familiarity of both the BCUC and interveners with the JANA principals, FEI chose not to conduct a formal bidding process for this specific analysis.

Please refer to Attachment 2.1 for the memo between JANA and FEI documenting the scope of the requested work; this also constitutes the retainer for JANA's analysis. As noted in the memo, JANA was engaged to develop a probabilistic analysis of a pipeline incident occurrence on the Westcoast T-South system. A portion of Attachment 2.1 is redacted and is being filed on a confidential basis as it contains commercially sensitive information, pursuant to Section 18 of the BCUC's Rules of Practice and Procedure regarding confidential documents as set out in Order G-15-19 and consistent with Order G-161-21 regarding treatment of commercially-sensitive information.

Although FEI did not consider a probabilistic analysis necessary to support the need for the TLSE Project, FEI asked JANA to conduct an independent analysis (provided in the response to BCUC

[2] Jana Corporation Report dated September 9, 2021.

IR1 1.5) to address BCUC and intervener information requests which sought to better understand the probability of a pipeline failure leading to a no-flow event.

FEI considers the need for the TLSE Project to be established without reference to a probabilistic analysis because, when incidents can result in consequences that are unacceptable (i.e., in this case, a no-flow event occurring at any time during more than half of a normal year resulting in a widespread and prolonged outage in the Lower Mainland, with attendant socio-economic impacts of the nature addressed in the PwC analysis), it is appropriate to mitigate the potential outcome. This principle is further explained by JANA in their paper *Managing Low Probability – High Consequence Pipeline Risk*:[3]

> When we land in Quadrant IV, what we must do is 1.) Accept that we cannot predict what will happen, or when; 2.) Reject all narratives and projections that try to tell us what will happen and when; and 3) Work towards mitigating the consequence of such an occurrence.
>
> The fourth quadrant, then, as defined by Taleb, is about the areas in our domain (in our case, pipelines) where our knowledge is limited AND that limitation has the capability to result in an event of high consequence. Also, while we may know the probability of an event occurring, due to the complexity of the system, we will not be able to predict it in terms of where and when. This need not imply that we need to be a victim of the situation. We can take action to change our risk position.

JANA's view quoted above is consistent with that articulated by both Guidehouse and PwC. Please see, for instance, Guidehouse's response to RCIA IR2 31.2.

Nonetheless, the JANA analysis determined the cumulative probability of a rupture event on the T-South system is forecast to be between 83.1 and 97.9 percent, and the cumulative probability of an ignited rupture is between 53.4 and 73.9 percent over the 67-year financial analysis period of the TLSE Project. Given that these incidents can lead to unacceptable outcomes (a sudden, widespread, and prolonged outage to FEI's Lower Mainland customers), FEI has prudently proposed the TLSE Project to mitigate the occurrence of this risk.

[3] http://www.janacorporation.com/s/Managing-Low-Probability-High-Consequence-Pipeline-Risk-c.pdf

3.0 Reference: PROJECT NEED

Exhibit B-15, Response to BCUC IR 1.6.1

Integrity Management

Preamble: FEI states: "Integrity-related personnel from both FEI and Enbridge (Westcoast) have met to facilitate high level technical information sharing (for example, most recently through a discussion on April 19, 2021). However, the information shared between operators was on a confidential basis, and as such, FEI is unable to provide specific information regarding Westcoast's integrity management processes on the T-South system."

3.1 Please discuss whether FEI has any general concerns with Westcoast's integrity management processes and capabilities.

3.1.1 If so, please speak to each specific concern in your response. What is the issue, what effect might that have on FEI, etc.

3.1.1.1 Please explain whether FEI has discussed these concerns with Westcoast. What was the result of those discussions?

3.1.2 If not, please explain on the record what FEI's understanding is of Westcoast's processes and capabilities.

Response:

FEI has no general or specific concerns with Westcoast's integrity management processes and capabilities based on the confidential information-sharing between Westcoast and FEI, including high-level technical information shared between the operators to date.

Moreover, no concerns have been raised in publicly available assessments of Westcoast by the Canada Energy Regulator (previously known as the National Energy Board or NEB). The following information was published in the Transportation Safety Board of Canada report on the 2018 Westcoast T-South failure near Prince George, and includes information on the NEB's assessments of Westcoast's integrity management processes and capabilities:

- The NEB issued Notices to Resume Work or of Measures Satisfied after it [Westcoast] was demonstrated that the relevant segments of pipeline were fit for service to safely operate at their respective maximum operating pressures.
- […] field inspections were performed to verify that regulatory requirements were being met.
- Technical meetings were held with Westcoast to evaluate crack detection tool reliability and run validation processes.

- […] Westcoast's integrity management practices were examined to verify that regulatory requirements were being met.

The Canada Energy Regulator's report does not identify any outstanding concerns or corrective actions that it required Westcoast to undertake.

Further, FEI did not note any general or specific concerns based on the confidential information-sharing between Westcoast and FEI.

4.0 Reference: Project Need

Exhibit B-15, Responses to BCUC IR's 1.2, 1.5, 6.1, 8.4, 10.6

Minimum Resiliency Planning Objective

Preamble: FEI states:

- "In other words, meeting (but not exceeding) the MRPO would still leave FEI exposed to no-flow events longer than three days. For that reason, FEI is proposing a 3 Bcf tank, which provides a resiliency margin above the MRPO and the potential to realize ancillary benefits." **(Response to BCUC IR 1.2);**
- "FEI is not seeking approval of the MRPO in principle or for general application, and such approval is not required…. " **(Response to BCUC IR 8.4);** and
- "FEI is pursuing a suite of resiliency investments. As discussed in Section 3 of the Application, FEI believes the three key elements that contribute to natural gas system resiliency (Diverse Pipelines and Supply, Ample Storage, and Load Management Capabilities) all require enhancing.

  The TLSE Project addresses the Ample Storage element of resiliency by providing FEI with sufficient on-system storage to withstand and recover from short-duration, high-deliverability events while also realizing other ancillary benefits for its customers. FEI is also working on infrastructure options to address the other two elements:

  - FEI filed a CPCN application with the BCUC for the implementation of Advanced Metering Infrastructure (AMI). A benefit of AMI is that it will improve FEI's ability to manage load on the system in the event of an emergency (i.e., Load Management Capability).
  - FEI is completing the initial scoping and planning for a Regional Gas Supply Diversity (RGSD) solution which would entail building a new pipeline route to the Lower Mainland connecting to the Southern Crossing Pipeline (SCP) in the BC Interior (i.e., Diverse Pipelines). The design of the RGSD project would be optimally sized to form a cost-effective resiliency solution in combination with FEI's other gas supply assets. The RGSD project would enhance gas supply resiliency by providing needed pipeline diversity in the region, as well other benefits, including helping to serve load growth in the region and assisting with the transition to a lower carbon energy future.

  In summary, RGSD, AMI and the TLSE Project in combination are required to meet FEI's long term resiliency needs; however, the TLSE Project is the most cost-effective and optimal solution to address the risk of a no-flow event underlying the MRPO." **(Response to BCUC IR 10.6).**

4.1 Please confirm that FEI views its resiliency planning objective as the underpinning of this Application?

Response:

The Minimum Resiliency Planning Objective (MRPO) is important, but the characterization in the question is too simplistic.

The fundamental underpinning of the Application is the recognition that FEI's Lower Mainland system would currently experience widespread and lengthy outages on the first day of a no-flow event on the T-South system if it were to occur at almost any time during the winter heating season (please also refer to the response to BCUC IR2 78.1 for additional information regarding the regasification capacity constraint at the Tilbury site (MMcf/day) that gives rise to this situation and the days where FEI cannot meet daily demand). The TLSE Project is needed to improve FEI's ability to maintain continuity of service and avoid widespread and lengthy service outages in the event that the supply of upstream natural gas is disrupted. Further, the TLSE Project will continue to provide gas supply and operational benefits from the facility by replacing the existing plant and equipment that is over 50 years old.

FEI agrees that the MRPO is an important element of the Application in the sense that, as discussed in the response to BCOAPO IR1 1.5, it is a way of articulating the risk and resiliency need in the Lower Mainland associated with a no-flow event on the T-South system—the single largest supply risk facing FEI. So, it would be correct that the regasification (measured in MMcf/day) or storage (measured in Bcf) requirements would likely be different from what FEI has proposed if the BCUC was to determine that it is prepared to accept an outcome of widespread and prolonged outages in the Lower Mainland on the first day of a no-flow event occurring in winter, or a different assessment from FEI's as to how long a no-flow period could last. To be clear, FEI believes strongly that such an approach would be contrary to the interests of customers and the province more generally.

4.2 Please clarify whether FEI's evidence is that approval of the TLSE CPCN is necessary to meet its MRPO, which is needed to address one of the key elements (i.e. Ample Storage) of natural gas system resiliency?

Response:

Among storage, pipelines, and load management, on-system storage is the only practical and cost-effective way to meet the MRPO for the following reasons:

- Load management does not add supply resources, but rather makes it more efficient for FEI to disconnect customers when faced with supply shortages.

- In order for a new pipeline to the Lower Mainland to provide sufficient supply to meet peak loads during a winter no-flow event it would have to be constructed with a capacity that would not be cost effective. In order to ensure a pipeline was capable of providing immediate response in the hours after a no-flow event, the pipeline would have to remain in a stand-by state with significant surplus capacity that is at odds with how pipelines typically operate. For these reasons, FEI has characterized pipelines as providing complementary resiliency with respect to longer duration constraints.

- There is no off-system storage that can be reliably accessed in winter if the T-South system is not functioning, nor can FEI rely on material support from Mt. Hayes for the Lower Mainland. Physical pipeline flows and system hydraulics do not allow for it.

The proposed TLSE Project is the most cost-effective and least-impactful way (i.e., versus a greenfield site) to provide on-system storage that will allow FEI to meet the MRPO. This requires addressing both regasification capacity (measured in MMcf/day) and storage capacity (measured in Bcf). As explained in the response to BCUC IR2 78.1, FEI's current regasification capacity is insufficient to support the single-day load in winter, and even if that constraint could theoretically be removed on its own (which is impractical), the Base Plant tank is still much too small to support the Lower Mainland load for the duration of a three-day no-flow event.

4.3 Please confirm that the TLSE Project is part of larger resource plan that considers a suite of resiliency investments? Please provide a general description of how this Project fits within that plan.

Response:

Confirmed. The TLSE Project is part of FEI's plans that consider a suite of resiliency investments. Details of how the Project fits within FEI's short- to long-term strategy to enhance system resiliency was provided in Appendix C of the Application (Annual Contracting Plan Compliance Report). In general, the Project is one component of a cost-effective portfolio approach to resiliency, which aims to enhance all three elements of a resilient gas system:

- Providing immediate response capabilities through increased storage to ensure survival of FEI's Lower Mainland system during a critical supply emergency;

- Diversifying its pipeline assets (i.e., the RGSD Project) to help FEI withstand a longer-term interruption or constraint on the T-South system; and

- Implementing Advanced Metering Infrastructure to enable FEI to avoid an uncontrolled shutdown in extreme events, and initiate a controlled shutdown and restoration if necessary.

The 2018 T-South Incident (which has underscored the need for increased system resiliency) occurred shortly after FEI filed its last Long Term Gas Resource Plan (LTGRP) in 2017. The upcoming 2022 LTGRP, expected to be filed in March 2022, will further explore FEI's resiliency strategy in alignment with Appendix C of the Application and the elements described above. Consistent with the identification of infrastructure requirements in past resource plans, FEI will discuss the resiliency strategy and the suite of resiliency investments in the 2022 LTGRP; however, the approval for these investments will be sought through separate CPCN applications (as in the case of the TLSE Project through this proceeding).

4.4 Did FEI consider expediting its 2022 LTRP to consider FEI's resilience investment portfolio including the TLSE Project and those projects identified in response to IR BCUC 14.6, such that a holistic review including rate impacts could be undertaken? Please explain why or why not.

Response:

FEI has not considered expediting the submission of the 2022 Long Term Gas Resource Plan (LTGRP). The LTGRP considers a wide range of issues, risks, and opportunities for delivering energy services to customers over a 20-year planning horizon. It is not always possible to align the timing of the review of all ongoing and rapidly changing issues and projects such that a complete review of all contemplated projects are included within any given iteration of the LTGRP. If FEI changed the timing of the 2022 LTGRP to include investigations into one issue or set of CPCNs, it would be to the detriment of being able to fully assess another issue or other CPCNs. For example, expediting the 2022 LTGRP to address resiliency requirements prior to the TLSE Application would prevent the inclusion of a complete assessment of demand-side management opportunities in the LTGRP because the Conservation Potential Review would not have been completed in time. FEI's resource planning process is necessarily lengthy and involves coordination of many activities within a constantly changing planning environment. As such, it is not an easily expedited process.

4.5 Please discuss whether, in FEI's view, the three key elements (Storage, Load Management, and Pipeline Diversity) identified should be weighted equally or not.

That is, is each key element equally important to achieve resiliency in the natural gas distribution system served by the T-South pipeline or is there a ranking/weight to be applied to each key element in any process attempting to achieve or assess resiliency?

Response:

The three key elements (Storage, Load Management, and Pipeline Diversity), are not resiliency objectives in and of themselves. Therefore, it is not appropriate to assign a generic ranking/weight in advance to each key element when attempting to achieve or assess resiliency. Instead, any identified solutions must be evaluated on their own merits for their contribution towards achieving the stated resiliency goals.

As discussed in the Application, a major disruption on the T-South system is the greatest supply risk facing FEI at present, and the threat is greatest for customers in the Lower Mainland. The most critical link that requires enhancement in FEI's gas supply chain is on-system storage in the Lower Mainland. As described in the Application, on-system storage would significantly enhance system resiliency, given that accessing more on-system storage (more regasification capacity (measured in MMcf/day) plus a larger tank (measured in Bcf)) provides FEI greater control to withstand and recover from an extreme event, such as a major gas supply disruption on the T-South system.

There are certain gas supply aspects that storage in the Lower Mainland cannot protect against, and that is where Pipeline Diversity comes into play. Specifically, long-term access to pipeline capacity extends the amount of time that FEI can withstand an outage or constraint on the T-South system, and would allow FEI to continue to serve a larger amount of load once on-system storage resources are depleted. FEI anticipates that, given the significant expected cost of constructing a pipeline, the resiliency benefits would be only part of the rationale for a pipeline project.

Finally, Load Management capability, such as that offered by Advanced Metering Infrastructure, is an important tool because it buys time and allows a controlled shutdown response once all other supply options are exhausted; however, without the TLSE Project, FEI would have to shed very significant amounts of the Lower Mainland load in winter to avoid a hydraulic collapse on the first day of the no-flow event (please also refer to the response to BCUC IR2 78.1). Widespread load shedding in response to a supply disruption is still a very undesirable outcome as it has a direct and negative impact on FEI's customers, as well as significant "knock-on" effects for the province as a whole. The business case for AMI is based primarily on factors other than resiliency.

4.6 Please discuss whether the BCUC approval of the TLSE CPCN would inherently demonstrate regulatory support for FEI's resiliency objective? Why or why not?

Response:

FEI disagrees with the proposition in the question, as FEI considers it to be an overstatement.

BCUC approval of the TLSE CPCN would indicate that the BCUC has found that there is a need for the TLSE Project and that the Project is in the public interest. As stated in the response to BCUC IR1 8.4, FEI is not seeking approval of the MRPO in principle or for general application, and such approval is not required. However, FEI would expect that part of the BCUC's rationale for approving the Project would be that the BCUC accepts that there is a resiliency risk that needs to be addressed, whether or not it accepts the specific articulation of that risk as set out in the MRPO. FEI has also identified ancillary benefits in the Application that could inform the BCUC's decision.

5.0 Reference: PROJECT COSTS, ACCOUNTING TREATMENT AND RATES

Exhibit B-17, Responses to BCOAPO IR 6.3, 7.3

Exhibit B-15, Response to BCUC IR 14.6

Project Costs, Rate Impacts

5.1 Please provide the actual total costs incurred to the end of September 2021 (or as current as possible) related to the TLSE project.

Response:

The actual costs incurred to the end of September 2021 are $14.542 million. This includes approximately $14.015 million of Project development costs and $0.527 million of Application costs. FEI notes the $14.015 million of Project development costs include the Preliminary Stage Development Costs of $1.546 million, which were actuals up to March 31, 2020 (as discussed in Section 6.4.4 of the Application and in the response to BCOAPO IR1 10.1).

5.2 Please briefly discuss the factors driving the 2022 forecast 8.07% Delivery Rate increase provided in response to BCOAPO IR 7.3.

Response:

FEI provided a detailed explanation of the factors driving the 2022 forecast delivery rate increase of 8.07 percent in the FEI Annual Review for 2022 Delivery Rates Application (2022 Annual Review) and in the responses to information requests in that proceeding. These materials can be found on the BCUC website.[4]

In the response to BCUC IR1 1.4 in the 2022 Annual Review proceeding, FEI provided the following table breaking down the 8.07 percent increase by each component of the revenue requirement:

[4] https://www.bcuc.com/OurWork/ViewProceeding?ApplicationId=910.

Components	Figure 1-1 ($ millions)	%
Demand Forecast	(2.275)	(0.26%)
Other Revenue	0.359	0.04%
Net O&M	1.850	0.21%
Depreciation	8.512	0.96%
Deferral Amortization	19.037	2.15%
Financing and Return on Equity	8.928	1.01%
Taxes	(0.215)	(0.02%)
Elimination of Accumulated Revenue Surplus	35.287	3.98%
Total Deficiency	71.483	8.07%
Non-Bypass Margin at 2021 Approved Rates	885.532	

As the table above shows, the primary drivers of the delivery rate increase are the elimination of the accumulated revenue surplus and an increase in deferral amortization. The increase in deferral amortization is primarily caused by increased amortization of the Demand-Side Management deferral account and a debit amortization of the 2020-2024 Flow-through deferral account primarily due to lower revenues than forecast.

5.3 Please provide an explanation of the illustrative rate impact chart provided in response to BCUC IR 14.6 including what the y-axis is intending to show, and how the year-over-year effective rate increases were derived.

Response:

The graph in the response to BCUC IR1 14.6 shows: 1) the cumulative annual rate increase in percentage from 2020 to 2030 when compared to 2020 rates (i.e., the stacked area graph); and 2) the year-over-year (or current year compared to previous year) effective rate changes due to the CPCN/OIC projects identified (i.e., the red line). As highlighted in the graph and in the response to BCUC IR1 14.6, these rate impacts do not include any offsetting revenue resulting from increased capacity/demand or Rate Schedule 46 revenues. The actual rate impact in the individual years is not dependent on these projects alone as there are many factors beyond these projects that will affect FEI's revenue requirement.

The y-axis of the graph shows the effective rate impact (both cumulative and year-over-year) in percentage. For the cumulative rate impact, the percentage in any given year is the sum of the

incremental cost of service for the projects shown divided by the non-bypass delivery margin before the major projects. For example, the 2027 cumulative rate impact of 22.4 percent is calculated based on the sum of the incremental cost of service due to the projects identified, which is $285 million,[5] divided by the 2020 approved non-bypass revenue of $1,272 million excluding the identified CPCN/OIC projects (i.e., $285 / $1,272 = 22.4 percent).

The year-over-year effective rate change is a relative change in percentage between the current year and the previous year. For example, the 2027 year-over-year effective rate change is calculated based on the difference in the incremental cost of service for the projects between 2026 and 2027 divided by the total 2026 non-bypass revenue. Please refer to the table below for an illustration of the 2027 year-over-year effective rate change.

Line	Particular	Reference	Amount
1	2026 Cumulative Incremental Cost of Service due to CPCN/OIC Projects Identified ($ millions)		239
2	2027 Cumulative Incremental Cost of Service due to CPCN/OIC Projects Identified ($ millions)		285
3	Year-over-Year Change ($ millions)	Line 2 - Line 1	46
4			
5	2020 Non-bypass Revenue (exclude CPCN/OIC Projects) ($ millions)		1,272
6	2026 Cumulative Incremental Cost of Service due to CPCN/OIC Projects Identified ($ millions)	Line 1	239
7	2026 Non-bypass Revenue (include CPCN/OIC Projects) ($ millions)	Line 5 + Line 6	1,512
8			
9	Year-over-Year Change (%)	Line 3 / Line 7	3.04%

5.4 Please expand the table provided in response to BCOAPO IR 6.3 to include each of the CPCN/OIC Projects identified in your response to BCUC IR 14.6.

Response:

FEI notes that the response to BCUC IR1 14.6 showed effective rate impacts (including delivery, midstream, and commodity) whereas the response to BCOAPO IR1 6.3 showed only the delivery rate impact. FEI has responded to this IR demonstrating impacts on delivery rates only.

An amended version of the table provided in the response to BCOAPO IR1 6.3, which includes all CPCN/OIC projects identified in BCUC IR1 14.6, is provided below. The total cumulative delivery rate impact from these projects when compared to the 2021 approved delivery rates is 32.45 percent (Line 34), which averages to 5.41 percent per year over the six-year period (2021 to 2027).

FEI reiterates its statement in its response to BCUC IR1 14.6 that "the figure below is illustrative only and does not represent FEI's estimated rate increase for the years shown". As previously explained, the incremental cost of service for the projects below do not include any offsetting

[5] Please refer to BCOAPO IR2 5.4 for the breakdown of the $285.392 million by CPCN/OIC projects.

revenues resulting from increased capacity/demand or Rate Schedule 46 revenues that would offset the rate impact of Tilbury Phase 1A and Phase 1B. Furthermore, there are many other factors that would impact FEI's revenue requirement such as the demand forecast, taxes, O&M expenses, and other capital additions.

Line	Particulars	Reference	Amount ($ millions)
1	2021 Approved Delivery Margin, non-bypass ($ millions)	G-319-20	879.479
2			
3	Tilbury LNG Storage Expansion (TLSE)	Table 6-6 of Application (2027)	79.799
4	Cumulative Delivery Rate Impact in 2027 (TLSE)	Line 3 / Line 1	9.07%
5			
6	Inland Gas Upgrades (IGU)		36.040
7	Cumulative Delivery Rate Impact in 2027 (IGU)	Line 6 / Line 1	4.10%
8			
9	Pattullo Gas Line Replacement (PGR)		13.765
10	Cumulative Delivery Rate Impact in 2027 (PGR)	Line 9 / Line 1	1.57%
11			
12	Okanagan Capacity Upgrades (OCU)		21.110
13	Cumulative Delivery Rate Impact in 2027 (OCU)	Line 12 / Line 1	2.40%
14			
15	Transmission Integrity Management Capabilities (TIMC-CTS)		11.472
16	Cumulative Delivery Rate Impact in 2027 (TIMC-CTS)	Line 15 / Line 1	1.30%
17			
18	Transmission Integrity Management Capabilities (TIMC-ITS)		11.461
19	Cumulative Delivery Rate Impact in 2027 (TIMC-ITS)	Line 18 / Line 1	1.30%
20			
21	Automated Metering Infrastructure (AMI)		42.036
22	Cumulative Delivery Rate Impact in 2027 (AMI)	Line 21 / Line 1	4.78%
23			
24	OIC - Coastal Transmission System Expansion (CTS)		14.588
25	Cumulative Delivery Rate Impact in 2027 (OIC-CTS)	Line 24 / Line 1	1.66%
26			
27	OIC - Tilbury Phase 1A (T1A)		55.120
28	Cumulative Delivery Rate Impact in 2027 (OIC-T1A)	Line 27 / Line 1	6.27%
29			
30	OIC - Tilbury Phase 1B (T1B)	See Note 1	-
31	Cumulative Delivery Rate Impact in 2027 (OIC-T1B)	Line 30 / Line 1	0.00%
32			
33	**Total Incremental Cost of Service in 2027**	**Sum of Line 3, 6, 9, 12, 15, 18, 21, 24, 27, 30**	**285.392**
34	**Cumulative Delivery Rate Impact in 2027**	**Line 33 / Line 1**	**32.45%**
35	**Average per year (2021 to 2027)**	**Line 34 / 6 years**	**5.41%**

Note 1: The 2027 incremental cost of service for T1B is zero as the estimated year when the assets enter rate base is 2028.

5.5 Please provide FEI's total rate base additions when all construction is completed, and all capital costs have entered FEI's rate base, associated with the CPCN/OIC Projects identified in your response to BCUC IR 14.6.

Response:

The total rate base additions (actual and forecast) due to the CPCN/OIC projects identified in FEI's response to BCUC IR1 14.6 are $3,329 million. Please refer to the table below for the actual/forecast amount as well as the year when each project enters FEI's rate base.

Line	Project	Actual/Forecast Amount ($ millions)	Actual/Forecast Year when all assets enter rate base
1	OIC - Coastal Transmission System Expansion (CTS)	166	2018
2	OIC - Tilbury Phase 1A (T1A)	495	2019
3	Pattullo Gas Line Replacement (PGR)	160	2024
4	Okanagan Capacity Upgrades (OCU)	271	2024
5	Inland Gas Upgrades (IGU)	360	2025
6	Transmission Integrity Management Capabilities (TIMC-CTS)	125	2026
7	Tilbury LNG Storage Expansion (TLSE)	752	2027
8	Advanced Metering Infrastructure (AMI)	476	2027
9	Transmission Integrity Management Capabilities (TIMC-ITS)	125	2028
10	OIC - Tilbury Phase 1B (T1B)	400	2028
Total		**3,329**	

5.6 Has FEI developed a rate mitigation plan/strategy to moderate the rate impacts associated with the numerous projects identified in response to BCUC IR 14.6. If yes, please provide a copy of the plan. If no, please explain why not?

Response:

FEI has not developed a formal rate mitigation plan or strategy associated with the projects identified in its response to BCUC IR1 14.6. Such a plan would be premature and may not be needed, as FEI does not know what the rate increases will be in those years when approved projects enter rate base, particularly when considering the potential for revenues that offset those or other rate increases.

Once the actual rate impacts are known, and if rate mitigation measures are required, FEI would consider such measures as part of an annual review or revenue requirements application. These

processes are the appropriate place to consider rate mitigation strategies because the rate impacts of major projects can be viewed holistically with all of the costs and revenues forecast for a given year or years. Through the revenue requirements or annual review proceedings, FEI (and the BCUC and interveners) can consider not only the costs of the projects at the time they enter rate base, but also any increased demand or cost reductions that can help offset those costs, and the timing of those costs/revenues, thus providing a full picture of all the factors impacting rates in a given year.

As an example, even though over the 2017 through 2019 period FEI had an approximate 5 percent delivery rate increase due to the investments in the CTS and Tilbury 1A projects, the approved delivery rate increase over that period was limited to 0.7 percent. This is because during that time period FEI had increases in demand and also cost decreases that helped to offset the project capital costs and bring those projects into rate base without a significant rate impact. This further demonstrates that the timing of when rate increases occur is not always directly correlated with when the major projects enter rate base.

Accordingly, FEI will continue to seek opportunities to mitigate and/or smooth rate increases in the future, and if such opportunities arise, FEI will bring these forward for consideration in future annual reviews or revenue requirement applications.

5.7 Please provide FEI's definition of affordability (as it relates to its ratepayers).

5.8 Please provide the metrics or measures FEI uses to assess the current and future affordability of its service to ratepayers?

5.9 Does, in FEI's planning and rates projection processes, the utility incorporate considerations of affordability in its decision-making?

5.9.1 If so, please describe when, how and how often?

5.9.2 If not, why does affordability not factor into those decisions?

Response:

FEI does not have a specific definition of affordability, nor does FEI believe such a definition is required or useful. Considerations regarding affordability are relative to both individual customer circumstances and the economy as a whole, and extend more broadly than FEI's rates charged for delivering energy to customers. This is why, from a customer service standpoint, FEI works with customers on an individual basis to tailor support to a customer's specific circumstance.

As explained in the response to BCOAPO IR2 5.6, FEI assesses the rate impact of its forecast cost of service as part of the revenue requirement process and, when appropriate, proposes rate mitigation strategies to smooth its annual delivery rate changes to the extent possible. FEI also considers affordability in its energy conservation measures that help to reduce bills (but not rates).

Despite current requirements to address necessary safety, reliability, integrity and resiliency investments through its major projects, FEI's goal continues to be to provide reliable and cost-effective service to customers.

6.0 Reference: PROJECT COSTS, ACCOUNTING TREATMENT AND RATES

Exhibit B-15, Response to BCUC IR 23.4

Regulatory Oversight

Preamble: FEI states:

> "A summary construction and in-service schedule for the TLSE Project, which includes construction of the new 3 Bcf storage tank, is provided in Table 5-9 of the Application. A more detailed schedule is included within Confidential Appendix L. This schedule is contingent on many factors and should not be seen as final; however, it is indicative of the expected sequence and overall duration of the design, construction and commissioning period. As noted in the response to CEC Confidential IR1 84.1, the in-service date for the TLSE Project is now expected to be in Q2 of 2027 as a result of some delays in both the BCUC and EA regulatory processes.
>
> The capacity and construction sequence of the Liquefaction Facility will be dependent on the LNG market. While the timing is subject to commercial uncertainty, the currently anticipated in-service date is 2028. As an indication, should the Liquefaction Facility be constructed to furnish the maximum envisioned size, the projected design and construction timeline is approximately 60 months from the beginning of Front-End Engineering (FEED). FEED would be undertaken when and if commercial agreements are in place."

6.1 Given the magnitude of the TLSE Project ($770 million)[6] and the Class 3 accuracy range (-20% to +30%)[7] provided in this Application, please explain FEI's views on the appropriate level of regulatory oversight required over the course of the project, assuming approval of the CPCN. As part of FEI's response, please provide the nature, scope and timeframes of any reports it views appropriately filed with the BCUC as well as the process for report review, and material cost changes or other significant project impacts that may materialize.

Response:

FEI clarifies that the TLSE Project cost estimate (which has been prepared to a Class 3 level of definition consistent with the BCUC CPCN Guidelines) has an expected accuracy range of -17 to +20 percent at an 80 percent confidence interval as described in Table 5-7 of the Application.

As with recent BCUC decisions on other FEI CPCN applications, and in consideration of the magnitude of the TLSE Project cost estimate, FEI anticipates that an appropriate level of

[6] Exhibit B-1, Application, page 1.
[7] Exhibit B-1, Application, page 134.

regulatory oversight over the course of the Project may include the following reporting regime, which has four elements (including their scope and timeframes):

- **Contract Finalization Report:** to be filed within 30 days of the finalization of the construction contract, which is expected to be complete in 60 days following the final negotiated contract with the construction contractor and receipt of firm bids.
- **Periodic Progress Reports:** starting three months after the finalization of the construction contract and outlining actual costs incurred to date, these reports (to be filed within 30 days of the end of each reporting period) contain an updated forecast of costs, project progress, and the status of project risks.
- **Material Change Reports:** these reports identify and explain any significant delays or material cost variances (as applicable) and the reasons for each delay or cost variance. These reports also include FEI's consideration of project risks, the options available to, and actions taken by, FEI to address the issue. FEI would file material change reports as soon as practicable and in any event within 30 days of the date on which the material change occurs.
- **Final Report:** this concluding report would include a breakdown of the final project costs compared to the initial cost estimates, including an explanation and justification of any material cost variances. FEI would file the Final Report within six months of the Project's in-service date.

The reporting requirements and the process (if any) to review the reports is for the BCUC to determine.

7.0 Reference: CONSULTATION

Exhibit B-15, Response to BCUC IR 7.1

Customer Research

Preamble: FEI states:

> "FEI periodically surveys a sampling of customers to gain insights on various topics. In March 2021, members of the FortisBC MyVoice community panel were asked to provide feedback on FortisBC's gas and electric infrastructure resiliency. In total, 2,125 community panel members participated in the survey which is provided as Attachment 7.1."

7.1 Please confirm that the survey, the survey questions, and the analysis of the survey results were all prepared internally by FEI? If no, please provide the name of the organization and the terms of reference for the engagement.

Response:

Confirmed, FEI prepared the survey and its questions. FEI also analyzed the results except for an open-ended question that it contracted Sentis Market Research to code manually. Please refer to the response to BCOAPO IR2 7.1.1 for the verbatim analysis of the open-ended question.

7.1.1 Please file a full copy of the survey and the survey results.

Response:

Please refer to Attachment 7.1.1 for the following documents:

- Attachment 7.1.1A - Infrastructure resiliency survey – questionnaire
- Attachment 7.1.1B - Infrastructure resiliency – survey report
- Attachment 7.1.1C - Infrastructure resiliency survey – verbatim analysis summary

7.2 Please explain FEI's views on whether the 2,125 participants who completed the survey are considered representative of FEI's total customer base of nearly a million customers?

Response:

FEI is of the view that the 2,125 MyVoice participants who completed the survey are similar to the total customer base. Whether a community panel like MyVoice, or a vendor managed panel, statistical reliability cannot be ascribed to the results as the sample is not random. Even so, this does not negate the value of the information gathered from the MyVoice participants. Further, while randomly selecting members of its customer base using a telephone survey would generally be considered to provide representative results, FEI's decision to use MyVoice is supported by other research contexts. For example, in the context of research in the food and health care industries the "…results from an outside sample and an insight community were similar."[8] FEI is not aware of any evidence that importance ratings of service factors meaningfully vary by different customer aggregations. MyVoice provided timely insights into customer attitudes about resiliency investments at no incremental cost. Therefore, FEI is confident that the panel reflects its customer base's perceptions and is appropriate for the investigation.

7.3 Please explain FEI's views on whether the demographic makeup of the 2,125 participants who completed the survey are considered representative of FEI's total customer base?

Response:

Please refer to the response to BCOAPO IR2 7.2.

7.4 Please explain whether the survey delineated between gas and electric infrastructure? If such a delineation was made, please provide the results separately for gas and electric infrastructure. If not, of the total 2,125 participants, how many were natural gas customers?

[8] Should Market Researchers Be Worried About Bias in Insight Communities? (informaconnect.com).

Response:

The survey did not differentiate between gas and electric infrastructure. Of the total 2,125 participants, 1,775 were natural gas customers.

7.5 Please explain whether, in FEI's view, these 2,125 participants were provided with adequate information to offer informed input rooted in a cost/benefit analysis of resiliency as defined in the survey?

Response:

The survey's purpose was not meant to "offer informed input rooted in a cost/benefit analysis." FEI described why it chose not to directly evaluate customers' willingness to pay for additional resiliency investments in the response to BCUC IR1 7.1.

7.6 Did FEI take steps to ensure the survey was crafted in such a way as to avoid inherent bias in the wording that might skew the results? If so, how was this achieved? If not, why not?

Response:

Market researchers at FEI follow the Canadian Research Insights Council (CRIC) Canadian Code of Market, Opinion, and Social Research and Data Analytics.[9] This organization sets standards for Canadian market research organizations. FEI is not an accredited member, but the CRIC's standards represent the most appropriate guidelines for FEI research practices.

To complete this particular research project, an FEI market researcher met with members of the TLSE Project team to understand their research needs. This activity informed a draft survey that was cross-checked with another FEI researcher to validate the questionnaire design, logic, clarity and appropriateness of each question. Biased questionnaire design and associated questions are not permissible under the CRIC standards.

Whether the survey draft is created by an external research company or FEI, it proceeds through a rigorous internal review process. The survey design process is iterative and the survey was sent

[9] https://canadianresearchinsightscouncil.ca/standards/. FEI Research does not currently use or insist on the use of the CRIC Research Verification Service.

to the TLSE Project team several times for comments and suggestions before it was distributed to respondents.

FEI is confident that the steps undertaken for this and other internally led surveys effectively minimize the chance that bias or other inappropriate research practices impact survey results.

8.0 Reference: Consultation

Exhibit B-15 BCUC IR's 7.1, 7.5; Exhibit B-16 BCOAPO IR 3.3

Customer Research

Preamble: FEI states:

> "Table 3 shows that respondents rated the importance of all energy service aspects more than nine points on a ten-point scale. Performance was rated slightly less for most aspects, meaning that FortisBC is underperforming these aspects relative to customers' expectations. However, the underperformance is minimal for most aspects, as the gaps are small. The exception is the service aspect "delivering your energy at a reasonable cost", where customers feel that the cost of energy is too high, in relation to the services they receive." **(Attachment 7,1, page 4)**;
>
> Respondents emphasized the importance for FEI to be proactive rather than reactive in their disaster response plan, and as such, expect FEI to make necessary and prudent infrastructure investments." **(Response to IR BCUC 7.5, page 40)**;
>
> "Table 1 below shows the percentage of respondents who rated the importance of the noted FortisBC energy service aspects, as eight, nine or ten, on a ten-point scale where one is "not at all important" and ten is "extremely important"" **(Attachment 7.1, page 1); and**
>
> "Respondents were asked to rate FortisBC's performance on several energy service aspects, using a ten-point scale, where one is "very poor" and ten is "very good". **(Attachment 7.1, page 2)**

8.1 Please confirm that 89% of respondents state that the cost of energy service is highly important[10].

Response:

Confirmed, 89 percent of respondents rated "delivering your energy at a reasonable cost" as an 8, 9, or 10 on the ten point scale, with 10 meaning "extremely important". FEI agrees these scores can be collectively characterized as "highly important."

[10] Attachment 7.1, Table 1, page 1, 89%.

8.2 Please confirm that 4% of respondents (approximately 60 respondents of 1500) state that being proactive rather than reactive is important.

Response:

Confirmed. FEI asked all survey respondents to share the reasons they considered when rating the importance of "having a resilient energy network that can withstand and recover from extreme disruption events." Approximately 1,500 respondents shared their reasons, and of these, 60 (or 4 percent of) respondents stated that being proactive rather than reactive is important.

For context, the reasons shared were unaided, top-of-mind responses (i.e., respondents were not given a set of choices to select from). Therefore, the focus of the results on the potential adverse impacts a severe emergency would have on their personal lives, rather than the role FEI might play in mitigating extensive or long-term service disruptions, is not unexpected.

8.3 Please clarify whether "No past experience with service disruptions" (5%) and "Experience with past service disruptions" (2%) are to be interpreted as meaning the same[11]?

Response:

These comment categories are distinct and should not be interpreted as having the same meaning. For clarity, FEI provides examples of verbatim responses from respondents that indicated they have either experienced service disruptions or have not experienced service disruptions.

Respondents who have not experienced service disruptions stated:

- I've not had occasion to consider this as I've never experienced a disruption event.
- I haven't experienced an extreme disruption so I can't rate that category. I would hope that you are well prepared for any event.
- Have not had any disruptions to use as an example of efficiency.

Respondents who have experienced service disruptions stated:

- I lived through the Ice Storm in Ontario in 1998. I was without electricity for 9 days and then it was sporadic after that for about two weeks. It was horrible and I never want to go through that again no matter what the cause.

[11] Response to BCUC IR 7.5, Table 2, page 39.

- Having experienced power outages during the winter months that lasted from 6 to 24 hours the same would apply to gas delivery. If there is no access to gas service and the furnace does not work the outcome could be dire.
- Have experienced loss once for 2 weeks.... not good!

8.4 Please provide the full 10-point scale for each question in the survey. For example, for questions related to Energy Service Aspects - Important where one is "not at all important", ten is "extremely important", please provide how two, three, four, five, six, seven, eight, and nine of the 10-point scale were characterized. Similarly, for those Energy Service Aspect - Performance questions that used the ten-point scale where one is "very poor" and ten is "very good", please provide how each point, two through nine, were characterized.

Response:

Examples of the survey structure and language follows. Only scores 1 (Not at all important/Very poor) and 10 (Extremely important/Very good) were described. Intermediate scores were presented numerically. Please refer to Attachment 7.1.1A provided in the response to BCOAPO IR2 7.1.1, for a copy of the infrastructure resiliency survey.

8.5 Please clarify whether respondent comments related to Performance Ratings were extracted from the respondent comments provided "when rating the importance of having a resilient energy network that can withstand and recover from extreme disruption events"[12]. If yes, please explain why. If not, please provide the details including the number of participants and a list of all the comments provided.

Response:

Yes, open-ended comments were requested after respondents were presented with the following question:

> ***Continue thinking about the importance of FortisBC's services. On a 10-point scale, where 1 is "Not at all important" and 10 is "Extremely important", please rate the following services according to their importance to you.***

[12] Response to BCUC IR 7.5, Table 2, page 39 compared to respondent comments, Attachment 7.1, page 2.

Not at all important

2

3

4

5

6

7

8

9

Extremely important

Don't know / unsure

- *Having reliable energy service that can withstand and recover from minor disruption events (e.g., typical storms, minor system damage)*
- *Keeping you informed during service disruptions*
- *Restoring service quickly after it has been disrupted*
- *Delivering your energy at a reasonable cost*
- *Having a resilient energy network that can withstand and recover from extreme disruption events (e.g., severe weather-related disasters, deliberate system damage or cyber-attacks)*

Respondents were then asked the following open ended question:

Open Ended:

What reasons did you consider when rating the importance of the last item above: Having a resilient energy network that can withstand and recover from extreme disruption events?

This approach allowed FEI to gather top-of-mind insights from customers to understand the underlying factors that influenced their importance rating for network resiliency. There were 1,504 completed verbatim responses to the open ended question. The content analysis to code the comments was conducted by Sentis Market Research.

Attachment 2.1

DATE: 9/1/2021

MEMO

FROM: Wayne Bryce, President & CEO
TO: Paul Chernikhowsky, Director, Regulatory Projects and Resource Planning
paul.chernikhowsky@fortisbc.com

RE: TLSE Support Proposal

JANA is pleased to support to FortisBC in the TLSE CPCN Submission, as follows:

Scope of Work

Probabilistic analysis of a pipeline incident occurrence on the Westcoast T-South System

Deliverables

- Response to BCUC IR1 1.5 regarding TLSE CPCN submission
- JANA White Paper with detail on analysis

Completion Date

September 8th, 2021

Fee

[redacted]

Terms

To be billed upon completion under the existing retainer contract, with reference to "TLSE CPCN"

Attachment 7.1.1A

Infrastructure resiliency - JS

Introduction
Instruction

We're seeking your opinion on several aspects of FortisBC's services. We'd like you to consider how important these services are to you and how well they are being performed. This survey will take about four to five minutes to complete, and will give you an automatic entry into our quarterly prize draw.

Overall satisfaction
Single Choice Question : Slider

We would like your opinion of the overall service provided by FortisBC. On a 10-point scale where 1 is “Not at all satisfied” and 10 is “Fully satisfied", how satisfied are you with the overall service provided by FortisBC?

- Not at all satisfied
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- Fully satisfied

Importance - general
Single Choice Grid : Sliders

Now, we'd like you to think about the importance of FortisBC's services. On a 10-point scale, where 1 is "Not at all important" and 10 is "Extremely important", please rate the following services according to their importance to you.

- Not at all important
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- Extremely important
- Don't know / unsure

- Having staff that are courteous and respectful
- Making it easy for you to manage your account
- Making it easy for you to speak directly with a FortisBC representative
- Having knowledgeable staff
- Resolving your issues in a timely manner
- Providing a bill that is easy to understand
- Providing a bill that is accurate
- Providing comprehensive online information about your home's energy use

Importance - reliability and resilience

Single Choice Grid : Sliders

Continue thinking about the importance of FortisBC's services. On a 10-point scale, where 1 is "Not at all important" and 10 is "Extremely important", please rate the following services according to their importance to you.

- Not at all important
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- Extremely important
- Don't know / unsure

  - Having reliable energy service that can withstand and recover from minor disruption events (e.g., typical storms, minor system damage)
  - Keeping you informed during service disruptions
  - Restoring service quickly after it has been disrupted
  - Delivering your energy at a reasonable cost
  - Having a resilient energy network that can withstand and recover from extreme disruption events (e.g., severe weather-related disasters, deliberate system damage or cyber-attacks)

Reasons for score selection

Open Ended : No Validation

What reasons did you consider when rating the importance of the last item above: Having a resilient energy network that can withstand and recover from extreme disruption events ?

-

Service ratings - general

Single Choice Grid : Sliders

Now, think about FortisBC's service quality, rather than "importance". On a 10-point scale, where 1 is "Very poor" and 10 is "Very good", please rate how we're doing on each of the following service aspects.

- Very poor
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- Very good
- Don't know / unsure

  - Having staff that are courteous and respectful
  - Making it easy for you to manage your account
  - Making it easy for you to speak directly with a FortisBC representative
  - Having knowledgeable staff
  - Resolving your issues in a timely manner
  - Providing a bill that is easy to understand
  - Providing a bill that is accurate
  - Providing comprehensive online information about your home's energy use

Service ratings - reliability and resilience

Single Choice Grid : Sliders

Continue thinking about FortisBC's service quality. On a 10-point scale, where 1 is "Very poor" and 10 is "Very good", please rate how we're doing on each of the following service aspects.

- Very poor
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- Very good
- Don't know / unsure

  - Having reliable energy service that can withstand and recover from minor disruption events (e.g., typical storms, minor system damage)
  - Keeping you informed during service disruptions
  - Restoring service quickly after it has been disrupted
  - Delivering your energy at a reasonable cost
  - Having a resilient energy network that can withstand and recover from extreme disruption events (e.g., severe weather-related disasters, deliberate system damage or cyber-attacks)

Risk comparison

Single Choice Question : Slider

Almost done!Comparing today to ten years ago, do you feel energy utilities are facing more or less risk from extreme events like severe weather, deliberate system damage and cyber attacks?

- Much less risk
- Less risk
- Same risk level
- More risk
- Much more risk
- Don't know / unsure

Survey end - MyVoice Member Hub redirect

Type of Termination Point: Redirect
Reason for Termination: Complete
Redirect to: URL
Redirect URL: https://www.myvoicefortisbc.com/hub
Message to display to respondent: Thank you for completing this survey. Your feedback is important to us, and has given you an automatic entry into our quarterly prize contest.Have you checked out our member hub? Click the Finish button below to login and browse all the new content.

Attachment 7.1.1B

Report #2(Survey: Infrastructure resiliency - JS)

Dataset Type: Live

Total: 2125 participants

Data Options: Complete

Exported: 11:20AM Oct 05, 2021

Q1. Overall satisfaction (Single Choice)

We would like your opinion of the overall service provided by FortisBC. On a 10-point scale where 1 is “Not at all satisfied” and 10 is “Fully satisfied", how satisfied are you with the overall service provided by FortisBC?

Total: 2125 responses

		Total
Total		2125
1	Not at all satisfied	10
		0%
2	2	10
		0%
3	3	13
		1%
4	4	20
		1%
5	5	97
		5%
6	6	100
		5%
7	7	192
		9%
8	8	445
		21%
9	9	474
		22%
10	Fully satisfied	764
		36%

Q2. Importance - general (Single Choice Grid)

Now, we'd like you to think about the importance of FortisBC's services. On a 10-point scale, where 1 is "Not at all important" and 10 is "Extremely important", please rate the following services according to their importance to you.

Total: 2125 responses

	Not at all important	2	3	4	5	6	7	8	9	Extremely important	Don't know / unsure
Having staff that are courteous and respectful	4	4	1	5	30	33	83	267	343	1157	198
	0%	0%	0%	0%	1%	2%	4%	13%	16%	54%	9%
Making it easy for you to manage your account	7	5	5	6	29	60	112	323	412	1130	36
	0%	0%	0%	0%	1%	3%	5%	15%	19%	53%	2%
Making it easy for you to speak directly with a FortisBC representative	9	2	17	15	57	79	127	272	354	961	232
	0%	0%	1%	1%	3%	4%	6%	13%	17%	45%	11%
Having knowledgeable staff	5	3	2	9	25	30	76	257	382	1128	208
	0%	0%	0%	0%	1%	1%	4%	12%	18%	53%	10%
Resolving your issues in a timely manner	4	3	5	2	23	20	92	220	343	1172	241
	0%	0%	0%	0%	1%	1%	4%	10%	16%	55%	11%
Providing a bill that is easy to understand	4	1	6	11	27	47	96	269	414	1232	18
	0%	0%	0%	1%	1%	2%	5%	13%	19%	58%	1%
Providing a bill that is accurate	6	3	1	7	20	20	64	172	257	1522	53
	0%	0%	0%	0%	1%	1%	3%	8%	12%	72%	2%
Providing comprehensive online information about your home's energy use	13	6	17	10	81	114	213	426	403	789	53
	1%	0%	1%	0%	4%	5%	10%	20%	19%	37%	2%

Q3. Importance - reliability and resilience (Single Choice Grid)

Continue thinking about the importance of FortisBC's services. On a 10-point scale, where 1 is "Not at all important" and 10 is "Extremely important", please rate the following services according to their importance to you.

Total: 2125 responses

	Not at all important	2	3	4	5	6	7	8	9	Extremely important	Don't know / unsure
Having reliable energy service that can withstand and recover from minor disruption events (e.g., typical storms, minor system damage)	5	3	2	3	19	25	60	175	337	1439	57
	0%	0%	0%	0%	1%	1%	3%	8%	16%	68%	3%
Keeping you informed during service disruptions	5	7	13	12	34	43	111	268	365	1147	120
	0%	0%	1%	1%	2%	2%	5%	13%	17%	54%	6%
Restoring service quickly after it has been disrupted	3	3	3	4	18	32	67	144	313	1424	114
	0%	0%	0%	0%	1%	2%	3%	7%	15%	67%	5%
Delivering your energy at a reasonable cost	11	7	11	7	41	52	73	128	216	1553	26
	1%	0%	1%	0%	2%	2%	3%	6%	10%	73%	1%
Having a resilient energy network that can withstand and recover from extreme disruption events (e.g., severe weather-related disasters, deliberate system damage or cyber-attacks)	4	4	4	4	23	24	84	168	343	1340	127
	0%	0%	0%	0%	1%	1%	4%	8%	16%	63%	6%

Reasons for score selection (Open End)

What reasons did you consider when rating the importance of the last item above: Having a resilient energy network that can withstand and recover from extreme disruption events ?

See attached summary verbatim analysis report.
Total: 2125 responses

Service ratings - general (Single Choice Grid)

Now, think about FortisBC's service quality, rather than "importance". On a 10-point scale, where 1 is "Very poor" and 10 is "Very good", please rate how we're doing on each of the following service aspects.

Total: 2125 responses

	Very poor	2	3	4	5	6	7	8	9	Very good	Don't know / unsure
Having staff that are courteous and respectful	6	1	3	3	42	39	82	225	341	807	576
	0%	0%	0%	0%	2%	2%	4%	11%	16%	38%	27%
Making it easy for you to manage your account	7	9	11	8	35	70	160	347	447	919	112
	0%	0%	1%	0%	2%	3%	8%	16%	21%	43%	5%
Making it easy for you to speak directly with a FortisBC representative	9	6	13	19	55	74	141	274	273	611	650
	0%	0%	1%	1%	3%	3%	7%	13%	13%	29%	31%
Having knowledgeable staff	5	2	5	9	33	45	100	251	343	700	632
	0%	0%	0%	0%	2%	2%	5%	12%	16%	33%	30%
Resolving your issues in a timely manner	15	5	9	10	46	44	112	246	330	627	681
	1%	0%	0%	0%	2%	2%	5%	12%	16%	30%	32%
Providing a bill that is easy to understand	13	11	11	13	39	75	178	383	436	936	30
	1%	1%	1%	1%	2%	4%	8%	18%	21%	44%	1%
Providing a bill that is accurate	7	7	10	9	33	54	126	276	401	1026	176
	0%	0%	0%	0%	2%	3%	6%	13%	19%	48%	8%
Providing comprehensive online information about your home's energy use	9	12	17	21	73	111	210	374	373	712	213
	0%	1%	1%	1%	3%	5%	10%	18%	18%	34%	10%

Service ratings - reliability and resilience (Single Choice Grid)

Continue thinking about FortisBC's service quality. On a 10-point scale, where 1 is "Very poor" and 10 is "Very good", please rate how we're doing on each of the following service aspects.

Total: 2125 responses

	Very poor	2	3	4	5	6	7	8	9	Very good	Don't know / unsure
Having reliable energy service that can withstand and recover from minor disruption events (e.g., typical storms, minor system damage)	9	3	18	11	43	61	143	308	352	735	442
	0%	0%	1%	1%	2%	3%	7%	14%	17%	35%	21%
Keeping you informed during service disruptions	24	22	39	41	99	102	159	273	269	489	608
	1%	1%	2%	2%	5%	5%	7%	13%	13%	23%	29%
Restoring service quickly after it has been disrupted	10	10	10	15	54	62	131	306	313	653	561
	0%	0%	0%	1%	3%	3%	6%	14%	15%	31%	26%
Delivering your energy at a reasonable cost	82	28	57	81	165	221	270	377	280	465	99
	4%	1%	3%	4%	8%	10%	13%	18%	13%	22%	5%
Having a resilient energy network that can withstand and recover from extreme disruption events (e.g., severe weather-related disasters, deliberate system damage or cyber-attacks)	12	4	13	21	67	72	125	260	258	542	751
	1%	0%	1%	1%	3%	3%	6%	12%	12%	26%	35%

Risk comparison (Single Choice)

Almost done! Comparing today to ten years ago, do you feel energy utilities are facing more or less risk from extreme events like severe weather, deliberate system damage and cyber attacks?

Total: 2125 responses

		Total
	Total	2125
1	Much less risk	29
		1%
2	Less risk	126
		6%
3	Same risk level	358
		17%
4	More risk	954
		45%
5	Much more risk	446
		21%
6	Don't know / unsure	212
		10%

Attachment 7.1.1C

Infrastructure Resiliency – MyVoice Panel Survey Results – Verbatim Analysis

April 28, 2021

Verbatim Analysis

Respondents were asked to share the reasons they considered when rating the **importance** of "having a resilient energy network that can withstand and recover from extreme disruption events". Approximately fifteen hundred respondents shared their reasons. The most common theme, cited by one quarter of respondents, was centered on the importance of personal comfort and maintaining energy for heating, hot water and running appliances in their homes. One fifth of respondents cited concerns about potential catastrophic events such as earthquakes and cyber-attacks, specifically noting the recent gas disruptions in Texas. Other concerns included medical and security issues. Respondents noted the importance for FortisBC to be proactive rather than reactive in their disaster response plan. A number of respondents noted the low probability of disastrous events occurring and preferred FortisBC to focus on improving current infrastructure before preparing for rare catastrophic events. Some respondents did not feel spending on resiliency was warranted based on the risk, and did want these costs passed onto consumers.

Table 4 shows the common themes from the responses and the percentage of responses with each theme.

Reason	**Percentage of reasons cited**
Comfort: heating, hot water, running appliances	25%
General need for consistent service with quick recovery after a disruption	22%
Concerns about weather, earthquakes, cyber-attacks, world disaster events	16%
Medical reasons, safety or security	8%
No past experience with service disruptions	5%
Important to be proactive, rather than reactive	4%
Consistent connection required for working at home and running businesses	3%
Want FortisBC to focus on improving infrastructure before preparing for rare catastrophic events	2%
Costs – do not want costs passed onto the consumer	2%
Experience with past service disruptions	2%
Low probability of disastrous events occurring	2%
Have access to alternate energy sources	1%

Table 4. Reasons for rating importance of having a resilient energy network
Total sample; Unweighted; base n = 1502; total n = 2125; 623 missing

The following is a sample of verbatim feedback from the respondents:

- *I rely on gas for heating, cooking, hot water and have only minimum electricity as a backup therefore gas service is extremely important to me.*

- *For us it is health related, if we have no power, heat etc. we would be very compromised. My husband is in a hospital bed and needs a ceiling lift to get to his wheelchair. Without power we would be in trouble, so having a good network to recover from disasters is very important.*

- *I rely on power to work from home, dealing with customers online and cannot have disruptions during calls.*

- *I lived through the ice storm in Ontario in 1998. I was without electricity for nine days and then it was sporadic after that for about two weeks. It was horrible and I never want to go through that again no matter what the cause.*

- *Extreme disruptions are no longer as uncommon as they once were. It seems that almost monthly, somewhere across North America, there is some sort of extreme disruption or another. An energy network that is both resilient and recoverable is getting to be a higher and higher priority.*

- *Look what happened in Texas this winter... we don't want that to happen here.*

- *I don't think cyber disruption is prioritized nearly enough by many organization leaders.*

- *Even though it is important to be able to recover in a timely manner, it is also understandable that an unreasonable amount of money should not be invested to withstand an event that is unlikely to occur.*