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August 18, 2022

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

Attention: Ms. Sara Hardgrave, Acting Commission Secretary

Dear Ms. Hardgrave:

Re: FortisBC Inc. (FBC)

2021 Long-Term Electric Resource Plan (LTERP) and Long-Term Demand-Side Management Plan (LT DSM Plan) (Application) – Project No. 1599244

FBC Final Argument

In accordance with the regulatory timetable established in the British Columbia Utilities Commission (BCUC) Order G-199-22 for the review of the Application, FBC respectfully submits for filing its attached Final Argument in the above noted proceeding.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC INC.

Original signed:

Diane Roy

Attachments

cc (email only): Registered Parties

BRITISH COLUMBIA UTILITIES COMMISSION

FORTISBC INC.

2021 LONG-TERM ELECTRIC RESOURCE PLAN AND LONG-TERM DEMAND-SIDE MANAGEMENT PLAN

FINAL ARGUMENT OF

OF

FORTISBC INC.

AUGUST 18, 2022

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PART ONE: INTRODUCTION AND OVERVIEW

1. FortisBC Inc. (FBC) filed its 2021 Long-Term Electric Resource Plan (LTERP) and Long-Term Demand-Side Management Plan (LT DSM Plan) on August 4, 2021.[1] The LTERP presents FBC's long-term plan for meeting the forecast peak demand and energy requirements of customers with demand-side and supply-side resources over a 20-year planning horizon (2021 to 2040). This includes FBC's 12-step action plan (Action Plan) which describes the key activities that FBC intends to pursue over the next four years. FBC requests that the British Columbia Utilities Commission (BCUC) accept the LTERP, including the LT DSM Plan, as being in the public interest pursuant to section 44.1(6) of the *Utilities Commission Act* (UCA).[2]

2. The 2021 LTERP is intended to meet the following objectives,[3] which the BCUC accepted as being in the public interest in its Decision and Order G-117-18 on FBC's 2016 LTRP (at p. 4):

- Ensure cost-effective, secure and reliable power for customers;
- Provide cost-effective demand side management and customer solutions that help meet FBC's and BC's environmental goals, and
- Ensure consistency with provincial energy objectives (for example, the applicable objectives in the *Clean Energy Act* (CEA) and the CleanBC Plan).

3. The analysis in the LTERP shows that FBC does not require any new supply-side resources until 2030, based on the Reference Case load forecast, existing resources and contracts in place, continued access to reliable and cost-effective market energy, and the proposed level of DSM. After 2030, FBC requires additional generation resources, primarily for capacity purposes. FBC's portfolio analysis provides a high-level indication of the potential combination of resources that could meet future requirements.[4] Given that FBC's load scenarios show that there are a number of load drivers that have the potential to significantly

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[1] Exhibit B-1.

[2] FBC does not view BCUC acceptance of the 2021 LTERP as providing approval for any rate, project, program, or expenditure for which it would otherwise be required to seek approval under the UCA. See Exhibit B-27, BCUC Panel IR2 6.3.1.

[3] Exhibit B-1, LTERP, p. 4.

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

impact FBC's load requirements over the planning horizon, FBC's Action Plan includes actions to monitor and actively manage load, as well as advance contingency supply plans that include the assessment of potential resource options identified in the LTERP in more detail in the next few years in case load materializes more quickly than expected.[5] Given that small changes in load could advance FBC's needs by several years,[6] and the long development timelines for new generation, FBC will likely need to initiate project development work numerous years in advance of physically needing the assets.[7] As such, FBC must begin the process of preparing to acquire new resources now, as it may take some time to fully define the available resources such that a request for a Certificate of Public Convenience and Necessity (CPCN) could be filed.

4. The LTERP and LT DSM Plan are comprehensive and detailed and provide robust support for FBC's long-term plan for the utility. FBC has provided detailed analysis in the body of the LTERP, with key supporting studies, including the Load Scenarios Assessment Report (Appendix G to the LTERP), Supply-Side Resource Options Report (Appendix K to the LTERP), Planning Reserve Margin Report (Appendix M of the LTERP) and the 2021 Conservation Potential Review (2021 CPR) (Appendix A of the LT DSM Plan.)

5. FBC's development of the LTERP and LT DSM Plan reflects the outcome of effective stakeholder, Indigenous, and community and customer engagement.[8] FBC convened a dedicated Resource Planning Advisory Group (RPAG), hosted a number of community engagement workshops to garner diverse perspectives on FBC's planning activities across the communities it serves, and surveyed customers to gain direct feedback. FBC also hosted multiple resource planning meetings with Indigenous community representatives located within its electric service territory. Additionally, FBC met with BCUC staff to discuss various resource planning topics. The information gathered through these activities is incorporated into the LTERP process, including informing FBC's planning and analysis, helping to determine preferred resource options and portfolios, and identifying long-term planning opportunities and

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5 Exhibit B-1, LTERP, pp. 214 to 217.

6 Exhibit B-6, BCSEA IR1 6.1.

7 Exhibit B-2, BCUC IR1 31.18.1 and 36.2.

8 Exhibit B-1, LTERP, Section 12.

areas of concern. As part of its Action Plan, FBC plans to continue with its engagement activities as part of the next long-term resource planning development process.[9]

6. The LTERP and LT DSM Plan also satisfy the legal and regulatory framework for a long-term resource plan filed under the UCA, including the requirements in section 44.1(2) of the UCA, the considerations in section 44.1(6) of the UCA, the BCUC's Resource Planning Guidelines and prior BCUC directions. Sections 1.4 and 1.5 of the LTERP set out each element of the legal framework with reference to where in the LTERP and LT DSM Plan they are satisfied.

7. Nine interveners[10] have participated in this proceeding; one intervener, the Residential Customer Intervener Association (RCIA), filed intervener evidence. Over the course of this proceeding, FBC responded to two rounds of IRs, filed Rebuttal Evidence in response to RCIA, and responded to IRs on its Rebuttal Evidence, and responded to two rounds of IRs from the BCUC Panel. FBC submits that the evidence in this proceeding is comprehensive and supports FBC's request that the LTERP and LT DSM Plan be accepted as being in the public interest.

8. In the remainder of this Final Submission, FBC addresses the key issues raised in this proceeding, organized as follows:

- Part Two: FBC's 2021 LT DSM Plan is in the public interest and should be accepted, as it demonstrates that FBC intends to reduce the anticipated pre-DSM demand by taking adequate, cost-effective demand-side measures, and FBC has reasonably explained why the further demand for energy to be served by the supply-side facilities and/or market purchases are not planned to be replaced by additional demand-side measures.
- Part Three: FBC's 2021 LTERP is in the public interest, as indicated by the following key points:

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9 Exhibit B-1, LTERP, p. ES-17.

10 These are: BC Sustainable Energy Association (BCSEA), BC Solar and Storage Industries Association (BCSSIA), Commercial Energy Consumers Association of BC (CEC), Industrial Consumers Group (ICG), 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 Tenants Resource and Advisory Centre (BCOAPO), Residential Consumer Intervener Association (RCIA), Movement of United Professionals (MoveUP), Columbia Power Corporation (CPC), Brilliant Power Corporation (BPC), Brilliant Expansion Power Corporation (BEPC) and Waneta Expansion Power Corporation (WEPC)(CPC, BPC, BEPC & WEPC), BC Hydro and Power Authority (BC Hydro).

- FBC reasonably plans to rely on capacity market purchases for the month of June until 2030 and to be capacity self-sufficient for all months after 2030;
- FBC intends to rely on the market to meet energy supply gaps beginning in 2023, consistent with the BCUC's Decision on FBC's 2016 LTERP;
- FBC plans to manage the impact of EV charging loads;
- FBC is taking appropriate actions to manage the potential for unplanned increases in load;
- FBC's preferred portfolio is in the public interest;
- FBC's transition to clean market purchases is in the public interest;
- FBC is proactively taking steps to adapt to climate change impacts; and
- FBC is proactively addressing resiliency and will consider more systematic approaches to evaluating resiliency in its next resource plan.

PART TWO: FBC'S 2021 LT DSM PLAN IS IN THE PUBLIC INTEREST

9. FBC's LTERP and LT DSM Plan demonstrate that FBC intends to pursue adequate, cost-effective DSM activities, and FBC requests that the BCUC accept the LT DSM plan as being in the public interest. In its Decision and Order G-117-18, the BCUC describes three key requirements relating to whether the LT DSM Plan is in the public interest. Namely, it must:[11]

- indicate how the public utility intends to reduce the anticipated pre-DSM demand by taking a cost-effective portfolio of demand-side measures (Cost Effectiveness);
- explain why the demand for energy to be served by the supply-side facilities and/or market purchases are not planned to be replaced by demand-side measures (Explanation); and
- contain, at a minimum, programs in three specific areas of low-Income households, rental accommodation, and education programming for students (Completeness).

10. FBC understands the intent of the Completeness criteria is that the LT DSM Plan meet the adequacy requirements of the *Demand-Side Measures Regulation* (DSM Regulation).

11. As set out below, FBC submits that its LT DSM Plan meets each of these key requirements.

A. The LT DSM Plan is Cost Effective

12. FBC submits that its LT DSM Plan demonstrates that FBC intends to reduce the anticipated pre-DSM demand by using a cost-effective portfolio of DSM measures as required under the DSM Regulation.

13. First, FBC's guiding principles to develop the LT DSM Plan include that it would only use a cost-effective portfolio of measures as indicated by the Total Resource Cost (TRC) ratio, except for adequacy measures required by the DSM Regulation. FBC's guiding principles for DSM measures ensure they are:

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[11] Decision and Order G-117-18, June 28, 2018, p. 10.

1. Customer focused by including a range of measures within program areas that address the key end-uses of the principal customer rate classes;
2. Cost effective by including only those measures, with the exception of adequacy measures, that have a Total Resource Cost (TRC) Benefit/Cost (B/C) ratio greater than unity on a portfolio basis (see Section 2.4); and
3. Compliant with the applicable sections of the UCA, the CEA, and the DSM Regulation.

14. The key indicator of cost effectiveness is the TRC. The TRC comprises benefits (the present value of a measure's energy savings over the effective measure life, valued at the utility's avoided costs) divided by the costs (incremental cost of measures plus program administration costs). Consistent with the DSM Regulation*,* FBC developed a long-run marginal cost (LRMC) for DSM purposes based on BC clean and renewable resources, of $90 per MWh, which reflects the cost of firm energy i.e., inclusive of generation capacity. Additionally, FBC used a Deferred Capital Expenditure (DCE) value of $51.22 per kW-year as its avoided capacity cost of deferred infrastructure, consistent with the methodology presented in Appendix C of FBC's 2017 DSM Expenditure Plan Application, accepted by the BCUC in its Decision and Order G-9-17.[12]

15. Second, FBC calculated the TRC test at the measure level in the 2021 Conservation Potential Review (2021 CPR) modelling tool[13] and screened out those measures that were not cost effective. Specifically, Residential measures were screened using the Modified Total Resource Cost Test (mTRC) per the DSM Regulation, while commercial and industrial measures were screened using the TRC. FBC screened only residential measures using the mTRC as, per section 4(1.5)(b)(iv) of the DSM Regulation, only 10 per cent of an electric utility's portfolio can pass the mTRC instead of the TRC, and residential measures tend to have lower TRC cost-effectiveness. In addition, measures in the low-income portfolio are subject to the mTRC

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12 Exhibit B-1, LTERP, p. 4; Exhibit B-2, BCUC IR1 38.1.

13 Exhibit B-1, LT DSM Plan, p. 8. The formula used by FBC when calculating the TRC and mTRC is listed as Equation 1 on page 30 of the Conservation Potential Review, included as Appendix A of the LT DSM Plan. The key assumptions used to calculate the TRC are listed in Table 1 on page 10 of the Conservation Potential Review, included as Appendix A of the LT DSM Plan. (Exhibit B-11, BCUC IR2 60.3.)

instead of the TRC and are predominantly residential measures.[14] As a result, all five of the DSM Scenarios pass the TRC test as all DSM Scenarios include the same portfolio of cost-effective DSM measures,[15] and differ only in the level of incentives for the measures.[16]

16. Third, for FBC's proposed Base DSM scenario, the CPR model estimates the portfolio TRC ratio to be 2.0, which is cost effective.[17] While FBC's LRMC appropriately takes into account the capacity savings benefits of the DSM measures,[18] the Base DSM Scenario would continue to be cost-effective even if an energy-only LRMC were used.[19]

B. FBC has Adequately Explained Why Demand Served is not Planned to be Replaced by DSM Measures

17. As set out below, FBC has provided a compelling explanation for why it has chosen the Base DSM Level as its preferred scenario in the LT DSM Plan.

18. First, FBC considered five potential DSM program scenarios: Low, Base, Med, High and Max. The DSM scenarios represent increasing levels of energy and capacity savings based on FBC paying levelized incentives to cover 50, 62, 72, 84 and 100 percent of incremental measure costs in FBC's DSM portfolio.[20] Table 3-1 from the LT DSM Plan, below, shows the projected energy and capacity savings and the average resource cost of the DSM scenarios, and the incremental cost of incurring higher incentive levels in Med, High and Max scenarios.[21] Note the *Incremental cost compared to base case ($/MWh)* row in Table 3-1 highlights the resource cost of the additional savings.

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14 Exhibit B-4, BCOAPO IR1 32.1.

15 Exhibit B-1, LT DSM Plan, p. 15.

16 As explained in Exhibit B-11, BCUC IR2 61.1, note that the market potential in the 2021 CPR is not a DSM scenario and that certain measures in the market potential were excluded from the DSM Scenarios.

17 Exhibit B-1, LT DSM Plan, p. 4.

18 Exhibit B-11, BCUC IR2 62.2 and 62.3.

19 Exhibit B-11, BCUC IR2 62.4.

20 As explained in Exhibit B-11, BCUC IR2 61.1, note that the market potential in the 2021 CPR is not a DSM scenario and that certain measures in the market potential were excluded from the DSM Scenarios.

21 Exhibit B-1, LT DSM Plan, pp. 13 to 15. The *Incremental cost compared to base case ($/MWh)* row in Table 3-1 highlights the resource cost of the additional savings.

Table 3-1: Key DSM Scenario Data

Category	DSM Scenario				
	Low	Base	Med	High	Max
Energy Savings, GWh					
Average per annum ('21 - '40)	21.0	21.8	22.4	23.4	25.2
Average per annum ('21 - '29)	26.8	28.0	29.4	31.4	34.5
Total (2021 to 2040)	421	435	449	468	503
Capacity Savings, MW					
Total (2021 to 2040)	61.6	64.0	65.6	68.1	72.7
Resource Cost, 2020 ($000s)					
Average Cost ($/MWh)	$38	$44	$49	$57	$75
Incremental cost compared to base case ($/MWh)	N/A	-	$183	$190	$234

19. FBC selected the Base DSM scenario as its preferred scenario in the LT DSM Plan, which can be characterized as a continuation of the 2016 LT DSM Plan's "High" scenario,[22] which was accepted by the BCUC in Decision and Order G-117-18 (at p. 12). FBC explained its choice of the Base DSM scenario, as follows[23]:

> Though the Low DSM scenario was more cost effective than the Base scenario, it was not chosen because:
>
> - The Base scenario maintains consistency with the previous DSM plan which had support from customers and stakeholders;
> - Transitioning to the Low scenario may require FBC to remove existing program offerings or reduce program incentives, potentially resulting in a reputational impact with customers and trade allies;
> - The Low scenario requires pullback of program offerings which limits FBC's ability to scale up programs in the future if new cost-effective measures are identified. Selecting the Base scenario provides flexibility to meet future market demands; and
> - The Base scenario includes additional budget to further investigate demand response (DR) programs that have the potential to cost-effectively defer capacity costs.

22 Exhibit B-4, BCOAPO IR1 40.1.

23 Exhibit B-1, LT DSM Plan, p. 17.

The Med, High and Max DSM scenarios were not chosen for the following reasons:

- They are less cost-effective than other resource options. FBC would be paying an increased incremental incentive proportion of measure costs, especially in comparison to the relatively low cost of power supply options, such as market electricity purchases; and
- They present higher risks of insufficient customer participation. DSM participation is voluntary and FBC cannot have assurance that customer participation will be sufficient to meet the higher scenarios. The fact that FBC had below-target energy savings in recent program results indicates that it may not be readily feasible to achieve higher levels of DSM.

20. In short, FBC chose the Base Scenario over the Med, High, or Max DSM Scenarios as the achievable savings amount of the Base Scenario was within 14 percent of the Max DSM Scenario, while having an average resource cost ($ per MWh) that was 41 percent lower than the Max DSM Scenario. While the Med, High, and Max DSM Scenarios are still cost effective, FBC considered the added costs would not result in significant enough benefits to justify significantly expanding the size of FBC's DSM programs and incentives.[24]

21. As stated by the BCUC Decision and Order G-117-18 (at p. 12), "the UCA does not compel FBC to pursue any and all DSM resources that are cost effective, but rather to provide an explanation for its choice of DSM scenarios." FBC submits that it has provided a compelling explanation for why it has chosen the Base DSM Scenario and that its explanation should be accepted.

C. The LT DSM Plan is Complete

22. FBC submits that the LT DSM Plan is complete, as it meets the adequacy requirements of the DSM Regulation. The LT DSM Plan portfolio includes programs for the Residential, Commercial, and Industrial customer classes, as well as low-income programs, portfolio-level supporting initiatives, and planning and evaluation activities required to support the DSM Plan. The LT DSM Plan was developed in compliance with the DSM Regulation, including program measures mandated to meet the DSM Regulation adequacy provisions, namely measures for

[24] Exhibit B-17, BCOAPO IR2 84.3.

rental and low-income customers, education (elementary and secondary), post-secondary schools, and specified codes and standards expenditures.[25]

23. The table below sets out the adequacy requirements of the DSM Regulation and the section and content of the LT DSM Plan that addresses the requirements.[26]

[25] Exhibit B-1, LT DSM Plan, p. 19.

[26] FBC notes that the section references in Table 1-1 of the LT DSM Plan are incorrect and that corrected references are provided in the table below.

B.C. Demand-Side Measures Regulation Adequacy Requirements

Section of the DSM Regulation	Adequacy Requirement	Section of LT DSM Plan Addressing Requirement
3(a)	A demand-side measure intended specifically (i) to assist residents of low-income households, or (ii) in housing owned or operated by certain entities, including local government and first nations, as described in the regulation	Section 4.2: FBC continues to offer energy saving opportunities for low-income customers including some Indigenous communities, low-income customers living independently, and low-income customers living in non-profit social housing. These offers are delivered through the Self Install Program, Direct Install Program and other initiatives.
3(b)	A demand-side measure intended specifically to improve the energy efficiency of rental accommodations	Section 4.1.4: The Rental Apartment Program offers no-cost walkthrough energy assessments and direct install of energy efficiency measures (such as screw-in light bulbs) to property managers of rental apartments. Additional technical and project management support is offered to encourage customers to implement the findings of the assessment.
3(c)	An education program for students enrolled in schools in the public utility's service area	Section 4.5.4: FBC, in collaboration with FortisBC Energy Inc. (FEI), offers an online education program that supports the development of energy education in BC classrooms. It provides high quality, engaging, curriculum-connected resources and programs that highlight the BC energy story and encourages a bias-balanced development of energy literacy in classrooms for kindergarten through to Grade 12. Virtual and live interactive Energy Is Awesome classroom presentations augment the on-line program. In addition, FBC provides funding support for several external third party non-profit educational organizations to deliver conservation messaging.
3(d)	An education program for students enrolled in post-secondary institutions in the public utility's service area	Section 4.5.4: FBC provides financial and in-kind support for post-secondary initiatives for curriculum-based class-room instruction, energy efficiency related curriculum development and

Section of the DSM Regulation	Adequacy Requirement	Section of LT DSM Plan Addressing Requirement
		broader campus-wide behaviour change programs.
3(e)	Provides financial or other resources to eligible recipients to support the development of standards respecting energy conservation or the efficient use of energy	Section 4.6.2: FBC collaborates with a number of international and national organizations such as the Consortium for Energy Efficiency and the Canadian Standards Association to set new efficiency standards for consumer electronics, appliances, and lighting products among other equipment and technologies.
3(f)	Measure(s) to support adoption by governments, including Indigenous communities, of a Step Code	Section 4.6.2: FBC also works with local, provincial, and federal governments who are setting policy and regulations to increase the minimum performance of electricity consuming equipment and/or as-built building performance level. The BC Energy Step Code is a notable example of such policies and regulations. FBC supports codes and standards policy development and research, through in-kind and financial co-funding arrangements to meet this adequacy requirement. Section 4.5.2: This element of Supporting Initiatives provides financial assistance to local governments, including Indigenous communities, and qualified institutions to facilitate energy efficiency planning activities like the development of community energy efficient strategic plans, energy efficient design practices and organizational policies like energy efficiency building code bylaws. The planning must be aimed at specifically reducing electricity usage and demand.

24. Consistent with FBC's past DSM expenditures schedules filed with the BCUC, FBC confirms that it intends to continue to pursue adequate, cost-effective demand-side measures and that this is reflected in its LT DSM Plan.

D. LT DSM Plan is a Guide that Informs, but does not Supplant, Detailed Planning

25. FBC submits that the LT DSM Plan should be considered a planning exercise that informs, but does not supplant, the detailed planning that is undertaken to develop programs in FBC's DSM expenditures plans.[27] While FBC submits that its DSM expenditure plans should be consistent with the resource planning goals of the LT DSM Plan and LTERP, they will not be identical.[28] Measures and programs proposed as part of FBC's DSM expenditure schedules will necessarily reflect detailed program design which considers factors not included in the LT DSM Plan, such as:[29]

- interactive effects or spillover potential with other DSM measures;
- Variation of savings and costs based on a more limited application of the DSM measure (e.g., only providing packaged terminal heat pumps to hotels and motels versus other building types);
- Revised savings and cost assumptions provided after the LT DSM planning process;
- Supporting measures on a project-by-project basis through the Performance Program; and
- Customer and industry demand and feedback.

26. For example, while the LT DSM Plan excludes non-cost-effective measures, FBC considers the bundling of cost-effective measures with non-cost-effective measures as part of program design during DSM expenditure planning. An example is FBC's Custom Efficiency Program, where customers implementing both cost-effective and non-cost-effective measures in the same project can obtain incentives from FBC, provided that overall program cost effectiveness is maintained.[30] However, whether in the LT DSM Plan or FBC's DSM expenditure planning, FBC intends to pursue adequate, cost-effective DSM in accordance with the DSM Regulation.

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27 Exhibit B-11, BCUC IR2 61.2.

28 E.g., at the program design level, FBC would consider also consider the net-to-gross ratio (Exhibit B-11, BCUC IR2 60.2).

29 Exhibit B-11, BCUC IR2 57.2.

30 Exhibit B-11, BCUC IR2 57.1.

PART THREE: FBC'S 2021 LTERP IS IN THE PUBLIC INTEREST

27. In this Part, FBC addresses the main topics explored in this proceeding related to the LTERP, with a focus on topics related to FBC's Action Plan. Due to the broad scope of this proceeding, FBC has not attempted to address every subject matter explored. To the extent that interveners raise topics in their submissions that FBC has not raised here, FBC will consider and respond in its Reply Submission.

28. FBC organizes this part around the following points:

- FBC reasonably plans to rely on capacity market purchases for the month of June until 2030 and to be capacity self-sufficient for all months after 2030;
- FBC intends to rely on the market to meet energy supply gaps beginning in 2023, consistent with the BCUC's Decision on FBC's 2016 LTERP;
- FBC plans to manage the impact of EV charging loads;
- FBC is taking appropriate actions to manage the potential for unplanned increases in load;
- FBC's preferred portfolio is in the public interest;
- FBC's transition to clean market purchases is in the public interest;
- FBC is proactively taking steps to adapt to climate change impacts; and
- FBC is proactively addressing resiliency and will consider more systematic approaches to evaluating resiliency in its next resource plan.

A. FBC Reasonably Plans to Rely on Firm Market Block Purchases for June Capacity Gaps until 2030 and to be capacity self-sufficient after 2030

29. FBC submits that its plan to rely on firm, fixed market block purchases for June capacity gaps until 2030 and to be capacity self-sufficient after 2030 is reasonable and in the public interest. In the subsections below, FBC describes the capacity gaps shown by its load-resource balance after DSM and describes its plan to meet the June capacity gaps.

(a) Load-Resource Balance Shows Capacity Gaps only in June up to 2030

30. FBC's LRB for annual capacity after the proposed level of DSM, as described in Section 9 of the LTERP, shows that capacity gaps up to 2030 occur only in the month of June based on the Reference Case load forecast:[31]

- **There are no winter capacity gaps that need to be filled until 2031:** Until 2030, based on the Reference Case peak load forecast after DSM, there would be surpluses of capacity for most years if FBC's Power Purchase Agreement with BC Hydro (PPA) is assumed to provide its full peak supply of 200 MW. After 2031, the capacity gaps increase until they reach approximately 175 MW by 2040 if the PPA is renewed. If the PPA is not renewed, then gaps in the order of approximately 375 MW occur by 2040. If FBC is able to shift the potential EV charging from peak demand periods, then the capacity gaps could be moved further out in time. With EV charging shifting of 50 percent, the capacity gaps begin in 2033 rather than 2031, increasing to approximately 100 MW by 2040 (assuming the PPA is renewed).

- **There are no summer[32] capacity gaps that need to be filled until 2030:** Until 2029, based on the Reference Case peak load forecast after DSM, there would be surpluses of capacity if the PPA is assumed to provide its full peak supply of 200 MW. After 2030, the capacity gaps increase until they reach approximately 180 MW by 2040 (assuming the PPA is renewed). If the PPA is not renewed, then gaps of approximately 380 MW occur by 2040. With EV charging shifting of 50 percent, the capacity gaps appear in 2031 rather than 2030. These increase to approximately 110 MW by 2040 if the PPA is renewed.

- **There are June capacity gaps in all years through 2040:** The capacity gaps increase until they reach approximately 230 MW by 2040 (assuming the PPA is renewed). If the PPA is not renewed, then gaps of approximately 430 MW occur by 2040. FBC's total existing capacity resources are lower in June which results in larger gaps during this month than in winter and summer periods. With EV charging shifting of 50 percent, the capacity gaps are about 150 MW by 2040 (assuming the PPA is renewed). If the PPA is not renewed, the gaps increase to about 350 MW by 2040.

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[31] Exhibit B-1, LTERP, pp ES-12 to ES-13 and Section 9.

[32] Summer peak demand typically occurs during July or August.

31. The table below provides the estimated number of hours per year, broken out by month, where FBC's Reference Case forecast peak demand exceeds FBC's existing capacity resources for the years 2021 through 2030.[33]

Estimated number of hours Demand exceeds existing supply (COUNT)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	**Total**
2021	0	0	0	0	0	10	0	0	0	0	0	0	10
2022	0	0	0	0	0	11	0	0	0	0	0	0	11
2023	0	0	0	0	0	11	0	0	0	0	0	0	11
2024	0	0	0	0	0	10	0	0	0	0	0	0	10
2025	0	0	0	0	0	12	0	0	0	0	0	0	12
2026	0	0	0	0	0	1	0	0	0	0	0	0	1
2027	0	0	0	0	0	2	0	0	0	0	0	0	2
2028	0	0	0	0	0	12	0	0	0	0	0	0	12
2029	0	0	0	0	0	15	0	0	0	0	0	0	15
2030	0	0	0	0	0	21	2	0	0	0	0	0	23

32. There are two key aspects of FBC's plan to address the June capacity gaps noted above. First, until 2030, FBC plans to meet the June after-DSM capacity gaps with firm, fixed-priced market block purchases up to 75 MW contracted prior to the start of each June. Second, after 2030, FBC is planning on being capacity self-sufficient on a planning basis given the risks associated with long-term reliance on market capacity and the need for capacity at other times of the year.[34] The rationale for this plan is discussed in the next subsection.

(b) Reliance on Market Block Purchases until 2030 is a Prudent Step Given Changing Circumstances

33. FBC's plan to rely on firm, fixed-priced market block purchases of up to 75 MW[35] is a significant change from its historical practice of relying on short-term market purchases.[36] FBC historically relied on a significant amount of day-ahead and real-time capacity from the market in June.[37] This practice had been based on the understanding that power would always be abundantly available in any hour during the freshet month of June, and market prices would be

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33 Exhibit B-26, BCUC Panel IR1 3.6.

34 Exhibit B-1, LTERP, pp. ES-14 to ES-15.

35 A market block is a constant amount of energy delivered in all designated hours of the month, which provides capacity by obligating the supplier to deliver energy during all the heavy load hours. (Exhibit B-11, BCUC IR2 43.5.)

36 Exhibit B-1, LTERP, p. 64; Exhibit B-2, BCUC IR1 1.3; Exhibit B-11, BCUC IR2 43.4.

37 Exhibit B-2, BCUC IR1 1.2 and 1.3.

reasonable given the amount of hydro generation in the Mid-C region.[38] Recent events, however, have challenged this understanding.

34. FBC's change in practice to cover the expected June capacity shortfall up to 2030 through firm, fixed market blocks up to 75 MW is a prudent change in response to the extreme load and market power price events in June 2021 and other 'scarcity pricing' events due to increased reliance on natural gas generation in the Pacific Northwest. [39] The June 2021 heat dome event, in particular, served as a trigger for FBC to re-evaluate its supply-side policies. The heat dome demonstrated that market supply in June can be constrained in the Pacific Northwest, which FBC previously considered to be a very remote possibility given the abundant amount of hydro generation in the region and the relationship of freshet to rising temperatures.[40]

35. FBC's plan to rely on firm, fixed market blocks for the month of June will reduce the risk of real-time power not being available in the spot market. By procuring market blocks for this month until 2030, rather than relying on the real-time market to address June resource gaps, FBC's supply risk is reduced. With contracted market blocks secured in advance, the seller has an obligation to deliver power, thereby shifting some risk from FBC to the seller. While FBC will still rely on market access to manage contingency events, locking in 75 MW market blocks reduces the volume that FBC would need to source in a contingency situation.[41]

36. FBC explained the rationale for 75 MW as the size of the market blocks, as follows:[42]

> For the 2021 LTERP, 75 MW was determined as the maximum level due to the need to purchase the energy associated with the June capacity requirements. Purchasing 75 MW of market blocks during all peak hours in the month of June, where there are typically 416 peak hours, results in 31.2 GWh of energy associated with the capacity. In other words, FBC has a very high degree of

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[38] Exhibit B-26, BCUC Panel IR1 3.1.2.

[39] Exhibit B-1, LTERP, p. 64; Exhibit B-2, BCUC IR1 1.3; Exhibit B-11, BCUC IR2 43.4; Exhibit B-26, BCUC Panel IR1 3.1.2.

[40] Exhibit B-26, BCUC Panel IR1 3.4.

[41] Exhibit B-26, BCUC Panel IR1 3.4.

[42] Exhibit B-2, BCUC IR1 1.3.

> confidence that it will be able to fully utilize up to a maximum 75 MW peak block within the month of June – both the energy and capacity - associated with such a contract. However, purchasing more than the suggested maximum 75 MW would reduce FBC's flexibility to manage potential low loads that could occur, and increase the likelihood of spilled energy. While FBC is able to store up to 24.5 GWh of excess energy in its storage account under the Canal Plant Agreement (CPA), if the storage limit is exceeded, the energy is deemed under the terms of the CPA to be spilled and delivered to BC Hydro at no cost.

37. FBC has a high degree of confidence that it can obtain and fully utilize 75 MW peak block in June.[43] FBC's past operating experience during the freshet and long-term market price forecasts indicate that FBC will very likely be able to procure 75 MW of dependable capacity by way of forward market blocks in the month of June until 2030.[44] The anticipated source of market block capacity purchases for June would be through FBC's Capacity and Energy Purchase and Sale Agreement (CEPSA) with Powerex.[45] Since the CEPSA became effective on May 1, 2015, FBC has been able to purchase the required amounts of market power for capacity purposes when needed.[46]

38. However, continued reliance on the market to deliver dependable capacity in June until 2030 is not without risk. The market is the primary contingency resource in the planning reserve margin model and relying on the market as both a planned resource and a contingency resource is risky as a loss of market access (for example, through the loss of access to 71 Line) would result in two issues – no market to serve the load, plus no market to serve as a primary backup resource. For instance, if the June 2021 heat dome event were to reoccur, the actual loads would far exceed FBC's expected capacity load forecast amount. While FBC would make strong and continuous efforts to ensure supply, as was accomplished in June 2021, there can be no certainty of success. [47] If there is no market power available when an extreme June heat event occurs, FBC would likely default onto the BC Hydro system. BC Hydro is expected to be one of the major regional market suppliers of June energy and capacity in the event of a future

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[43] Exhibit B-2, BCUC IR1 1.3.

[44] Exhibit B-26, BCUC Panel IR1 3.5.

[45] Exhibit B-11, BCUC IR2 43.5. See Exhibit B-1, LTERP, p. 116 for a description of the CEPSA.

[46] Exhibit B-9, CEC IR 1.46.2.

[47] Exhibit B-26, BCUC Panel IR1 3.5. Exhibit B-9, CEC IR 1.46.2.

heat dome as they are expected to have significant capacity available at that time of the year. If BC Hydro is also short supply, the entire region would likely be experiencing an extreme capacity shortfall.[48]

39. FBC considers that the higher cost of purchasing market blocks compared to real-time market purchases is reasonable due to the increased certainty that capacity will be available to meet customer demand in June.[49] The net present value (NPV) incremental cost to purchase market blocks, instead of real-time market capacity, to meet the June capacity requirements up to 2030 for the preferred portfolio C3 is approximately $1.3 million and FBC expects the NPV incremental costs to be similar for portfolios B2 and C4.[50] Further, purchasing market blocks is more cost effective for customers than building a new resource, because FBC only has a capacity gap in one month of the year until 2030. The forecast cost of market capacity in June from 2021 to 2030 is significantly lower than the forecast cost of other capacity-orientated supply-side resources.[51]

(c) Capacity self-sufficiency after 2030 is reasonable and prudent

40. After 2030, FBC has assumed capacity self-sufficiency for all months, including June. There are two primary reasons for this.

41. First, FBC plans for capacity self-sufficiency in all months on a planning basis beginning in 2030 given the longer-term market risks identified in the LTERP. As other Pacific Northwest utilities have identified, relying too heavily on wholesale markets to purchase capacity, especially during peak periods, could significantly increase price and reliability risk. Additionally, if the potential capacity shortage in the Pacific Northwest becomes more pressing and is not addressed early enough, peak demand periods will have greater risk of volatile power prices and loss of load or blackouts.[52]

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[48] Exhibit B-26, BCUC Panel IR1 3.5.

[49] Exhibit B-26, BCUC Panel IR1 3.2.

[50] Exhibit B-26, BCUC Panel IR1 3.3.

[51] Exhibit B-11, BCUC IR2 43.2.

[52] Exhibit B-1, LTERP, p.64.

42. Second, in 2030 FBC is expecting to acquire new resources to meet projected summer seasonal peak demand, and it will therefore be more cost effective to acquire new resources at that time. Planning for year-round capacity self-sufficiency beginning in June 2030 will allow a smoother and more cost-effective change in FBC's June supply policies, in return for continuing to accept a small amount of risk no greater than what stakeholders have historically accepted.[53]

B. Reliance on the Market to meet Energy Supply Gaps Beginning in 2023 is Consistent with the BCUC's Decision on FBC's 2016 LTERP

43. FBC currently plans to rely on market energy to meet the energy supply gaps after DSM beginning in 2023. This plan not to be energy self-sufficient is consistent with the BCUC's Decision on FBC's 2016 LTERP.

44. FBC's load-resource balance (LRB) for annual energy after the proposed level of DSM shows that energy gaps start in 2023 and increase to almost 950 GWh by 2040 if the PPA is renewed. If the PPA is not renewed, then the gaps after 2033 are more significant and increase to approximately 1,990 GWh per year by 2040.[54]

45. FBC plans to use wholesale market energy to meet these energy requirements.[55] Historically, FBC has not planned to rely on the market as an energy resource over and above its firm power purchase contracts. However, FBC's current firm power purchase contracts, including the PPA, will not be sufficient to satisfy energy requirements for the duration of the long-term planning horizon. As such, wholesale market energy purchases will not only be used as an economic alternative to the PPA, but will also be needed to meet energy shortfalls over the planning horizon.[56]

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[53] Exhibit B-26, BCUC Panel IR1 3.5. Exhibit B-9, CEC IR 1.52.3.

[54] Exhibit B-1, LTERP, pp ES-12 to ES-13 and Section 9.

[55] Exhibit B-1, LTERP, p. 64; Exhibit B-9, CEC IR1 18.1.

[56] Exhibit B-2, BCUC IR1 1.5.

46. FBC expects that market energy will continue to be a cost-effective resource.[57] A key finding of FBC's portfolio analysis is that, based on the market price forecasts in the LTERP, market energy is more cost effective than other resource options.[58] As illustrated in Figure 11-2 of the LTERP, the portfolio with market energy throughout the planning horizon has a lower LRMC than portfolios assuming a self-sufficiency requirement because of the low cost of market supply relative to the cost of other resource options.[59] Access to economic wholesale power is a benefit, which is in the public interest.[60]

47. FBC also expects that access to market energy will remain adequate through the short-term, particularly if the CEPSA agreement with Powerex remains in place. Energy is available in the market from various utilities and independent power producers that have surplus power available for sale, which are typically the result of other utilities' own loads not being as high as forecast or their supplies of electricity being higher than forecast, such as may be the case during a wet or windy period. Alternatively, energy may be procured from independent asset owners such as self-generators that have under-utilized capacity and available fuel.[61] The source of wholesale market purchases is ultimately at the discretion of Powerex.[62]

48. FBC's plan to rely on the market to meet its energy gaps beginning in 2023 is consistent with the BCUC's Decision on FBC's 2016 LTERP, where the BCUC rejected FBC's plans to achieve electricity self-sufficiency by 2025, stating:[63]

> For the reasons above, the Panel does not accept the line of reasoning that the CEA objectives support the case for FBC to pursue self-sufficiency.
>
> Turning to the line of reasoning regarding market conditions, FBC acknowledges that market purchases have been a reliable strategy in the recent past, and further argues that it is FBC's preferred strategy through 2024.

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57 Exhibit B-11, BCUC IR2 44.1.

58 Exhibit B-1, LTERP, p. 188.

59 Exhibit B-1, LTERP, pp. 181 to 182.

60 Exhibit B-9, CEC IR1 18.2.

61 Exhibit B-1, LTERP, pp. 64-65.

62 Exhibit B-11, BCUC IR2 44.1.

63 BCUC Decision and Order G-117-18, FBC 2016 LTERP and LT DSM Plan, dated June 28, p. 7.

> FBC comments that markets could change in ways that compromise a continuation of that strategy beyond 2024 and/or that the PRP [Planning Reserve Margin] test could fail at some time in the future. That said, the Panel has not been persuaded that events are likely to unfold in a way that produces either of these potential outcomes and, therefore, compromises a continuation of the current strategy. For these reasons, the Panel does not accept the line of reasoning that expected market conditions require the pursuit of a self-sufficiency objective at this time.
>
> **Thus, the Panel finds that FBC's objective of achieving electricity self-sufficiency is not in the public interest, and therefore does not accept it as a valid planning objective against which portfolio options should be evaluated.** [Emphasis in original.]

49. However, relying on the wholesale market for energy purposes does introduce price and availability risk for market power, as well as due to the potential for transmission constraints. FBC mitigates risk to wholesale market energy prices by relying on firm forward fixed price market energy blocks, rather than leaving forecast load requirements to the day-ahead or real-time markets.[64] However, market shortages can be caused by factors such as extreme or extended hot or cold weather conditions, regional drought conditions, generating unit or transmission outages, and structural changes in load growth. Another risk to the long-term reliable availability of wholesale market electricity is that FBC has no transmission facilities that connect directly with markets outside of BC and is dependent on the availability of third-party transmission capacity to serve its customers' needs. FBC's transmission transfer limit and market access availability at the three third-party interconnections on the BC/US border often operate at their maximum available transfer limits, and therefore wheeling additional power across the border into BC is frequently impossible. However, for the purposes of the LTERP, FBC is assuming continued transmission access to the wholesale market through Teck's 71 Line and the CEPSA agreement with Powerex.[65]

C. FBC Plans to Manage the Impact of EVs on Peak Load

50. FBC's Action Plan reasonably includes implementing a program to help shift home EV charging, as follows:

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64 Exhibit B-1, LTERP, p. 65.

65 Exhibit B-1, LTERP, pp. 65-66.

4. Implement program to help shift home EV charging

As discussed in Section 2.3.2, EV growth is continuing within the FBC service area and EV charging, if left unmitigated, could significantly increase peak demand on the system. This could lead to the requirement for additional capacity generation resources and/or transmission and distribution infrastructure, increasing rates for customers. FBC's preference is to implement a software-based incentive program in order to encourage shifting home EV charging from peak demand periods while requiring minimal customer involvement. As part of this initiative, FBC intends to implement an EV charging pilot project as part of a wider residential demand-response pilot. Section 4.6.3 of the LT DSM Plan discusses this further.

51. The need for a program to shift EV charging load is clear. As shown in Figures 3-4 and 3-5 of the 2021 LTERP, the main driver of the Reference Case forecast peak demand growth to 2040 is light-duty EV charging based on the sales targets in the *Zero-Emission Vehicle Act* (ZEV Act).[66] While adoption of EVs in FBC's service area lags behind the province as a whole, FBC expects that consumer uptake of EVs will continue to increase, especially as EVs are introduced with greater range and at prices that target mass market adoption. While the Reference Case is based on the targets in the ZEV Act, FBC's recent customer survey also shows that 43 percent of residential and 37 percent of commercial survey participants are likely to buy or lease an EV in the next three years.[67] The energy and demand charging requirements of EVs has the potential to place significantly greater demands on utility infrastructure and increase the requirement for future generation resources, particularly if the majority of EV owners charge their EVs at the end of the workday, during FBC's peak demand periods.[68]

52. The benefits of shifting EV charging are material. A key finding of FBC's portfolio analysis is that shifting EV charging loads from peak periods reduces the need for capacity resources and lowers portfolio costs.[69] By shifting EV charging load to the off-peak hours, FBC can utilize

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[66] Exhibit B-26, BCUC Panel IR1 4.1. This forecast growth assumes that there is no shifting of EV charging from peak periods, as FBC does not currently have any programs or measures in place to manage EV charging. Exhibit B-1, LTERP, p. 177. The Reference Case forecast includes light-duty EV charging based on ZEV Act sales targets, while FBC's load scenarios include various levels of light-duty EV penetration as well as medium-duty and heavy-duty EV charging. (Exhibit B-1, LTERP, p. 44 and Sections 3.5 and 4.0.)

[67] Exhibit B-1, LTERP, pp. 37 to 39 and Appendix N.

[68] Exhibit B-1, LTERP, pp. 41-42, and Sections 6.5.2 and 11.3.5, and Appendix H, pp. 14 to 19.

[69] Exhibit B-1, LTERP, p. 188.

existing capacity resources and deliver more energy to customers over the year. As illustrated in the portfolio analysis in Figure 11-5, the LRMC for the portfolio assuming no shifting is $78 per MWh; the portfolio assuming 50 percent shifting reduces the LRMC to $68 per MWh. The difference in the NPV of the additional resource costs required over the planning horizon due to shifting 50 percent EV charging from peak hours is in the order of $50 million.[70]

53. FBC has considered rate-based, hardware-based, and software-based options to mitigate the potential impacts of home EV charging on peak demand and intends to pursue a software-based approach which could include incentives to encourage home EV charging during off-peak periods.[71] FBC summarized its analysis of the options in Table 2-1 of the LTERP, as copied below.

TABLE 2-1: STRATEGIES FOR MITIGATING EV PEAK DEMAND IMPACTS

	Rate-based approach	Hardware-based approach	Software-based approach
Description	Shift loads via opt-in time-based rates, such as time of use (TOU) rates.	Shift loads via hardware, such as smart charger. Utility provides rebate for purchase and installation of hardware, as well as rebate/bill credit for continued participation.	Shift loads via software that controls charging directly through vehicle or through EV charger. Utility provides rebate/bill credit upon verification that peak load has been shifted on a continuous basis.
Pros	Widely used by other utilities. Easy to administer once implemented.	Utility has direct control (with ability for customer to override), which increases load-shifting effectiveness and enables demand response opportunities.	Utility has direct control (with ability for customer to override), which increases load-shifting effectiveness and enables demand response opportunities. Ease of implementation (e.g., no hardware to purchase/install, software works with multiple chargers/vehicles) which may lead to higher adoption rates.

70 Exhibit B-1, LTERP, p. 186.

71 Exhibit B-1, LTERP, p. 42 and 177.

	Rate-based approach	Hardware-based approach	Software-based approach
Cons	Utility has no direct control over charging, limiting the effectiveness of peak load shifting and demand response programs. Potential for free ridership where some customers are rewarded for existing behaviour, without the benefit to the grid of any new peak-load shifting. Difficult to implement without separate meter, resulting in low adoption. Cost basis for justifying significantly differentiated time-based rates is limited/insufficient.	High cost of smart charging equipment (even with rebate) could discourage adoption. Only a limited number of smart chargers are compatible with utility control, again limiting participation (i.e., customers may not want to be forced into being a specific charger).	Not yet widely used by utilities in North America, therefore limited data available to verify effectiveness.

54. In addition, FBC identified the following concerns with TOU rates:[72]

- TOU rates implemented on a whole-home basis (i.e., for the meter serving a premises) may not be favourably received by customers as the timing and customer ability to shift discretionary loads likely varies depending on the end-use and customer preferences;

- TOU rates that are EV-specific and require a separate meter for EV charging may not be favourably received by customers due to the added cost of the additional hardware and billing complexity driven by two residential meters and rates at one premise;

- The use of TOU rates for shifting EV home charging to off-peak periods may have the inadvertent effect of driving the creation of a second load peak for certain areas of FBC's system depending on customer uptake and response to TOU price signals; and

- Customers may be more receptive to an approach that only incents the shifting of EV loads as opposed to whole-home TOU rates.

55. FBC expects software-based solutions to have greater efficacy and customer acceptance as it is easier to implement for both FBC and customers, targets only EV loads, provides the flexibility for utility control or customer control, and has no direct cost impacts on EV

[72] Exhibit B-2, BCUC IR 1.37.1.

customers.[73] FBC expects a software-based approach will be able to shift 50 percent of EV charging from peak demand periods, which is a much higher rate than from TOU programs in other jurisdictions.[74] Therefore, FBC opted to pursue a software-based approach.

56. FBC is implementing pilot programs to help determine how much shifting of EV charging from peak periods it might be able to achieve.[75] If the pilot programs demonstrate the success of a software-based approach, FBC will implement a program in the near future and will include it in a future DSM Expenditure filing with the BCUC. If unsuccessful, FBC may consider the other options to meet the objective of shifting EV charging from peak demand periods. As FBC cannot start an incentive-based permanent EV charging peak mitigation program until it is accepted by the BCUC as part of a future DSM Expenditure Plan,[76] the BCUC will have the opportunity to review FBC's proposed program to help shift home EV charging in future DSM Expenditure Plans.

57. FBC submits that its plan to implement a program to shift EV charging demand is reasonable and in the public interest.

D. FBC Is Taking Appropriate Actions to Manage the Potential for Unplanned Increases in Load

58. FBC is taking appropriate actions to manage the potential for unplanned increases in load. Although the LRB after DSM indicates that no new supply-side resources (other than market energy purchases) are required until 2030, FBC recognizes that actual load requirements may not match the forecasts and that, as illustrated by the load scenarios, there are several load drivers that have the potential to significantly impact FBC's load requirements over the planning horizon. As described in the subsections below, FBC is taking appropriate actions to manage the potential for unplanned increases in load:

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73 Exhibit B-1, LTERP, p. 43; Exhibit B-13, CEC IR2 63.1 and 63.2.

74 Exhibit B-1, LTERP, p. 43; Exhibit B-13, CEC IR2 63.1 and 63.2.

75 Exhibit B-1, LTERP, pp. 43 and. 51; Exhibit B-1, LT DSM Plan, p. 26; Exhibit B-8, RCIA IR1 2.2.2; Exhibit B-13, CEC IR2 13.5; Exhibit B-12, BCSEA IR2 21.1.

76 Exhibit B-16, RCIA IR2 40.1.

- FBC is monitoring for changes in the planning environment and potential load drivers;
- FBC has contingency resources and supply plans in place so that it can respond if its load expectations change;
- FBC is assessing contingency resources so that it is prepared to advance supply options if needed and is monitoring for new power supply opportunities; and
- FBC is taking actions to manage load, such as plans to shift EV loads and manage new large industrial loads.

(a) FBC is Monitoring Changes in the Planning Environment and Load Drivers

59. First, FBC monitors the planning environment and sources of load driver information and updates its long-term load forecast annually to determine if changes in planning are warranted due to any impacts on the load-resource balance and need for new resources. For example:[77]

- FBC tracks customer rooftop solar PV installations monthly through its Net Metering program to determine if they are growing at a rate similar to that included in the load scenarios.
- FBC periodically monitors EV registration data for its service area to help determine the growth rate of EVs, and any developments regarding the potential for large load customers, such as cannabis production and data centre facilities.
- FBC monitors and analyzes temperature data for its service area on an annual basis to determine if any trends are developing that might impact customers' load requirements.

60. FBC also updates its load forecast on an annual basis and compares it to FBC's existing resources and planned DSM levels to update its LRB. FBC is then able to determine if and when new resources might be needed and, if they are, if this need will be sooner than contemplated in the 2021 LTERP.[78]

61. This monitoring is reflected in FBC's Action Plan, as follows:

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[77] Exhibit B-9, CEC IR1 25.1; Exhibit B-13, CEC IR2 72.1.

[78] Exhibit B-9, CEC IR1 25.1; Exhibit B-13, CEC IR2 72.1.

1. Continue to monitor the planning environment

Being aware of and understanding the many factors that influence FBC's planning environment is critical for long-term resource planning and is an ongoing activity for FBC. FBC will continue to monitor energy and environmental policy in Canada and the US as well as regional market developments that may impact market supply, demand and pricing, resource options and costs. FBC's preferred portfolios include a portfolio based on energy and capacity self-sufficiency in the event that electricity market conditions change from the current environment such that energy no longer becomes a reliable and cost-effective option for FBC. In addition, FBC will continue to monitor and examine emerging technologies and changing demand and uses for electricity by its customers. FBC's monitoring activities will ensure that it is aware of and able to respond to relevant changes in the planning environment to meet the LTERP objectives.

2. Monitor potential load drivers to determine if a particular load scenario is emerging

The LRB presented in Section 9 of this LTERP indicates that new supply-side resources other than market energy purchases are not required until at least 2030 based on existing resources and committed contracts, the Reference Case load forecast, current market energy conditions and the proposed level of DSM. However, actual load requirements and DSM program uptake by customers may not match the forecasts, meaning that resources may be needed sooner or later than expected. As part of its ongoing resource planning activities, FBC will continue to assess the LRB on a periodic basis to see if any changes in resources might be required.

As discussed in respect of the Load Scenarios (Section 4), there are a number of load drivers that have the potential to significantly impact FBC's load requirements over the planning horizon. FBC will continue to monitor the various load drivers and, in particular, the drivers that may have the most impact on FBC's loads in the next few years, such as EV growth or the addition of new large loads. This will enable FBC to determine if a particular scenario is emerging or if penetration levels and growth for a particular driver are occurring faster than expected and if the forecast LRB gaps are changing, potentially moving the requirement for new resources sooner than indicated by the Reference Case load forecast. The portfolio analysis presented in Section 11 includes contingency planning to address the potential impact of higher load scenarios than the Reference Case load forecast on the timing and requirement for new resources.

(b) FBC has Contingency Resources and Supply Plans to Manage Load Changes

62. Second, FBC's contingency portfolio supply plans enable FBC to effectively manage load changes over time.[79] In the event of load increases greater than those in the Reference Case load forecast, FBC has several options that could be implemented separately or in combination, depending on the specific energy and capacity requirements, including the following:[80]

- Increase market energy purchases;
- Increase PPA energy and capacity (if not already at its maximum);
- Implement other EV charging peak shifting options;
- Ramp up DSM to higher incentive levels; and
- Accelerate new resources from the preferred portfolios which require shorter lead times, such as a Simple Cycle Gas Turbine (SCGT) plant using renewable natural gas (RNG) or battery storage units.

63. The following table lists the identified contingency resources, total resource size, the potential prices, and anticipated lead-times of the above options.[81]

	Energy	Capacity	Cost	Lead Time [82]	Comments
Increase Market Purchases **(Up to approximately 3,241 GWh)**	Yes	*[83]	$28 to $49/MWh	1 day	FBC has improved reliability in access to market energy through the CEPSA. UEC shown in Table 10-2.
Increase PPA Energy and capacity **(Up to 1,752 GWh and 200 MW capacity)**	Yes	Yes	$49 to $60/MWh, $101 to $123/kW-year	1 day (To avoid penalty, 1 year)	FBC can increase PPA capacity to meet changing peak loads (at the cost of increasing the capacity ratchet). UEC and UCC shown in Table 10-2.

79 Exhibit B-1, LTERP, Section 11.3.9.1.

80 Exhibit B-11, BCUC IR2 45.1.

81 Exhibit B-9, CEC IR1 57.1.

82 Lead Times to implement new resource options are high-level estimates only and may be extended depending on the nature of the project.

83 FBC does not plan to rely on market capacity to meet expected load. However, if it is required to do so due to a contingency event, FBC will purchase market capacity.

	Energy	Capacity	Cost	Lead Time [82]	Comments
Implement other EV Peak shifting options		*	$TBD/kW-year	2 years	EV charging shifting pilot program is being developed. Other potential options listed in Table 2-1 have not yet been fully defined.
Ramp up DSM to higher incentive levels **(Up to an additional 6.5 GWh of incremental savings per year)**	Yes		$183 to $234/MWh	1+ years	Incrementally higher levels of DSM. Would require BCUC approval to increase spending and requires time to engage with Trade Ally Network. Table 3-1, FBC LT DSM Plan.
Accelerate new resource options: **RNG SCGT** **(50 to 100 MW+ installed capacity)**		Yes	$131 to $148/kW-year	4 years	Cost-effective resource option for year-round dispatchable capacity. UCC shown in Table 10-2.
Accelerate new resource options: **Battery** **(25 to 50 MW installed capacity)**		Yes	$226 to $267/kW-year	2 years	Capacity resource with likely least path of resistance and sized to be a stop gap. Costs likely lower in future years. UCC shown in Table 10-2.

* FBC does not plan to rely on market capacity to meet expected load. However, if it is required to do so due to a contingency event, FBC will purchase market capacity.

64. As seen in the table above, some of the options would take one to four years to implement, although, as the footnote in the table notes, lead times to implement new resource options are high-level estimates only and may be extended depending on the nature of the project. FBC has recently experienced delays in infrastructure development, and so expects that the lead times for new resource development could be longer than expected. On a short-term, operational basis, FBC has a number of contingency resources. First, FBC can call on operating reserve to cover any power lost for the first 60 minutes of any outage. Second, for any outages longer than 60 minutes in duration, FBC has the option of purchasing replacement power from the wholesale market, via its CEPSA with Powerex. Third, FBC may also choose to reduce the amount of surplus Waneta Expansion (WAX) capacity that it sells to Powerex under the CEPSA, and retain that capacity for its own use. Fourth, FBC can also increase its usage under the PPA,

as FBC is rarely using the full 200 MW of PPA capacity available, and has never used the full amount of energy available under the contract. Fifth, in the event of emergencies only, FBC may access additional BC Hydro capacity under FBC's Imbalance Agreement with BC Hydro.[84]

65. FBC provided further details on each of the five contingency resources identified above, as follows:[85]

> **Operating Reserves:** BC Hydro is a participant in the Northwest Power Pool (NWPP). The NWPP is a voluntary organization and is a designated Reserve Sharing Group in accordance with BC, North American Electric Reliability Corporation (NERC), and Western Electricity Coordinating Council (WECC) reliability standards. FBC is not a Balancing Authority and therefore does not formally participate in the NWPP Reserve Sharing Group except indirectly through BC Hydro and the Canal Plant Agreement (CPA). As Operating Reserves are held by the participating members, the only way that FBC would not be able to receive Operating Reserve from BC Hydro is if the reserves from the entire region were already allocated to a previous event. Operating Reserves are only available for use after an initiating event, such as loss of generation, and can only be used for 60 minutes.
>
> **Market purchases:** FBC has the ability to purchase wholesale power from Powerex under the CEPSA Agreement, via forward block contracts, day-ahead purchases, or real-time hourly purchases. Provided 71 Line transmission is available, there is a very high probability that FBC would be able to purchase the required power. If 71 Line were not available, or the required imports exceed the available transmission space on 71 Line, Powerex would still attempt to deliver required power to FBC, but the probability is slightly lower. FBC is not able to quantify these probabilities but, in either case, FBC expects that it is reasonable to assume that supply will be available under almost all circumstances. Some factors that could impact FBC's ability to import market power would be: availability of 71 Line due to planned or forced outages, Teck Resources Limited's use of 71 Line import rights reducing FBC's import ability, or a Powerex supply shortfall causing them to limit exports to FBC.
>
> **Reduction of surplus capacity sales to Powerex:** On a day-ahead basis, FBC schedules any WAX surplus capacity it has available to Powerex. This means that FBC has enough flexibility to adjust or reduce the amount of surplus released, on a day ahead basis, to accommodate its native load forecast first. FBC cannot adjust its capacity sales after the preschedule deadline except in the event of a

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84 Exhibit B-9, CEC IR1 28.3 and 38.2.

85 Exhibit B-26, BCUC Panel IR1 5.1.

WAX unit outage. If the WAX plant is out of service for any reason, FBC loses access to that capacity which it may require to serve load, and also to enable capacity sales.

Increasing use under the PPA: On a preschedule basis, under the PPA agreement with BC Hydro, FBC can take up to 200 MW of capacity in any hour. However, on a real-time, hourly basis, FBC is limited to a 25 MW maximum schedule change. This could impact FBC if requirements change by more than 25 MW on a real-time basis. Furthermore, if BC Hydro were to have supply constraints, there could be a situation in which BC Hydro is unable to deliver the requested PPA capacity to FBC.

Imbalance Agreement: Under the terms of the Imbalance Agreement, FBC is precluded from relying on Imbalance Energy for planning purposes and thus does not intend to take or rely upon Imbalance Energy. The only risk in being unable to take energy under the Imbalance Agreement would be if BC Hydro did not have sufficient resources to supply FBC.

66. FBC's ability to respond to the June 2021 heat dome event illustrates the depth and flexibility of FBC's capability to meet unplanned load on an operational basis. Notably, during the June 2021 heat dome event, FBC's available capacity of 790 MW exceeded the load level during the heat dome event of 764 MW.[86] If resource contingency events had occurred (such as FBC generator outages), FBC would have been able to call on Operating Reserve for 60 minutes, or even higher market purchases if available. If the market resources were unavailable, FBC would have needed to exercise the Imbalance Agreement with BC Hydro. If BC Hydro has no additional capacity, then FBC would have had no choice but to manually curtail load.[87]

67. Therefore, while continued service during a future heat dome event cannot be guaranteed,[88] FBC submits that it has a reasonable level of operational flexibility to respond to unplanned load.

86 Exhibit B-13, CEC IR2 38.1

87 Exhibit B-13, CEC IR2 38.1 and 38.2.

88 Exhibit B-26, BCUC Panel IR1 3.5.

(c) FBC is Assessing Contingency Resources and Monitoring for Potential Available Power Supply Opportunities

68. As part of a prudent approach to manage future system loads, FBC intends to assess contingency resources now to help ensure FBC is able to meet an increase in forecast load. Therefore, FBC's Action Plan includes assessing contingency resources to help ensure that FBC is prepared in the case of a change in forecast load:[89]

> **3. Contingency resource(s) assessment**
>
> As part of the contingency planning discussed in Section 11, new generation resources or power supply contracts may be required sooner than is contemplated in this LTERP based on the Reference Case load forecast. Recent events like the extreme heat and record loads for FBC in June 2021 (discussed in Section 2.2.1) highlight the need for FBC's resource portfolio to be flexible and adaptable to unexpected changes in loads. As part of a prudent approach to manage future system loads, FBC intends to explore its potential resource options identified in this LTERP in more detail in the next few years so that FBC is ready, if required, to bring forward an application for a new resource to the BCUC for approval prior to the development of the next LTERP. As part of this assessment, FBC may require funding for any costs above approved capital and O&M budgets. FBC expects to review its financial forecast in its Annual Review of rates and if necessary, file an updated forecast of expenditures to account for any material changes to the forecast and to either ask for approval of the changes or indicate that a separate supplemental filing for this work will be required.

69. Given that small changes in load could advance FBC's needs by several years,[90] and the long development timelines for new generation, FBC will likely need to initiate project development work numerous years in advance of physically needing the assets.[91] This would include obtaining more specific information regarding the costs, energy and capacity profiles of resource options and other relevant data.[92]

70. As such, FBC must begin the process of preparing to acquire new resources now, as it may take some time to fully define the available resources such that a request for a CPCN could

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89 Exhibit B-1, LTERP, p. 215.

90 Exhibit B-6, BCSEA IR1 6.1.

91 Exhibit B-2, BCUC IR1 31.18.1 and 36.2.

92 Exhibit B-2, BCUC IR1 31.18.1.

be filed. This is particularly important given the long development timelines of major projects in British Columbia, including the time for land acquisition, front-end engineering design (FEED), permitting, environmental assessment, and stakeholder and Indigenous consultation.[93] As discussed below in paragraph 82, in FBC's preferred portfolio, RNG SCGT plants are optimal resources for providing peak capacity when needed. Given the four-year lead time for an SCGT plant, FBC expects to initiate project development work, including land acquisition, FEED, permitting, and stakeholder and Indigenous consultation in the near future.[94]

71. In addition, if an opportunity to obtain power supply that meets the LTERP objectives arises, FBC may choose to bring an application forward to the BCUC to take advantage of the opportunity while it exists.[95] FBC's Action Plan therefore includes the following:[96]

> **Monitor potential available power supply opportunities:**
>
> While Section 10 assesses possible future generation resource options, other opportunities for additional power supply for FBC may become available in the future. One example relates to the expiry of the BRX agreement in 2027, discussed in Section 5.3. The entire set of capacity and energy entitlements attributed to BRX may be available as a future resource option for FBC and could be an opportunity to secure cost-effective, locally-generated power to help meet FBC's resource needs. Other examples may be the acquisition of power supply from potential generation projects with Indigenous Nations interests in the region or projects that contribute to signficant GHG reduction to meet the Province's climate action goals as well as FBC's LTERP objectives. FBC intends to continue to monitor developments regarding potential future resource options.

72. In addition to the examples noted in the Action Plan item above, FBC will continue to monitor BC Hydro contract renewals for any resource option opportunities. Approximately 70 of BC Hydro's total of 127 electricity purchase agreements (EPAs) with independent power producers are expiring over the next 20 years, representing approximately 9,100 GWh of reliable energy and 1,300 MW of dependable capacity. Energy currently provided to BC Hydro from these IPPs may become available when these EPAs expire. There may be opportunities for

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93 Exhibit B-4, BCOAPO IR1 94.2.

94 Exhibit B-2, BCUC IR1 31.18.

95 Exhibit B-2, BCUC IR1 36.2.

96 Exhibit B-1, LTERP, pp. 215 to 216.

FBC to acquire power from these expiring EPAs on a cost-effective basis in the future.[97] FBC will continue to monitor these and any other resource option opportunities.

(d) FBC is Taking Actions to Manage New Load and its Impacts

73. In addition to its plan to shift EV loads as discussed above, FBC's Action Plan includes the following activities to manage new load and its impacts:[98]

> **5. Consider initiatives to manage large loads**
>
> Section 2.3.5 discusses the emergence of new large loads and potential benefits for FBC customers from increasing managed load growth on its system. FBC is at the early stages of a number of further initiatives to allow it to accommodate large loads on its system. FBC is evaluating its connection contribution model to find ways to balance prospective, new, and current customer needs. FBC may also consider rates or incentives for large load customers that enable FBC to curtail them during peak demand periods, thereby deferring or avoiding the requirement for new capacity generation resources or additional system infrastructure.
>
> **11. Assess transmission and distribution capital infrastructure requirements**
>
> As discussed in Section 6.5, FBC's system planning indicates several projects are required over the next decade based on the 1 in 20 forecast used for system planning. Additional projects may also be required later in the planning horizon if higher than expected loads materialize and capacity generation resources are not put in place or are not sufficient to manage peak demand growth. FBC also plans to assess the risk to specific assets and estimate costs for climate change adaptation resiliency measures and risk mitigation investments. Additionally, in light of the June 2021 extreme temperatures experienced in the FBC service area (discussed in Section 6.2), FBC intends to assess the impacts of this event on its system infrastructure. FBC plans to conduct further analysis beyond what has been presented in this LTERP over the next few years to help assess future system infrastructure requirements. FBC expects that it will submit CPCN applications to the BCUC for any applicable projects in a timely manner.

74. With respect to FBC's plan to manage larger loads, FBC has now filed an application[99] for approval to implement an interruptible rate for larger customers. The interruptible rate would

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[97] Exhibit B-1, LTERP, p. 171.

[98] Exhibit B-1, LTERP, pp. 215 to 216.

allow FBC to curtail a customer's usage during peak hours, reducing system loading impacts during peak periods and overall system capacity requirements on a limited basis. This would increase the potential to add new interruptible loads to the FBC system without triggering the level of system upgrades typically required for firm load additions. For large loads not on an interruptible rate, FBC is exploring the use of a demand response program to manage their load.[100]

75. As indicated in Action Plan Item 11 quoted above, FBC has identified the projects required over the next decade based on the 1 in 20 forecast, and recognizes the potential for additional projects if higher than expected loads materializes. As set out in Table 6-3 of the LTERP (copied below), FBC has identified six transmission reinforcement projects within the next ten years and has already received a CPCN for one of these projects (Kelowna Bulk Transformer Addition).[101] The other projects could be the subject of future CPCN applications.

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99 At the time of filing the LTERP, FBC was developing the interruptible rate (Exhibit B-2, BCUC IR 1.37.2). On July 6, 2022, FBC filed an Application for Approval of a Large Commercial Interruptible Rate (https://www.bcuc.com/OurWork/ViewProceeding?applicationid=1024), as noted by the BCUC in Order G-199-22 in this proceeding.

100 Exhibit B-2, BCUC IR1 37.2.

101 BCUC Decision and Order C-4-20, dated November 30, 2020.

Table 6-3 – Transmission Reinforcement Projects

Time Frame	Project	Purpose	Primary Driver	
			Capacity	Reliability
2021-2022	Kelowna Bulk Transformer Capacity Addition	Add additional 230/138 kV transformation capacity in Kelowna to adequately supply area load	X	X
2024-2025	Replace AS Mawdsley (ASM) Transformer T1	To provide adequate transformation capacity during normal and contingency conditions	X	X
2027-2028	52L & 53L Upgrade	To provide adequate capacity during single contingency	X	X
2028-2029	Replace AS Mawdsley (ASM) Transformer T2	To provide adequate transformation capacity during normal and contingency conditions	X	X
2028-2029	60L & 51L Upgrade	To provide required capacity when either LEE T3, T4 or T5 is out of service and there is an outage of another LEE transformer		X
2028-2029	20L Upgrade	To provide adequate capacity during normal and single contingency conditions	X	X

76. FBC's load mitigation measures (load curtailment and EV charging load shifting) could reduce the peak demand requirements, thereby deferring the need for additional transmission and distribution projects.[102] As indicated in Action Plan item 11, FBC is also conducting further analysis to assess future infrastructure requirements that may be required to meet potential future load.

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[102] Exhibit B-1, LTERP, p. 139.

77. In summary, FBC submits that it is appropriately monitoring changes in load, has a reasonable level of contingency resources in place, and is prudently assessing supply side options and taking action to manage new load and its impacts.

E. FBC's Preferred Portfolio is in the Public Interest

78. Based on the portfolio analysis presented in section 11 of the LTERP, FBC has determined a set of preferred resource portfolios. The preferred portfolios are those that meet the LRB gaps based on the Reference Case load forecast, include cost effective DSM, and best meet the LTERP objectives of cost-effectiveness, reliability, and BC's energy objectives.

79. The table below shows how the portfolios considered for the preferred portfolios were determined, with reference to the various portfolios presented in the figures in Sections 11.3.1 to 11.3.6 of the LTERP.[103]

Portfolio Figure/Attributes	Portfolio(s) Considered for Preferred Portfolios	Reason
Figure 11-1: Varying DSM Levels	A1	Base DSM level is considered optimal per LT DSM Plan
Figure 11-2: Market Access vs. Self-Sufficiency	A1, B2	Least-cost and include clean market adder
Figure 11-3: Clean vs. Non-Clean	C3, C4	Least-cost clean portfolios
Figure 11-4: Load Scenarios	A1	Reference Case load forecast is expected planning forecast
Figure 11-5: EV Charging Shifting	A1	FBC does not yet have a program in place for shifting EV charging
Figure 11-6: PPA Renewal	A1	Least-cost with PPA renewal

As the table above indicates, portfolios A1, B2, C3 and C4 were the resulting portfolios considered for the preferred portfolios. FBC did not include A1 in the preferred portfolios as it

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103 Exhibit B-2, BCUC IR1 31.8.

includes an SCGT plant using conventional natural gas and so it does not rate as well as other portfolios listed in the table above in terms of clean and renewable attributes.

80. Portfolio C3 has the lowest LRMC of the portfolios including only clean or renewable resources and so ranks favourably in terms of cost effectiveness and environmental attributes. As shown in Table 11-2 of the LTERP, this portfolio also rates 'high' in terms of resiliency and provides some economic development in terms of BC employment. It includes market energy throughout the planning horizon, but maintains a capacity self-sufficiency requirement.[104]

81. Portfolio B2 also includes only clean or renewable resources, maintains a capacity self-sufficiency requirement throughout the planning horizon, but additionally includes an energy self-sufficiency requirement starting in 2030. This portfolio has relatively low environmental impacts, provides some operational flexibility and geographic resource diversity, and contributes to economic development. Although the LRMC of portfolio B2 is relatively low, the average cost of this portfolio is comparably higher as full energy self-sufficiency would impact FBC's ability to utilize the market to meet current load in addition to the incremental load. Portfolio B2 would likely be a preferred option for FBC in the event that market conditions changed such that market energy was no longer a reliable or cost-effective option in the future. Therefore, portfolio B2 is considered a preferred portfolio as it also meets the LTERP objectives while also including both capacity and energy self-sufficiency over the long term.[105]

82. Portfolio C4 also includes only clean or renewable resources but excludes SCGT plants, even those using RNG as fuel. Portfolio C4 maintains a capacity self-sufficiency requirement, but allows market energy throughout the planning horizon. This portfolio requires a collection of resource options that are more costly than SCGT plants to maintain capacity self-sufficiency. This portfolio has higher cost attributes and lower operational flexibility than the other two preferred portfolios but has low environmental impacts, high geographic diversity, and a higher contribution to economic development. FBC has included portfolio C4 in the preferred portfolios as FBC recognizes that there may be social licensing issues with the permitting and

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[104] Exhibit B-1, LTERP, pp. 193 to 194.

[105] Exhibit B-1, LTERP, pp. 193 to 194.

construction of an SCGT plant in its service area, even if the plant were to use a renewable fuel like RNG.[106]

83. Based on the information presented in Section 11 of the LTERP and stakeholder feedback, FBC recommends Portfolio C3 as the preferred portfolio. Portfolio C3 includes FBC accessing clean market energy and so has the lowest cost in terms of LRMC, average costs and rate impacts for the three portfolios considered for the preferred portfolios. Portfolio C3 is similar to the other two portfolios in terms of its GHG emissions but has a lower environmental land footprint. This portfolio also provides FBC with high levels of resiliency given that its resource mix provides high geographic diversity and higher levels of operational flexibility with the two SCGT plants using RNG fuel, which is important for contingency planning. The inclusion of SCGT plants in the preferred portfolio provides some additional flexibility to handle new, large or unexpected loads as these resources have some remaining availability at the end of the planning horizon to accommodate additional energy and capacity growth. The SCGT plants would also provide added reliability in the event the wind and solar resources in the portfolio do not provide energy and capacity when required.[107]

84. Portfolio C3 best meets the LTERP objectives in terms of balancing cost-effectiveness, reliability, inclusion of cost-effective DSM and consideration of BC's energy objectives. This portfolio is also aligned with the energy priorities as indicated by stakeholders, Indigenous communities, and customers through FBC's LTERP engagement processes.[108] Therefore, FBC submits that this portfolio should be accepted as being in the public interest.

85. For clarity, the BCUC's acceptance of the LTERP does not imply approval for FBC to implement the recommended portfolio. As some or all of these components will change over time, it is more likely that the preferred portfolio is rather an indication of the types of resources FBC may need to implement in the future. Updated information may mean that FBC later determines that other new resources may be required. FBC expects that, when the time

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[106] Exhibit B-1, LTERP, pp. 193 to 194.

[107] Exhibit B-1, LTERP, p.195.

[108] Exhibit B-1, LTERP, p.195.

comes to commit to acquiring new resources or supply contracts, it would then submit an application, such as a request for a CPCN, to the BCUC for approval.[109]

F. Transition to Clean Market Purchases is in the Public Interest

86. FBC submits that its plan to transition to clean market purchases, as stated in item 8 of FBC's Action Plan, is in the public interest:[110]

> **8. Transition to Clean Market Purchases**
>
> As discussed in Section 10.4, FBC has assumed for the purposes of this LTERP that future market energy purchases are sourced from clean or renewable generation and, as such, has applied a clean market adder to the cost of its market purchases. FBC intends to pursue this option with Powerex, its current market supplier per the CEPSA, and plans to provide an update on its status in a future FBC Annual Electric Contracting Plan filing.

87. While FBC intends to be capacity self-sufficient on a planning basis, FBC plans to be dependent on the market for energy purposes, and FBC believes it will be able to procure clean market power for energy purposes with the use of a market adder. Since the 2016 LTERP, Powerex has become open to offering a clean market product to FBC, and Powerex has confirmed that it should be possible for the large majority of FBC's required market purchases to come from clean or renewal resources at a reasonable cost. Therefore, all of the portfolios that FBC has presented in the LTERP, with the exception of portfolios B3 and B4, have a clean market adder applied.[111]

88. For clarity, FBC does not intend to ensure that all market purchases qualify as clean on an operational basis, but rather only when it is reasonable to do so. In the event loads are greater than anticipated or in a contingency event, if FBC is required to go to the market and clean power under the terms of FBC's contract with Powerex is not available, FBC plans to

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[109] Exhibit B-6, BCSEA IR1 5.1.

[110] Exhibit B-2, BCUC IR1 31.2.

[111] Exhibit B-2, BCUC IR1 31.2; Exhibit B-6, BCSEA IR1 3.6; Exhibit B-27, BCUC Panel IR2 6.4 and 6.5.

accept this small proportion of non-clean energy into its portfolio as needed to avoid a loss of load event.[112]

89. Given FBC's plan to rely on market energy over the planning horizon, FBC submits that it is in the public interest that it transition to clean market purchases. Reducing emissions from the market energy that FBC plans to purchase is consistent with the provincial government's climate targets and CleanBC plan,[113] and the British Columbia energy objectives to reduce emissions.[114] The clean market adder also reflects FBC stakeholders' desires for clean energy in the portfolio.[115] As indicated by FBC's customer survey, strategies for the reduction in GHG emissions was the third most important attribute of the LTERP for customers.[116] Moreover, the June 2021 heat dome event and other climate-related events have brought home the impacts of climate change. It is important that FBC take actions to reduce GHG emissions attributable to its resource portfolio.

90. FBC has estimated the clean market price adder to be approximately $2 per MWh, based on a high-level assessment by IHS Markit (IHS) of technology and power market fundamentals to determine the potential cost of an unbundled Renewable Energy Credit (REC), if such a market were available. The ultimate cost of the Clean Market Adder would be a point of negotiation between FBC and Powerex and submitted to the BCUC for review and acceptance under section 71 of the UCA. While the negotiated value of a Clean Market Adder could vary over time, it is likely that the Clean Market Adder costs will decline as additional renewable energy projects are built in the region.[117] Based on discussions with Northwest Power and Conservation Council (NPCC) and IHS, and a review of other utilities' IRPs, there could be an oversupply of RECs in the future.[118]

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112 Exhibit B-27, BCUC Panel IR2 6.4.

113 Exhibit B-1, LTERP, pp. 27-28.

114 Exhibit B-1, LTERP, p. 11.

115 Exhibit B-2, BCUC IR1 31.2.

116 Exhibit B-1, LTERP, Appendix N, pp. 14 to 15.

117 Exhibit B-1, LTERP, p. 80; Exhibit B-27, BCUC Panel IR2 6.4.

118 Exhibit B-6, BCSEA IR1 3.6.

91. Any clean market purchases that FBC may make would need to come from a source that is recognized in BC as clean or green and to ensure that there is no double-counting of clean energy attributes. If FBC purchases clean market power through the CEPSA agreement, FBC will work with Powerex to ensure that those purchases are consistent with BC requirements.[119] These purchases would most likely follow the parameters described in Powerex's Clean Energy Trade Standard (Standard). Under Powerex's Standard, RECs are recognized as evidence of clean supply, but only to the extent that they are coupled with the delivery of that clean supply.[120]

92. For clarity, FBC does not consider acceptance of the LTERP as approval for clean market purchases. Rather, if the BCUC accepts the LTERP, including action item 8, then FBC would negotiate an agreement for clean market purchases, which would then be subject to BCUC review and acceptance under section 71 of the UCA.[121]

G. FBC Is Adapting to Climate Change Impacts

93. FBC is taking seriously the threat that global climate change presents to FBC infrastructure and operations.[122] FBC has identified wildfires as the most significant climate-related risk to its system, while others include flooding and extreme weather.[123] FBC continues to adapt to take into account such climate change impacts, as indicated in the subsections below:

- FBC has been building climate resiliency using its standards and practices over time;
- FBC is proactively adapting to climate change related risks;
- FBC is monitoring developments regarding climate change impacts on water availability that may impact FBC's resources; and

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119 Exhibit B-2, BCUC IR1 9.1.

120 Exhibit B-6, BCSEA IR1 20.1.

121 Exhibit B-6, BCSEA IR1 3.3; Exhibit B-27, BCUC Panel IR2 6.1, 6.2 and 6.3.

122 Exhibit B-1, LTERP, p. 140.

123 Exhibit B-1, LTERP, p. 140.

- FBC is updating its 1 in 20 peak demand forecast method to take into account the June 2021 heat dome event.

(a) FBC Has Been Building Climate Change Resiliency

94. First, FBC has already been building infrastructure climate resiliency using its standards and practices:[124]

- FBC performs an annual inspection for all transmission and distribution lines, and conducts repairs for any urgent work identified. Condition assessments are completed on an eight-year cycle for transmission and distribution lines and on a six-year cycle for substations. Rehabilitation work to repair the aging infrastructure is completed in the following years.

- FBC has also 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.

- FBC is conducting assessments to analyze the vulnerability of its system to the impacts of climate change. FBC is currently working with an external consultant to develop wildfire risk modeling. The assessment is expected to be complete in 2022. After this project is complete, FBC will begin to further assess the risks related to flooding and extreme weather in more detail.

95. FBC is also currently completing the Kelowna Bulk Transformer Addition project, which will increase the firm transformer capacity at the LEE substation and is expected to be complete before summer 2023. This project will help mitigate potential impacts if an event similar to the June 2021 heat dome were to occur again.[125]

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[124] Exhibit B-2, BCUC IR1 24.1.

[125] Exhibit B-11, BCUC IR2 51.2.

96. Industry standards and organizations such as the Institute of Electrical and Electronics Engineers (IEEE) and Canadian Standards Association (CSA) have discussed adopting standards to support utilities in integrating considerations of climate change impacts. Once completed, FBC intends to consider, and adopt if appropriate, the updated standards as guidelines. However, FBC intends to be proactive regarding the resiliency of its system in light of climate change impacts regardless of the timing of standards development.[126]

(b) FBC is Proactively Adapting to Climate Change Related Risks

97. Second, FBC is proactively developing a roadmap for climate change adaptation, which FBC expects will be completed in Q4 2022, as well as undertaking other studies, pilots and business cases to understand and develop appropriate responses to climate change-related risks.[127] These efforts include the following:

- **Pilot Programs re Alternative Materials for Poles:** FBC is researching and assessing, through pilot programs, the use of alternative materials for poles in areas impacted by flooding. The alternative material pole type pilot program was completed for the Creston wetlands areas in November 2021.[128] The pilot helped FBC to gain internal experience with the installation, operation, and maintenance of the composite poles in a wetland area. FBC is considering use of composite materials for poles impacted by flooding as, generally, composite poles will not experience rot or corrosion in standing water. The installation of composite material poles in flooding areas would be considered on a case-by-case basis.[129]

- **Business Case re Wildfires:** FBC is developing an internal business case to assess various mitigation strategies for wildfires. Some of these solutions will be dependent on the results of the wildfire risk modeling currently under development with an external consultant. These strategies include, but are not limited to, application of fire-retardant gel to wood poles, current-limiting fuses, fire-protection mesh, and updates to FBC's reclosing policy.[130]

- **Business cases for Flooding and Extreme Weather Events:** Business cases will be developed for flooding in 2023/2024 and extreme weather events (including

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[126] Exhibit B-1, LTERP, p. 140. Exhibit B-2, BCUC IR1 24.3; Exhibit B-11, BCUC IR2 52.3.

[127] Exhibit B-2, BCUC IR1 24.4; Exhibit B-11, BCUC IR2 52.4.

[128] Exhibit B-2, BCUC IR1 24.4; Exhibit B-11, BCUC IR2 52.4.

[129] Exhibit B-11, BCUC IR2 52.5.

[130] Exhibit B-2, BCUC IR1 24.4; Exhibit B-11, BCUC IR2 52.4.

> windstorms) in 2025 to 2027, once assessments for these climate change impacts are completed.[131] Analysis of selective underground distribution as a potential option on a case-by-case basis in high-risk areas will be completed during the development of the extreme weather business case.[132]

98. As discussed in section 6.6 of the LTERP, depending on the potential risks associated with climate change, system infrastructure adaptation measures could result in installation of new equipment, the use of new technologies, changes to FBC operating procedures, and updates to FBC's design standards. Further, depending on the specific climate change impacts, there may be a need for resiliency measures and additional infrastructure capacity to address higher customer peak demand.[133] This is appropriately reflected in Item 11 of FBC's Action Plan.[134]

(c) FBC Is Monitoring Developments Regarding Climate Change Impacts on Water Availability as it Relates to FBC's Supply Resources

99. Third, FBC is monitoring developments regarding climate change impacts on water availability that could impact FBC's supply resources. As discussed in Section 5.1.1 of the LTERP, climate change could have a material impact on water availability for hydroelectricity generation in the Pacific Northwest.[135] Changes to water availability could open the possibility of changes to the entitlements under the CPA, and potential changes to the Columbia River Treaty between Canada and the United States or Kootenay Lake levels as governed by the International Joint Commission order, which could indirectly impact FBC CPA entitlements.[136]

100. However, FBC has not observed any material changes in water availability to date.[137] Further, FBC explained why it believed that a 10 percent reduction in its energy and capacity entitlements due to long-term water availability risks is unlikely to occur:[138]

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131 Exhibit B-2, BCUC IR1 24.4; Exhibit B-11, BCUC IR2 52.4; Exhibit B-26, BCUC Panel IR1 2.2.

132 Exhibit B-11, BCUC IR2 52.6.

133 Exhibit B-13, CEC IR2 65.2.

134 Exhibit B-1, LTERP, pp. 215 to 216.

135 Exhibit B-1, LTERP, p. 114.

136 Exhibit B-2, BCUC IR1 21.4; Exhibit B-11, BCUC IR2 50.2.

137 Exhibit B-2, BCUC IR1 18.1; Exhibit B-13, CEC IR2 65.2.

138 Exhibit B-11, BCUC IR2 50.4.

Plant capacity, and corresponding capacity entitlement, is not determined by water availability. Therefore, FBC does not expect that small to moderate reductions in available water to materially impact capacity entitlement.

Energy entitlement is impacted by long-term water availability. However, FBC's generation on the Kootenay River is undersized compared to the water flows used to calculate energy entitlement for approximately 50 percent of the year. Under the CPA, FBC entitlements are based on pre-Columbia River Treaty conditions, prior to the construction of the Duncan and Libby dams as well as the Kootenay Canal Plant.

Although FBC has not studied the impacts of changing water flows on entitlements, at a high level FBC believes there is a reasonable possibility winter energy entitlement may increase since milder temperatures may support higher natural winter water flows even if natural annual flows are on average reduced. During a significant portion of the year, FBC expects that there would still be sufficient water flow to utilize all the available FBC generation such that there is no impact on energy entitlements for that portion of the year. However, once water flows recede in the summer and fall months, these flows would likely be at lower levels than used in the entitlement calculations so there would be a greater potential for a reduction in summer and fall energy.

Based on the Reference Case load forecast and energy self-sufficiency not being a planning criteria, summer and fall energy requirements are not driving the need for supply side resources within FBC's preferred portfolios. Therefore, it is likely that there would be minimal pressure to advance supply-side resources beyond increasing BC Hydro PPA or market energy purchases over the summer and fall months. These increased purchases may be fully or partially offset by the potential for increasing winter energy entitlement. Winter energy is a critical resource gap so the overall impact on FBC from reduced water availability could even be, counter intuitively, a delay in the requirements for new supply side resources. The monthly timing of the available natural water flows used in calculating entitlements would determine the impact on the need for FBC resources.

For the above reasons, a 10 percent uniform reduction in both energy and capacity is highly unlikely to occur. FBC does not expect material changes in capacity entitlement. The resulting shape of FBC energy entitlements after a redetermination process compared to the forecast monthly load requirements as well as self-sufficiency criteria will determine the impact on supply-side resources.

101. Even so, FBC is appropriately monitoring developments regarding climate change impacts on water availability as it relates to FBC's supply resources.[139] FBC monitors developments with respect to long-term water availability by reviewing industry studies and reports, attending industry events and seminars, working closely with other utilities such as BC Hydro, and by keeping apprised of new information and studies as they become available.[140] FBC may undertake or collaborate with other entities in future studies and make adjustments as appropriate in a future LTERP, once there is more information regarding the potential impacts on its supply from climate change.[141]

(d) FBC is Updating its 1 in 20 Peak Demand Forecast in Response to June 2021 Heat Dome

102. Fourth, in response to the June 2021 heat dome event which occurred after FBC prepared its forecast for the LTERP, FBC will include the 2021 June heat event in its 1 in 20 peak demand forecast. Including the event in the forecast is appropriate as FBC's transmission and distribution system needs to be designed to be reliable even during extreme weather conditions. The June 2021 heat event produced a system summer peak demand of 764 MW, while the December 2021 system winter peak demand was 777 MW, both of which were record breaking for FBC. With the uncertainty regarding weather impacts due to climate change and the potential for increased electrification in the future, it is possible that these system peak demand levels could reoccur and possibly more frequently. Therefore, FBC will include the June 2021 heat event in all system peak forecasts, including the 1 in 20 forecast.[142]

H. FBC Is Proactively Addressing Resiliency and Will Consider More Systematic Approaches to Evaluating Resiliency in its Next LTERP

103. FBC defines resiliency as follows:[143]

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139 Exhibit B-2, BCUC IR1 18.1; Exhibit B-13, CEC IR2 65.2.

140 Exhibit B-11, BCUC IR2 50.1. Also see Exhibit B-3, BCSSIA IR1 12.3 for a list of reference studies and reports that FBC considered when developing Sections 2.3, 2.4, and 5.0 of the LTERP, which discuss climate change impacts.

141 Exhibit B-2, BCUC IR1 18.1; Exhibit B-13, CEC IR2 65.2. Also see Exhibit B-26, BCUC Panel IR1 1.1.

142 Exhibit B-1, LTERP, p. 121; Exhibit B-2, BCUC IR1 21.1 and 21.3; Exhibit B-26, BCUC Panel IR1 2.1.1.

143 Exhibit B-21, Rebuttal Evidence, p. 3

> Resiliency refers to the ability to prevent, withstand, and recover from system failures or unforeseen events. Resiliency is directly linked to the concept of reliability in the sense that a system cannot be resilient without first having reliable components. However, resiliency also encompasses concepts such as preparing for, operating through, and recovering from significant disruptions, no matter the cause.

104. FBC submits that it is taking a proactive approach to resiliency, and that its plan to provide a more systematic analysis of resiliency in its next LTERP is appropriate given recent events such as the June 2021 heat dome.

105. FBC addresses these points in the subsections below.

(a) FBC is taking a Proactive Approach to Resiliency

106. FBC's proactive approach to resiliency is apparent from the LTERP and the evidentiary record in this proceeding. FBC addresses resiliency in the LTERP from several different perspectives, showing the following:

- FBC's existing supply-side resources include a mix of diverse and flexible resources that demonstrate FBC's attention to developing a resilient supply-side portfolio over time.
- FBC evaluated future resource portfolios based on high-level resiliency criteria.
- FBC has been proactively investing in the asset resiliency of its transmission and distribution system to maintain reliable and resilient assets and mitigate climate-related risks.

107. Each of these points is discussed below.

Existing Supply-side Resources are Diverse and Flexible

108. As discussed in Part Three, Section D above, FBC's current supply-side resource portfolio includes a mix of diverse and flexible resources. These resources enable FBC to withstand, adapt and recover from a variety of short-term sudden and unexpected events. FBC notes the following:

- FBC has significant flexibility to withstand unplanned loads or unit outages on an operational basis including by increasing market energy and capacity purchases, and increasing PPA energy and capacity (if not already at its maximum). [144]

- FBC's calculation of its planning reserve margin (PRM), i.e. the dependable capacity above the expected peak demand required to maintain a targeted level of system resource adequacy, shows that FBC's Loss of Load Expectation (LOLE) is well below the target of 0.1 for all years of the planning horizon.[145] In its decision regarding the 2016 LTERP, the BCUC accepted FBC's PRM methodology, noting it is consistent with industry practice.[146]

- FBC has several options to respond to outages and replace lost power, including operating reserves, purchasing replacement power from the wholesale market, reducing the amount of surplus WAX capacity that it sells to Powerex under the CEPSA, and increasing its usage under the PPA contract with the BC Hydro.[147]

109. The diversity and flexibility of FBC's existing resources demonstrates FBC's attention to resiliency in developing its resources over time.

FBC Evaluated the Resiliency of Future Resource Portfolios

110. FBC explicitly considered resiliency in the LTERP in its assessment of alternate supply-side resource portfolios under various load scenarios. Specifically, FBC's portfolio evaluation framework[148] assesses portfolios against various criteria, two of which related to resiliency: operational flexibility and geographic diversity. Operational flexibility and geographic diversity are attributes that can help FBC respond to and recover from extreme events and help mitigate the risk of supply loss and transmission-related risk, such as by making FBC less reliant on particular transmission assets for its supply.[149]

111. FBC evaluated each of its three preferred portfolios against these criteria.[150]

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144 Exhibit B-1, LTERP, p. 197; Exhibit B-6, BCSEA IR1 6.3.

145 Exhibit B-1, LTERP, Appendix M, Table 3-1, p. 17; Exhibit B-21, Rebuttal Evidence, p. 4.

146 BCUC 2016 LTERP Decision and Order G-117-18, June 28, 2018, page 26.

147 Exhibit B-21, Rebuttal Evidence, p. 4. Exhibit B-9, CEC IR1 28.3.

148 See Section 11.3.8 of the LTERP.

149 Exhibit B-24, CEC IR3 86.1.

150 Exhibit B-1, LTERP, pp. 192-193.

- Operational flexibility refers to the ability of the portfolio to manage higher than expected energy and capacity loads, over a short period of time, such as due to the June 2021 heat dome, or over a longer period of time due to unexpected load growth.[151] More specifically, operational flexibility refers to the dispatchability of the resource, meaning the utility can ramp up and ramp down generation on short notice to match load requirements, which enhances the ability of the utility to respond to disruptive events[152] Therefore, as discussed further below, FBC gave its preferred portfolios that have RNG SCGT plants higher ratings for operational flexibility. An SCGT plant has operational flexibility as it is both dispatchable (i.e., the utility controls the fuel source) and is not duration constrained.[153]

- Geographic diversity reflects whether or not the portfolio resources are located within or near the Kootenay or Okanagan regions of FBC's service area.[154] As FBC's existing generation resources are located within the Kootenay region, while most of FBC's customer load requirements are in the Okanagan, adding resource options to the Okanagan improves FBC's resource diversity. FBC gave all three of its preferred portfolios a 'high' geographic diversity ratings given that they contain solar resources, which are located in the Okanagan, as well as battery and SCGT plants, which could be located in either region and most likely closer to key load growth centres, like Kelowna.

112. Portfolios that do not include an RNG SCGT Plant, such as portfolio C4, have lower operational flexibility. The portfolios without RNG SCGTs require a large and diverse number of renewable resources to replace the year-round dependable capacity that would be provided by an SCGT plant. For example, generally speaking, within portfolio C4, wind resources provide capacity during the winter peak, solar resources provide capacity during the summer peak, and the portfolio is supported by larger battery storage.[155] This provides less operational flexibility for the following reasons:[156]

- Solar and wind are similar intermittent resources in that they do not have consistent output over the year, may or may not provide energy during peak hours, and require the utility to take power when it is produced, which may vary

[151] Exhibit B-1, LTERP, p. 192.

[152] Exhibit B-22, BCUC IR2 65.3.

[153] Exhibit B-22, BCUC IR3 65.2.

[154] Exhibit B-1, LTERP, p. 192.

[155] Exhibit B-22, BCUC IR3 65.2.

[156] Exhibit B-22, BCUC IR3 65.2.

from when it is needed. While the geographic diversity of portfolio C4 does provide some resiliency benefits, there is little to no operational flexibility.

- Other generation types that provide year-round dependable capacity, such as biomass or geothermal, generally operate as baseload resources with high load factors and therefore do not increase operational flexibility and are generally more costly.

- Intermittent resources are located and interconnected to the system where climate conditions are best for energy production, rather than where it best meets system load requirements.

- While batteries are a flexible and dispatchable resource in normal operations, during extreme events it may be very difficult to recharge the battery as often and as quickly as needed. If the battery cannot be recharged, it ceases to be a resource for the remaining duration of the event. Batteries may become limited by charging cycles during heat waves and cold snaps.[157] Batteries are an effective tool to help manage the daily load shape but do not have sufficient energy storage to provide power throughout an adverse system event that takes multiple days to repair.

113. FBC provided the following illustrative scenario:[158]

> To illustrate, consider the hypothetical scenario where an extended extreme cold weather event in January covers BC, as well as the western portion of the US, resulting in a general lack of both energy and capacity throughout the region. It is unlikely that solar or run-of-river resources would provide much, if any, generation during the peak hours as the sun usually sets before the evening peak and run-of-river resources may be frozen. Wind may provide moderate generation, but there is no guarantee the wind speed will be substantial. Baseload generation such as biomass would be valuable but utilized as a baseload resource and unable to ramp up generation further to provide extra energy during peak hours. Battery storage would be valuable if sufficiently charged, which may or may not be possible depending on the dispatch earlier in the day. Furthermore, if there is damage affecting the transmission system, the battery may not be able to charge until repairs are complete. On the other hand, provided fuel supplies are available, an SCGT would be able to ramp up production to help meet peak loads plus run during non-peak hours to provide extra localized energy if it is needed. A portfolio without SCGTs would need to rely on market power as well as a fully operational transmission path, which may or may not be available. Transmission aside, market power would likely be

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157 Exhibit B-9, CEC IR1 44.

158 Exhibit B-22, BCUC IR3 65.2.

provided by a third-party SCGT, as opposed to wind or solar, during an extreme event, as gas-fired generation is generally the marginal resource at the top of the regional resource stack.

114. In summary, FBC evaluated its preferred portfolios against resiliency criteria. FBC's preferred portfolio (portfolio C3) provides high levels of resiliency given that its resource mix provides high geographic diversity and higher levels of operational flexibility with two SCGT plants using RNG fuel, which is important for contingency planning and the ability to help manage unexpected and sudden changes in loads.[159]

FBC is investing in the resiliency of its transmission and distribution system

115. FBC's LTERP also addresses resiliency in terms of its transmission and distribution system planning. Specifically, 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.[160]

116. As stated in the LTERP: "FBC invests in the asset resiliency of its transmission and distribution system to maintain reliable and resilient assets and mitigate climate-related risks."[161] As noted above, FBC has been building climate resiliency using its standards and practices over time, including hardening the power system to withstand higher wind speeds and redesigning substations that fall within a flood zone.[162] Furthermore, as discussed in Part Three, Section G above, FBC is planning to implement strategies to maintain reliable and resilient assets and mitigate climate-related risks, including a roadmap for climate change adaptation.[163]

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[159] Exhibit B-1, LTERP, p. 195; Exhibit B-21, Rebuttal Evidence, pp. 4 to 5; Exhibit B-22, BCUC IR3 65.2.

[160] Exhibit B-21, Rebuttal Evidence, p. 5.

[161] Exhibit B-1, LTERP, p. 140.

[162] Exhibit B-1, LTERP, p. 140; Exhibit B-2, BCUC IR1 24.1; Exhibit B-21, Rebuttal Evidence, p. 5.

[163] Exhibit B-2, BCUC IR1 24.4; Exhibit B-21, Rebuttal Evidence, p. 5.

117. FBC notes two other features of the LTERP related to the transmission and distribution system.

118. First, in Section 6.2.2 of the LTERP, FBC discusses the eight transmission interconnections between the FBC system and the systems of neighbouring transmission entities, including BC Hydro. FBC's transmission interconnections improve reliability and resiliency by providing the flexibility to move energy between FBC and other utilities (primarily BC Hydro), to transfer FBC's own resources from the point of generation in the Kootenays to its major load centre in the Okanagan, to import market power, and to provide economic benefits based on the ability to share generation operating reserves. FBC's ability to import and export electricity from other members of the Western Interconnection improves system reliability and resiliency, and has economic benefits, by allowing FBC to access transmission and generation resources that it would not otherwise be able to access.[164]

119. Second, Section 2.1.1 of Appendix M (2021 Planning Reserve Margin Report) to the LTERP discusses FBC's Imbalance Agreement with BC Hydro, which provides some resiliency benefits to FBC customers in low probability, but high consequence events. Although the Imbalance Agreement is not a service or reliability planning tool, imbalance energy may transfer between the FBC and BC Hydro systems during unexpected conditions.[165]

FBC is Proactively Addressing Resiliency

120. In summary, FBC is taking a proactive approach to resiliency by developing and implementing plans to ensure its transmission and distribution system and supply portfolio remain resilient in the future.[166]

(b) A More Systematic Approach to Resiliency is Appropriate for the Next LTERP

121. FBC submits that a more systematic approach to resiliency is appropriate for its next LTERP. In the intervener evidence filed by the RCIA, Midgard Consulting Inc. (Midgard) takes

[164] Exhibit B-21, Rebuttal Evidence, pp. 5-6.

[165] Exhibit B-21, Rebuttal Evidence, p. 5.

[166] Exhibit B-21, Rebuttal Evidence, p.6.

issue with FBC's approach to resiliency, stating that FBC's resiliency framework is under-developed and proposing a different framework for evaluating resiliency.[167] FBC submits that the proper response to the issue raised by Midgard is for FBC to consider methods to improve its consideration of resiliency in the LTERP, develop an approach in consultation with stakeholders, and propose an approach in its next LTERP for the BCUC's review.

122. First, while FBC considers a more systematic approach to resiliency in future LTERPs is warranted in light of recent events, FBC's approach to resiliency as reflected in the 2021 LTERP has been appropriate and effective. Midgard's evidence regarding resiliency raises a timely issue for consideration. However, there is no evidence that Midgard's recommendations are indicative of industry best practices or have been implemented anywhere in the utility industry. Midgard was not able to identify any utilities in North America that practice resiliency evaluation in their long-term planning as described by Midgard.[168] Midgard also states that it is not its experience "that most utilities make use of resiliency planning to a greater degree than presented by FBC."[169] Therefore, Midgard has not identified any aspect of FBC's LTERP that is out of step with long-term resource planning practices.[170] FBC therefore submits that the BCUC can and should accept FBC's 2021 LTERP as being in the public interest.

123. Second, while FBC's approach to resiliency has been appropriate and effective, FBC proposes to expand its approach to more systematically consider resiliency in its next LTERP in light of the extreme and unpredictable weather events that have occurred in the recent past. These events include the June 2021 heat dome, which occurred less than two months prior to the filing of the Application on August 4, 2021. A more systematic approach 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. To undertake this approach, FBC would need to develop evaluation criteria for its portfolio analysis and likely need to include resiliency in its LTERP planning

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167 Exhibit C8-6.

168 Exhibit C8-7, RCIA's response to BCSEA IR1 3.6.

169 Exhibit C8-7, RCIA's response to CEC IR1 8.1.

170 Exhibit B-21, Rebuttal Evidence, p. 11.

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. FBC therefore notes that this expanded approach may require increased resources.[171]

124. Third, while FBC agrees that a more systematic approach to resiliency would be beneficial, FBC does not agree with Midgard's suggested use of long-term load scenario planning for the purposes of assessing a portfolio's resiliency to short-term disruptive events. The LTERP scenario planning is based on assessing the impacts of load drivers, which are 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. Load scenario planning is a useful method for determining which resources may be required to meet various load scenarios over the planning horizon and is consistent with the BCUC Resource Planning Guidelines.[172]

125. However, FBC submits that the BCUC need not make any determination on the appropriate way to improve FBC's framework for considering resiliency at this time. Rather, FBC recommends that FBC explore improving its approach further and develop an enhanced approach to resiliency with input and feedback from stakeholders, such as through the LTERP RPAG process. FBC would then bring forward recommendations as part of the development of its next LTERP.[173] FBC submits that this is the appropriate response to the timely issue of resiliency raised by Midgard in its evidence.

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[171] Exhibit B-21, Rebuttal Evidence, p. 11.

[172] Exhibit B-23, RCIA IR3 3.2.

[173] Exhibit B-21, Rebuttal Evidence, p. 11.

PART FOUR: CONCLUSION

126. FBC submits that the BCUC should accept the 2021 LTERP, including the 2021 LT DSM Plan, as being in the public interest. A Draft Order sought is included in Appendix P2 of the LTERP.

ALL OF WHICH IS RESPECTFULLY SUBMITTED

Dated:	August 18, 2022	***[original signed by Chris Bystrom]***
		Christopher R. Bystrom
		Counsel for FortisBC Inc.