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July 7, 2022

Commercial Energy Consumers Association of British Columbia
c/o Owen Bird Law Corporation
P.O. Box 49130
Three Bentall Centre
2900 – 595 Burrard Street
Vancouver, BC
V7X 1J5

Attention: Mr. Christopher P. Weafer

Dear Mr. Weafer:

Re: FortisBC Inc. (FBC)

2021 Long-Term Electric Resource Plan (LTERP) and Long-Term Demand-Side Management Plan (LT DSM Plan) (Application) – Project No. 159924

Response to the Commercial Energy Consumers Association of British Columbia (CEC) Information Request (IR) No. 3 on Rebuttal Evidence

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On August 4, 2021, FBC filed the Application referenced above. In accordance with the regulatory timetable established in British Columbia Utilities Commission Order G-130-22 for the review of the Application, FBC respectfully submits the attached response to CEC IR No. 3 on Rebuttal Evidence.

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

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC INC.

Original signed:

Diane Roy

Attachments
cc (email only): Commission Secretary
Registered Parties

85. Reference: Exhibit B-21, Q5

> **Q5: How does resiliency differ from reliability?**
>
> A5: FBC defines reliability consistent with FEI's definition in Section 3.2.1.2 of the TLSE Application, which is as follows:
>
> > Reliability refers to designing and operating a system to ensure it meets the expected customer demand at all times, and is a combination of two concepts: adequacy and security. Adequacy refers to the ability to ensure a sufficient supply of energy, whereas security refers to the ability to consistently deliver that supply to customers.
>
> As noted in the definition of resiliency above, reliability is required to achieve resiliency and so resiliency builds on reliability. A reliable system is one in which supply and demand are balanced to keep electricity flowing and is robust enough to minimize the risk of disruptions. A resilient system is one that is able to quickly and efficiently restore the electricity flow after an outage has occurred. The more robust and reliable the system is, the better it is able to lower the impact of outages on customers and increase the system's resiliency.

85.1 Is it fair to say that reliability relates to the ability of the system to withstand negative events without being impacted (prevention of system loss), whereas resiliency relates to the system's ability to recover quickly from a negative event in which it was impacted (recovery from system loss)? Please explain why or why not.

Response:

FBC agrees that reliability relates to the ability of the system to withstand negative events without being impacted (prevention of system loss), as this characterization is generally consistent with FBC's definition of a reliable system as one that provides a consistent flow of electricity and is robust enough to minimize the risk of disruptions.[1]

FBC agrees that resiliency includes the system's ability to recover quickly from a negative event by which it was impacted (recovery from system loss). However, this describes only one aspect of resiliency as resiliency also includes the ability to prevent and withstand system failures or unforeseen events, as well as recover from them.

[1] Exhibit B-21 - FBC's Rebuttal Evidence, page 3.

86. Reference: Exhibit B-21, pages Exhibit B-21, Q6

> **3.0 FBC'S APPROACH TO RESILIENCY IS COMPREHENSIVE AND PROACTIVE**
>
> **Q6: Midgard states that "FortisBC claims that "geographic diversity" and "operational flexibility" are the sum of its resiliency needs." Is this true?**
>
> A6: No. FBC selected two resiliency attributes, geographic diversity and operational flexibility, for the purposes of its LTERP portfolio analysis. These attributes, along with others relating to cost, the environment and economic factors, were selected to help assess the potential supply-side resource portfolios at a high level appropriate for long-term resource planning. They were not meant to represent a complete or exhaustive list of all the resiliency attributes that FBC considers relevant and important in its long-term planning. FBC's resiliency requirements extend to the operational flexibility and diversity of its existing supply-side resource portfolio, in order to manage short-term sudden and disruptive events, as well as the resiliency of its transmission and distribution system, including plans for implementing strategies to maintain reliable and resilient assets and mitigate climate-related risks.

86.1 Please provide a list of the key failure risks that FBC considers in managing its resiliency and the resiliency attributes that FBC seeks to mitigate those risks.

Eg.	Risk	Resiliency Attribute
	Supply loss in a given area	Geographic Supply diversity
	Lost transmission line	N-1
	Data attack affecting system	

Response:

FBC understands this IR to be asking about resiliency risks within the context of the long-term resource planning process. For a general discussion of risks to FBC's system, please refer to sections 8 and 9 of the FBC Business Risk Assessment in Appendix B of FortisBC's evidence for Stage 1 of the cost of capital proceeding.[2]

The three examples of risks listed by the CEC in the IR above are the three key resiliency risks that FBC seeks to mitigate, as follows:

- Supply loss in a given area could be mitigated by FBC's contingency resources discussed in the response to BCUC Panel IR1 5.1. Supply loss in a given area could be mitigated through geographic supply diversity and operational flexibility, such as provided by an SCGT plant, as described in response to BCUC IR3 65.2.

[2] Online at: DOC_65494_B1-8-1-FEI-FBC-Evidence-on-Stage1-Appendices.pdf (bcuc.com).

- In order to mitigate transmission-related risks, FBC currently follows the requirements set out in the BC Mandatory Reliability Standards (MRS) Transmission Planning (TPL) Standards, approved by the BCUC, to test and manage the reliability and resiliency of the FBC transmission system. FBC takes into consideration single and multiple failure events and relies on appropriate remedial action schemes to maintain system integrity for events involving multiple elements. Geographic diversity and operational flexibility also help mitigate transmission-related risk as they, in general, make FBC less reliant on particular transmission assets for its supply. For example, as discussed in response to BCUC IR3 65.2, an SCGT plant that is located and interconnected in the Okanagan could provide prolonged local back-up power after an event that damages transmission infrastructure.
- Cyber-attacks that could impact system reliability and resiliency are considered through the FBC Corporate Security Risk Management Program, which uses a risk-based approach to protect critical systems. The program continually adapts to protect against existing and new threats by using daily threat intelligence from multiple third-party experts. From a resource planning-perspective, geographic supply diversity and operational flexibility again help mitigate the impacts of cyber attacks to the extent that they result in a supply loss or loss of transmission infrastructure.

As discussed in its Rebuttal Evidence, FBC expects to develop a more complete resiliency analysis through internal discussions during the development of the next LTERP. FBC then expects to discuss illustrative resiliency events with stakeholders, such as through the LTERP Resource Planning Advisory Group (RPAG) process, to help form the list of key failure risks that should be included in portfolio analysis, as well as gather input and feedback on potential resiliency attributes.

87. Reference: Exhibit B-21, Q7, page 5

> In terms of its transmission and distribution system planning, Section 6 of the LTERP discusses FBC's investments in the resiliency of its transmission and distribution system and how FBC's planning criteria require that the system be planned, designed and operated to serve all customer loads both during normal operations and during contingency operations (i.e. one system element out of service). FBC's planning criteria are consistent with those used by other utilities in the Western Interconnection. As discussed in the response to BCUC IR1 24.1, there are several ways in which FBC has been building climate resiliency using its standards and practices over time. For example:
>
> - FBC has been working to harden the power system to withstand higher wind speeds and other environmental factors through updated designs and material selection. A recent example is the rehabilitation work on the 63kV transmission line 27L to account for increased snow loading as this is a frequent environmental factor that impacts this line.
> - Substations that fall within a flood zone are redesigned and raised above the flood level when the stations are rebuilt. A recent example includes the Ruckles Substation Upgrade, which raised the site above the 1 in 200-year flood level and successfully avoided flooding damage in 2018.
> - FBC continues to enhance its system protection by upgrading distribution recloser protection to detect and clear faults faster, as well as providing communications-assisted system automation.

87.1 Does FBC consider that the above examples relate to the system's ability to avoid failure when tested by climate events, rather than recovering from a failure?

Response:

FBC considers that the above examples relate to the system's ability to both avoid failure and recover from failures due to climate events. The first two examples primarily relate to the system's ability to avoid failures when tested by climate events such as high winds and flooding. The third example primarily relates to the system's ability to recover from failures, as communications-assisted system automation acts to sectionalize faulted sections of line and quickly restore service to other customers.

88. Reference: Exhibit B-21, Q10

> **4.0 SCENARIO PLANNING**
>
> **Q10: Midgard claims in response to BCUC IR 3.1 that 'FBC has acknowledged in its LTERP application evidence that has not robustly tested its portfolio options for resilience when it stated: "At this point in time, there is too much uncertainty to know which of the scenarios, if any, will occur in the future."' In response to BCSEA IR 1.2, Midgard also claims based on the same statement that "FBC admits that its definition of resiliency does not involve testing for resiliency." Did FBC acknowledge or admit this?**
>
> A10: No. The quoted statement from the executive summary of the LTERP makes the non-controversial point that there is uncertainty as to which load scenario will actually unfold over the next 20 years. In short, FBC cannot foresee the future. It simply does not follow from this statement that FBC has acknowledged that it has not robustly tested its portfolio for resilience or that its definition of resiliency does not involve testing for resiliency.

88.1 Please confirm that good resiliency would ensure that the utility is prepared to capably respond to any scenario which occurs, involving recovery from a loss of service situation.

Response:

FBC does not consider it reasonable to expect the utility to be prepared to respond to "any scenario" involving a loss of service. There are some catastrophic scenarios that would be cost-prohibitive for FBC to plan to be able to respond to, such as for example, loss of all interconnections with BC Hydro.

Developing resiliency is an ongoing and iterative process and, as discussed in its Rebuttal Evidence (page 6), FBC continues to be proactive in its approach to resiliency and is taking further steps to improve its resiliency in responding to future disruptive events.

89. Reference: Exhibit B-21, Q11

> **Q11: Midgard describes scenario planning in section 3 of its evidence. How does FBC's scenario planning compare to what Midgard describes? In particular, has FBC tested 'alternative resource portfolios against future "extreme" or "surprise" scenarios that incorporate one (1) or more significant discontinuities from BAU'?**
>
> A11: FBC's scenario planning in the LTERP includes identifying emerging trends and technologies, i.e., load drivers, not reflected in the Reference Case load forecast and examining their potential uptake or penetration levels through load scenarios. These loads drivers included elements, not captured at all or in any material way, in FBC's historical trends, such as significant electric vehicle (EV) growth, temperature changes due to climate change, new large commercial and industrial loads (such as cryptocurrency facilities) and hydrogen production. Several alternative load scenarios based upon these potential load drivers were developed, to explore the potential increase or decrease in FBC's load requirements relative to the business as usual (BAU) load forecast. Therefore, the scenarios represent discontinuities, and not just extrapolation, of historical trends. FBC's portfolio analysis includes developing alternative resource portfolios to meet the Reference Case load forecast as well as the alternative load scenarios. Given the 20-year planning horizon of the LTERP, the load drivers and scenarios were developed to reflect emerging technologies and new load trends which have the potential to be relevant and impactful over the entire 20-year period.
>
> FBC's load drivers and scenarios did not include future "extreme" or "surprise" scenarios, such as those including significant climate/environmental/geologic disruptions, energy supply discontinuities, epidemics and pandemics, market crashes and financial collapses or wars, insurrections or malicious actors, included by RCIA in its evidence. FBC assumes these types of load drivers to be lower probability events and relatively short term in nature as compared to the load drivers included in the LTERP. FBC's system has proved to be reasonably resilient in response to significant climate and environmental disruptions, as noted in the response to Question 8 above, as well as pandemics and market and financial crises that have occurred over time. However, FBC has not explicitly tested alternative resource portfolios against future "extreme" or "surprise" scenarios as part of its LTERP portfolio analysis.

89.1 Please describe how FBC evaluated its system as being 'reasonably resilient' in response to pandemics and market and financial crises.

Response:

FBC has evaluated its system as being 'reasonably resilient' in response to pandemics and market and financial crises based on the continued reliable operation of its system during recent events. Supply chain issues related to the COVID-19 pandemic are ongoing and FBC has implemented the following strategies to adapt to recent challenges:

- Evaluating whether any projects can be safely rescheduled to accommodate higher costs on other projects that cannot be deferred;
- Using long-term supply contracts for many commonly used materials and service providers (e.g., engineering consultants, construction contractors, etc.);
- Competitively bidding large contracts for materials and services to market to ensure competitive pricing; and
- Communicating with critical suppliers and contractors to discuss issues and mitigation strategies.

89.2 Please provide a list of, and describe, the 'extreme' or 'surprise' scenarios that FBC did not test its alternative resource portfolios against.

Response:

As discussed in its Rebuttal Evidence (page 8), FBC has not explicitly tested alternative resource portfolios against future "extreme" or "surprise" scenarios as part of its LTERP portfolio analysis. RCIA's evidence includes a listing of these future "extreme" or "surprise" scenarios, including significant climate/environmental/geologic disruptions, energy supply discontinuities, epidemics and pandemics, market crashes and financial collapses or wars, insurrections or malicious actors. At this time, FBC has not determined if this is a complete list of future "extreme" or "surprise" scenarios nor does it have descriptions of them. FBC expects that these scenarios or events would be developed with input and feedback from stakeholders, such as through the LTERP Resource Planning Advisory Group (RPAG) process as part of the development of its next LTERP.[3]

89.3 What cost would be involved in examining the 'extreme' or 'surprise' scenarios that FBC has not examined, which while potentially low probability may have dramatic impactful consequences.

Response:

FBC does not know at this time what cost would be involved in examining the "extreme" or "surprise"' scenarios or events that FBC has not examined. This will be explored during the development of FBC's next LTERP.

[3] Exhibit B-21 – FBC's Rebuttal Evidence, page 11.

90. Reference: Exhibit B-21, Q12 and Q13, page 10

Q12: Midgard states: "In Midgard's opinion, FortisBC's alternative resource portfolios could be more compellingly evaluated against these resiliency elements by using a structured scenario planning approach, thereby testing the resiliency of each portfolio against plausible futures that feature significant discontinuities with the status quo assumptions upon which the LTERP forecasts are based." Does FBC agree that the scenario planning is the appropriate way to plan for resiliency?

A12: FBC does not agrees that scenario planning is the appropriate way to plan for resiliency. As discussed in the response to Question 11 above, the LTERP scenario planning is based on assessing the impacts of load drivers, not captured in any significant way in historical trends, on various resource portfolios over the 20-year planning horizon. The load drivers typically have the impact of increasing or decreasing the load requirements over the entire planning horizon and so are continuous and long lasting in nature. In order to incorporate resiliency in its portfolio analysis, FBC recommends that the various resource portfolios should be evaluated, or stress tested, against various resiliency metrics, such as those related to the more discrete short-term and low-probability "surprise" or "extreme" events. For example, how one portfolio compares to another portfolio in terms of resiliency to a specific potential flooding or wildfire event.

It is also important to plan for resiliency in terms of the transmission and distribution system. It is critical that both the supply-side resources and the transmission and distribution system are resilient in order to ensure FBC is able to prevent, withstand, and recover from system failures or unforeseen events. FBC takes a proactive approach in this regard, as discussed in Question 9 above.

Structured decision making is an approach for organized analysis of resource management decisions. It involves defining objectives, establishing evaluation criteria, developing alternatives and evaluating trade-offs so that a decision can be made. FBC has used this approach in its LTERP, developing several alternate portfolios and evaluating them based on several different attributes, relating to the objectives, and alternate load scenarios so that a preferred portfolio can be determined. FBC considers this approach to be appropriate for long-term resource planning as it enables the assessment of different portfolios against various attributes that relate to the planning objectives and alternate load scenarios. This method is also consistent with the BCUC Resource Planning Guidelines, which include the development of multiple resource portfolios and evaluation and selection of resource portfolios.

90.1 Please elaborate on how 'stress testing' the resource portfolios differs from the structured planning approach promoted by Midgard.

Response:

As discussed in FBC's Rebuttal Evidence, structured decision-making is an approach for organized analysis of resource management decisions. FBC has used this approach in its LTERP portfolio analysis by developing several alternate portfolios and evaluating them based on different attributes and load scenarios. However, FBC does not agree that scenario planning is the appropriate way to plan for resiliency, as suggested by RCIA in its Evidence. The LTERP scenario planning is based on assessing the impacts of load drivers, not captured in any significant way in historical trends, on various resource portfolios over the 20-year planning horizon. The load drivers typically have the impact of increasing or decreasing the load requirements over the entire planning horizon and so are continuous and long lasting in nature. In order to incorporate resiliency in its portfolio analysis, FBC recommends that the various resource portfolios should be evaluated, or stress tested, against various resiliency metrics, such as those related to the more discrete short-term and low-probability "surprise" or "extreme" events.

90.2 Please identify the resiliency metrics that FBC would or does use to stress test the portfolios.

Response:

In the 2021 LTERP, FBC evaluated the resiliency of alternative portfolios in terms of their geographic diversity and operational flexibility. For future LTERPs, FBC expects that it would stress test alternative portfolios against various "extreme" or "surprise" events, as discussed in its Rebuttal Evidence (page 11) and the response to CEC IR3 89.2.

90.3 When does FBC expect to conduct such 'stress testing', or is it already complete?

Response:

Please refer to the response to CEC IR3 90.2.

90.4 Will the Commission be provided with any further information related to the 'stress testing'? If yes, when will this be provided?

Response:

FBC expects that further information related to portfolio stress testing for resiliency will be provided to the BCUC and other RPAG members during the development of its next LTERP. Please also refer to the response to CEC IR3 89.2.

91. Reference: Exhibit B-21, Q15

> **Q15: Is FBC open to taking a different approach to resiliency in future LTERPs?**
>
> A15: While FBC's approach to resiliency has been appropriate and effective (as discussed in the previous responses), in light of the extreme and unpredictable weather events that have occurred in the recent past, FBC considers that it should expand its approach to more systematically considering resiliency in its next LTERP. This could include enhancing the LTERP portfolio analysis through the development of "extreme" or "surprise" events and evaluating various resource portfolios against these to assess, or stress-test, the portfolios' resiliency. FBC would need to develop an evaluation criteria for its portfolio analysis and likely need to include resiliency in its LTERP planning objectives. FBC would also need to consider the transmission and distribution system's ability to manage these types of events, as the interdependent relationship of supply-side resources and the system infrastructure should be considered in combination. However, FBC does not know, at this point, what incremental time and resources would be required to perform such analysis. Any enhanced approach to resiliency is something that FBC expects it would develop with input and feedback from stakeholders, such as through the LTERP Resource Planning Advisory Group (RPAG) process. Therefore, FBC recommends exploring this approach further and bringing forward recommendations as part of the development of its next LTERP.

91.1 Please confirm that costs related to resiliency planning and the future LTERP are recovered from ratepayers.

Response:

Confirmed.

91.2 Please provide an approximate time at which FBC would expect to provide its next LTERP.

Response:

Please refer to the response to BCUC IR3 64.2.

91.3 Please provide FBC's understanding as to whether it could potentially make use of resiliency planning processes undertaken by other utilities, and whether FBC has considered this option.

Response:

With respect to incorporating resiliency planning into its LTERP portfolio analysis, FBC does not have a full understanding at this time what processes are being undertaken by other utilities or if it could make use of any such processes from other utilities. However, FBC staff have been attending and participating in various events related to climate change adaptation and increasing their understanding of what other utilities are doing to include resiliency in their system planning processes. FBC could use this information to enhance its current processes, and will consider this as part of the development of its next LTERP.

With respect to resiliency planning for its transmission and distribution system, FBC's planning criteria require that the system be planned, designed, and operated to serve all customer load both during normal operations and during contingency operations (i.e., one system element out of service) and is consistent with those used by other utilities in the Western Interconnection.[4] In Section 6.6 of the LTERP, FBC discusses how the utility industry continues to discuss the need to be proactive in preparing and taking action to respond to climate change and improve the resiliency of the grid. Organizations such as the Institute of Electrical and Electronics Engineers and the Canadian Standards Association have discussed developing industry standards to support utilities in integrating considerations of climate change impacts.

FBC intends to be proactive regarding the resiliency of its system in light of climate change impacts.[5]

[4] Exhibit B-21 – FBC Rebuttal Evidence, page 5.
[5] Ibid, page 2.