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FortisBC Inc.
2021 Long-Term Electric Resource Plan and
2021 Long-Term Demand-Side Management Plan

Decision
and Order G-380-22

December 21, 2022

Before:
A. K. Fung, KC, Panel Chair
C. M. Brewer, Commissioner
A. Pape-Salmon, Commissioner

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Executive summary

On August 4, 2021, FortisBC Inc. (FBC) filed the 2021 Long-Term Electric Resource Plan (2021 LTERP) including its 2021 Long-Term Demand-Side Management Plan (LT DSM Plan) under section 44.1(2) of the *Utilities Commission Act* (UCA). FBC is seeking the British Columbia Utilities Commission's (BCUC) acceptance of the 2021 LTERP including the LT DSM Plan as being in the public interest pursuant to section 44.1(6) (Application).[1]

The 2021 LTERP presents FBC's long-term plan for meeting the forecast customer peak demand and energy requirements with demand-side and supply-side resources over the 20-year planning horizon (2021 to 2040). The LT DSM Plan illustrates different levels of demand-side resource options for assessment along with supply-side resource options in meeting the load-resource balance gaps over the planning horizon identified within this LTERP.

The Panel finds that the 2021 LTERP including the 2021 LT DSM satisfies the applicable criteria set out in section 44.1(8) of the UCA and accordingly, accepts the plan in whole as being in the public interest.

The 2021 LTERP shows FBC does not require any new supply-side resources until at least 2030. According to FBC's analysis, existing supply resources and contracts, continued access to reliable and cost-effective market energy, and the level of DSM proposed in the Base DSM scenario are expected to be sufficient to meet the needs of FBC's customers until that time. In that respect, the Panel considers the 2021 LTERP may be reassuring to those who receive service from FBC in confirming that there is no need to invest in costly system expansions in order to serve load, at least between now and 2030. The Panel is further satisfied that FBC's preferred resource portfolio appropriately balances the relevant considerations for long-term resource planning in an environment of uncertainty, and best meets the 2021 LTERP objectives in terms of balancing cost-effectiveness, reliability, inclusion of cost-effective DSM and consideration of BC's energy objectives.

However, the Panel notes that FBC's additional load scenario analysis shows a gap between FBC's Reference Case load forecast and the increases in load attributable to its "Deep Electrification" and "Diversified Energy Pathway" scenarios which might result from actions taken in response to government policy. Should either of these load scenarios emerge earlier than anticipated during the 20 year planning horizon, FBC may need to substantially adjust its resource plan in order to meet that increased load. This may well require FBC to file a new resource plan and pursue additional supply side resources earlier than it might otherwise have done. Accordingly, FBC should ensure that it has contingency plans on hand to address that gap. While we agree that a reduction in future load is unlikely given government and public expectations for increased electrification, we find FBC's overall approach to managing unplanned changes in load to be reasonable in the meantime. FBC has identified viable options for additional resources and more than adequately addressed how and when these resources will be brought on-stream during the term of this 2021 LTERP.

The Panel is persuaded that the evidence in this proceeding demonstrates that FBC's goal of pursuing year-round capacity self-sufficiency beginning in 2030 is an appropriate part of its long-term resource planning and that its plan to meet the June capacity gap using firm market block purchases until 2030 is an appropriate interim measure.

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

However, the Panel also acknowledges that we are in the midst of an uncertain energy transition and circumstances may change between now and 2030 requiring a re-examination of FBC's 2030 goal for year-round capacity self-sufficiency and the need for an earlier implementation. Accordingly, the Panel directs FBC to provide the following information with respect to capacity self-sufficiency in its next LTERP:

1. An updated assessment of market risks and ability to meet demand;
2. An update on the ability to secure firm market blocks for June capacity and timing for planned capacity self-sufficiency for all months (currently scheduled for 2030); and
3. An assessment of the cost-effectiveness of capacity self-sufficiency as compared to other options.

Lastly, the Panel directs FBC to file its application for review and acceptance of its next LTERP no later than December 31, 2026, unless ordered otherwise by the BCUC. As the Panel observed above, changing circumstances and unexpected increases in load may require FBC to file a revised plan and pursue additional supply side resources sooner than 2026.

1.0 Introduction

1.1 Application and Order Sought

On August 4, 2021, FortisBC Inc. (FBC) filed the 2021 Long-Term Electric Resource Plan (2021 LTERP) including its 2021 Long-Term Demand-Side Management Plan (LT DSM Plan) under section 44.1(2) of the *Utilities Commission Act* (UCA). FBC is seeking the British Columbia Utilities Commission's (BCUC) acceptance of the LTERP including the LT DSM Plan as being in the public interest pursuant to section 44.1(6) (Application).[2]

FBC is a vertically integrated electric utility that generates, transmits, and distributes electricity to approximately 144 thousand direct customers in the southern interior of BC, in addition to approximately 38 thousand indirect wholesale customers in the communities of Summerland, Penticton, Grand Forks and Nelson.[3]

The LTERP presents FBC's long-term plan for meeting the forecast customer peak demand and energy requirements with demand-side and supply-side resources over the 20-year planning horizon (2021 to 2040). The Application is divided into two volumes: Volume 1 contains the overall 2021 LTERP, and volume 2 describes FBC's LT DSM Plan filed as part of the LTERP. The LT DSM Plan provides FBC with different levels of demand-side resource options for assessment along with supply-side resource options in meeting the load-resource balance gaps over the planning horizon identified within this LTERP.

Briefly stated, FBC's 2021 LTERP shows that it does not require any new supply-side resources until at least 2030, and accordingly FBC does not seek any approvals in this Application. FBC bases this conclusion on several assumptions, in particular its Reference Case load forecast, existing supply 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. However, this requirement could be delayed until at least 2031, depending on the amount of electric vehicle (EV) charging load FBC is able to shift from peak demand periods.[4] FBC intends to bring forward any requests for approval of specific resource needs that are identified within the 2021 LTERP for evaluation and review through a separate application to the BCUC if warranted.[5]

1.2 Legislative Framework

Subsection 44.1(2) of the UCA requires that that a public utility must file with the BCUC a long-term resource plan that includes all of the following:

a) An estimate of the demand for energy the public utility would expect to serve if the public utility does not take new demand-side measures during the period addressed by the plan;

b) A plan of how the public utility intends to reduce the demand referred to in paragraph (a) by taking cost-effective demand-side measures;

[2] Exhibit B-1, p. 1.
[3] Ibid., pp. 2-3.
[4] Ibid., Executive Summary. p. 1.
[5] Ibid., p. 1.

c) An estimate of the demand for energy that the public utility expects to serve after it has taken cost-effective demand-side measures;

d) A description of the facilities that the public utility intends to construct or extend in order to serve the estimated demand referred to in paragraph (c);

e) Information regarding the energy purchases from other persons that the public utility intends to make in order to serve the estimated demand referred to in paragraph (c);

f) An explanation of why the demand for energy to be served by the facilities referred to in paragraph (d) and the purchases referred to in paragraph (e) are not planned to be replaced by demand-side measures; and

g) Any other information required by the BCUC.

With respect item g) above, this includes information which the BCUC in the FBC 2016 LTERP Decision[6] encouraged or directed the utility to provide in its next LTERP. It also includes consideration of the BCUC's Resource Planning Guidelines[7] which provide guidance regarding information to be included in a resource plan.

In determining whether to accept the 2021 LTERP as being in the public interest, or reject it, in whole or in part, this Panel must consider the factors laid out in section 44.1(8) of the UCA, namely:

a) the applicable BC's energy objectives;

b) the extent to which the plan is consistent with the applicable requirements under sections 6 and 19[8] of the *Clean Energy Act*;

c) whether the plan shows that the public utility intends to pursue adequate, cost-effective demand-side measures; and

d) the interests of persons in BC who receive or may receive service from the public utility.

Section 6 (4) of the *Clean Energy Act* (CEA) states that a public utility must consider BC's energy objective to achieve electricity self-sufficiency, when planning in accordance with section 44.1 of the UCA for the following:

(a) the construction or extension of generation facilities, and

(b) energy purchases.

With respect to the LT DSM Plan, the Demand-Side Measures Regulation[9] (DSM Regulation) defines the adequacy requirements and cost-effectiveness tests that the BCUC must use in evaluating the plan. These are reviewed in Section 4 of this Decision.

[6] FortisBC Inc. 2016 Long Term Resource Plan and Long Term Demand Side Management Plan Decision and Order G-117-18 dated June 28, 2018

[7] BCUC Resource Planning Guidelines, https://docs.bcuc.com/documents/Guidelines/RPGuidelines_12-2003.pdf

[8] Section 19 of the *Clean Energy Act* applies only to prescribed utilities with respect to targets in relation to clean or renewable resources. FBC is not a prescribed utility under section 19.

[9] BC Reg. 326/2008.

1.3 Regulatory Process

By Order G-265-21, the BCUC established a regulatory timetable for review of the Application. The amended regulatory timetable[10] provided for: two rounds of information requests (IRs) to FBC; filing of intervener evidence by one of the interveners, the Residential Consumer Intervener Association (RCIA) and IRs to RCIA; the filing of rebuttal evidence by FBC and IRs to FBC; two rounds of panel IRs to FBC; and final and reply arguments.

Nine interveners registered in the proceeding, namely:

- RCIA;
- BC Sustainable Energy Association (BCSEA);
- BC Solar and Storage Industries Association (BCSSIA);
- Commercial Energy Consumers Association of BC (the 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);
- Movement of United Professionals (MoveUP);
- Columbia Power Corporation , Brilliant Power Corporation , Brilliant Expansion Power Corporation and Waneta Expansion Power Corporation; and
- British Columbia Hydro and Power Authority (BC Hydro).

Of the nine interveners named above, the last two did not file any file argument. In addition to the nine registered interveners, nine entities registered as “interested parties,” of which one provided a letter of comment. The BCUC received one additional letter of comment from a member of the public.

1.4 Structure of the Decision

The remainder of the Decision addresses the following:

- Section 2 assesses the key components of FBC’s 2021 LTERP including the load forecast and load scenarios and the parties’ key submissions with respect to these components.
- Section 3 reviews the development of the LT DSM Plan, and assesses the cost-effectiveness and adequacy of the LT DSM Plan in accordance with the UCA and the DSM Regulation.
- Section 4 considers whether BCUC acceptance of the 2021 LTERP including the LT DSM Plan is in the public interest.
- Section 5 explores other issues which arose during the proceeding, including resiliency, climate change and FBC’s role in decarbonising the BC energy sector and reducing greenhouse gas (GHG) emissions.

[10] The regulatory timetable was subsequently amended in Orders G-292-21, G-314-21, G-24-22, G-130-22 and G-199-22.

- Section 6 discusses the timing of filing of the next LTERP along with recommendations for the development of FBC's subsequent LTERPs.

2.0 FBC's 2021 LTERP

The development of a long-term resource plan involves several steps, many of which are outlined in the BCUC's Resource Planning Guidelines as well as section 44.1(2) of the UCA. Key aspects of FBC's 2021 LTERP are described in this section, beginning with FBC's analysis of the load forecasts, which determine the annual energy and peak demand requirements of FBC's customers, and additional alternative load scenarios which explore the factors that might affect future load requirements over the planning horizon.

Sections 2.2 to 2.4 of this Decision review FBC's existing supply resources and explore demand and supply resource options for meeting future load, and the impacts on the transmission and distribution systems. We conclude this section with a discussion of the load resource balance after including demand side measures, and the process followed by FBC to arrive at its preferred portfolio of resources for meeting system needs over the LTERP's 20 year planning horizon.

2.1 Load Forecasts and Load Scenarios

Section 44.1(2)(a) of the UCA requires that FBC provide an estimate of the demand for energy the public utility would expect to serve during the period covered by the 2021 LTERP, before any demand-side measures (DSM) are included.

The BCUC's Resource Planning Guidelines outline that resource plans should include the development of a range of gross (pre-DSM) demand forecasts. These forecasts should take into account factors in the broader planning context which are not affected by utility actions, and exclude actions the utility can take to influence demand.[11] FBC has developed a Reference Case load forecast of the expected annual energy and peak demands of its customers to represent the most likely forecast to be used for planning purposes, providing for a range of possible variability around this forecast. The key underlying assumptions and methodology are outlined below.

With respect to the changing energy policy environment, the BCUC's Resource Planning Guidelines require that a resource plan be consistent with government policy as it is expressed in legislation or in specific policy statements. Emerging policy issues may be addressed as risk factors.[12] As part of this 2021 LTERPP, FBC has taken the additional step of developing a range of alternative load scenarios to explore the impact of emerging technologies, policies, climate change and changes in how customers use e energy that could impact load drivers that are not captured in the Reference Case load forecast.

Given that some interveners such as BCSSIA have raised concerns with the treatment of these emerging factors in the Reference Case relative to the identified load scenarios, this section addresses both the load forecasts and the additional alternative load scenarios. As discussed below, the difference between the two is that the Reference Case load forecast represents FBC's best estimate of most likely gross demand based on historical load drivers plus any new highly-certain loads and light-duty EV charging load. In contrast, the alternative load

[11] BCUC Resource Planning Guidelines, p. 3.
[12] Ibid., p. 5.

scenarios were developed by FBC as an additional measure to test the sensitivity of the different resource portfolios to alternative energy futures.[13]

2.1.1 Reference Case Load Forecast

FBC developed its LTERP Reference Case load forecast in April 2020 to inform the development of the other elements of the 2021 LTERP with the goal of filing its resource plan by mid-2021.[14] This LTERP Reference Case load forecast, which FBC ultimately filed as part of its 2021 LTERP on August 4, 2021, was finalized prior to both the June and December, 2021 extreme weather events in the Pacific Northwest, as well as the release of the CleanBC Roadmap to 2030 (Roadmap) on October 25, 2021.

FBC developed its Reference Case load forecast using the following elements:[15]

- The business as usual (BAU) forecast for gross energy load, net energy load and peak demand, consisting of historical load drivers;[16]
- The Reference Case (expected) forecast builds on the BAU forecast, and includes gross energy load, net energy load and peak demand for "highly certain (industrial) loads and light-duty EV charging load;"
- The factors and conditions that influence FBC's load growth over the planning horizon for the BAU and reference case; and
- The load forecast drivers that result in variability of the forecast and provide a probability range around the Reference Case load forecast.

BAU Forecast

The BAU is developed first, and is built up from separate residential, commercial and industrial forecasts, each employing a different methodology. [17]

The residential BAU is calculated by applying a ten-year trend to the normalized historical use-per customer (UPC). The before-DSM UPC forecast is then multiplied by the forecast average customer count (based on BC Stats population forecasts) to derive the before-DSM load forecast. The before-DSM UPC is forecast to decline from 10.15 MWh in 2021 to 9.44 MWh in 2024. However, with trends towards more electrification of end uses, FBC views that a continuation of the current downward trend in UPC is not realistic. If the downward trend in UPC were to continue, the before savings UPC by 2041 would be approximately half of the current value, which would be further reduced by DSM. As a result, FBC has held the residential UPC constant for the remainder of the 20-year planning horizon.[18] FBC states it is unable to quantify the exact impacts of various electrification factors on the residential UPC and, therefore, chose to hold the UPC constant for the remainder of the planning horizon, starting in 2024.[19]

[13] Exhibit B-1, p. 96.
[14] Exhibit B-1, p. 85.
[15] Ibid., p. 82.
[16] Ibid., p. 96.
[17] Ibid., pp. 82, 84.
[18] Ibid., Appendix F, pp. 6-7.
[19] Ibid., Exhibit B-13, CEC IR 71.2.

The industrial load in BAU was developed using a survey for the 43 industrial customers in FBC's territory, representing approximately 12 percent of FBC's gross energy load.[20] The BAU forecast includes new projects with near 100 percent certainty of completion, and in the current forecast includes six cannabis production facilities and one forestry customer.[21] All seven of the loads associated with new industrial customers included in the BAU forecast have materialized at this time. All of the new cannabis customer loads are currently in the commercial class, as they have not yet ramped up production enough to be moved into the industrial class.[22]

In terms of previous trends with respect to the accuracy of the industrial survey, FBC notes that "over the past five years (2016 to 2020) there has been an average variance of 1.6 percent between forecast and actuals for the industrial class, indicating that the individual customers are, on an aggregate basis, proficient at forecasting their future demand."[23]

Reference Case Energy Load Forecast

The Reference Case gross energy load forecast builds onto the BAU forecast, and includes the following:[24]

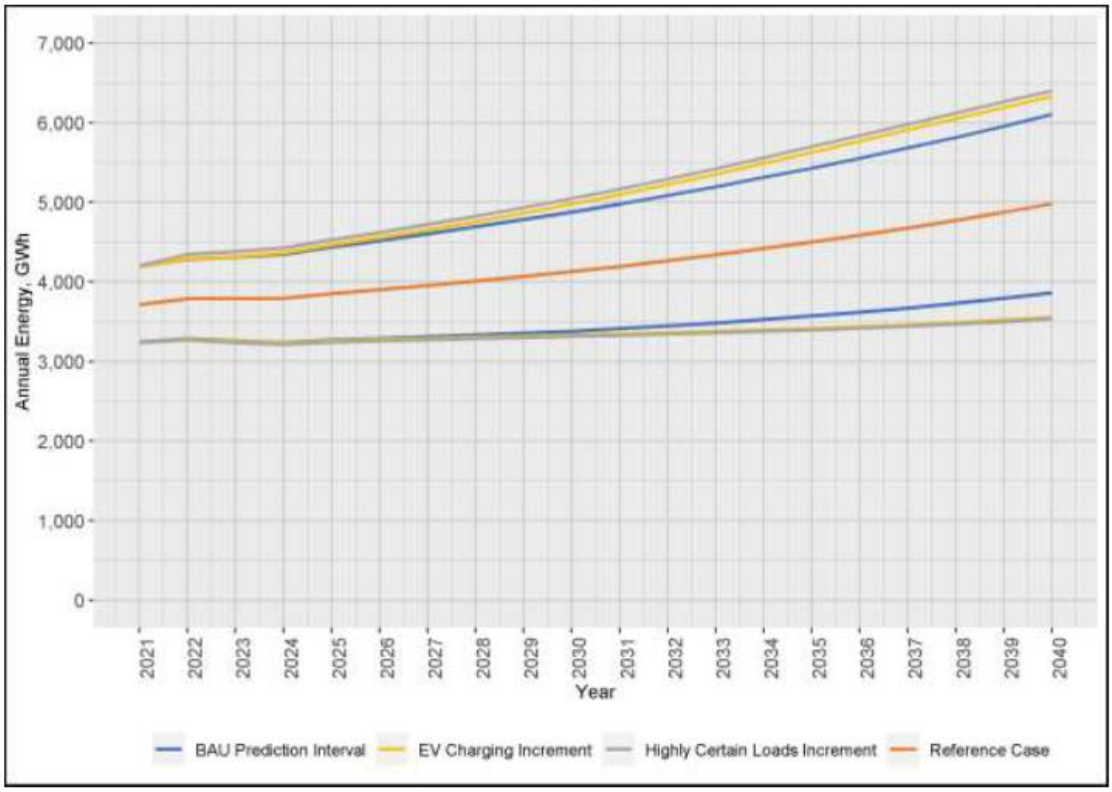
- EV charging load forecast based on the *ZEV Act* light-duty EV sales targets. FBC has confirmed that its light-duty EV uptake includes both residential and commercial vehicles.[25] The Reference Case assumes no mitigation programs or initiatives are in place to shift home EV charging off peak demand periods.[26]
- New highly certain industrial customer loads, determined by FBC key account managers as having a 75 percent probability of occurring, include loads from a waste-water treatment facility, a renewable energy facility and long term increases from a current forestry sector customer. [27]

FBC acknowledges that its potential new industrial load growth is very likely to be impacted by BC Hydro's Load Attraction program. This has already been seen, with some new large load customers choosing to locate in BC Hydro's service territory rather than FBC's service territory. Regarding projected load growth based on existing customers, FBC does not expect that BC Hydro's Load Attraction program will have a significant impact since these customers have existing facilities and infrastructure that will be costly to re-locate.[28]

To account for future variability in the Reference Case load forecast, FBC developed uncertainty bands around the Reference Case load forecast comprised of three elements, namely a statistical variation around the BAU forecast, and upper and lower band forecasts for the EV and industrial loads, as shown in Figure 1 below.[29]

[20] Exhibit B-1, p. 90.
[21] Exhibit B-2, BCUC IR 8.7; Exhibit B-4, BCOAPO IR 8.4.
[22] Exhibit B-11, BCUCIR 46.1.
[23] Exhibit B-2, BCUC IR 8.6.
[24] Exhibit B-1, pp. 82, 89.
[25] Exhibit B-2, BCUC IR 7.1.
[26] Exhibit B-1, Appendix F, p. 18.
[27] Ibid., p. 90; Exhibit B-2, BCUC IR 8.11.
[28] Exhibit B-11, BCUC IR 46.3.
[29] Exhibit B-1, Figure 3-6, pp. 91-92

Figure 1: Reference Case Annual Energy Forecast and Uncertainty Bands (GWh)



Reference Case Peak Demand Forecast

The Reference Case peak demand forecast is the highest level of capacity expected to be needed at one point in time on the FBC system due to high customer demand, which is affected by weather and customer growth. FBC's system is dual peaking, with annual winter and summer peaks. Winter peaks have historically been larger than the summer peaks and are forecast to continue to be larger in the future.[30] Peak load requirements are modelled on historical records (typically winter peaks) and the most recent summer peak occurred in the summer of June 2021, after FBC had prepared the load forecast for the LTERP.[31]

The Reference Case winter and summer peak forecasts do not include any shifting of EV loads to off peak periods, as FBC currently has no EV charging mitigation programs in place.[32] Future options to address EV loads and mitigate peak impacts are explored further in Section 2.4.2 below.

Impact of Recent Policy Changes

FBC has confirmed that despite the release of the Roadmap after the filing of its 2021 LTERP on August 4, 2021, the assumptions and results presented in the 2021 LTERP, including the Reference Case load forecast, are generally aligned with the Roadmap. As such, FBC still considers the Reference Case load forecast to be the most representative reflection of current policies and market conditions that will impact demand over the planning

[30] Ibid., p. 87.
[31] Ibid., p. 88.
[32] Ibid.

horizon. As these Roadmap elements further develop over time, however, FBC expects that future LTERPs will include appropriate updates.[33]

2.1.2 Additional Alternative Load Scenario Analysis

As already mentioned above, in addition to developing uncertainty bands around the Reference Case using established load forecast methodologies, FBC asked its consultant Guidehouse Canada Ltd. (Guidehouse) to develop a range of alternative load scenarios in the context of the ongoing energy transition and the additional uncertainty this imposes on FBC over the planning horizon. These scenarios recognize "that emerging technology, government policies, climate change and changes in how customers use and provide energy could impact load drivers that are not captured in the Reference Case forecast….They are not alternate load forecasts, but are rather possible future pathways for electricity use."[34] [Emphasis added.] According to FBC, these scenarios simply provide examples of the potential impacts on FBC's future load requirements if specific load drivers occurred at specific growth or penetration levels, and were used in the 2021 LTERP to compare the sensitivity of different resource portfolios to changes in load in the context of an uncertain energy transition.[35]

The nine load drivers considered to have the most substantial impact on future loads include: residential integrated photovoltaic solar and storage; commercial integrated photovoltaic solar and storage; adoption of all types of electric vehicles; fuel switching from gas to electricity; fuel switching from electricity to gas; climate change; large load sector transformation; hydrogen production; and carbon capture and storage.[36]

The three primary alternative load scenarios consisted of: [37]

- **Deep Electrification**, which imagines a future world with a focus on decarbonization via electrification, partially supported by an increase in distributed generation;
- **Diversified Energy Pathway**, which imagines a future world in which decarbonization is pursued in large part through renewable natural gas, hydrogen production and carbon capture and storage; and
- **Distributed Energy Future**, which imagines a future world in which highly favourable contracts with distributed energy (rooftop solar) producers would result in a steep increase in electricity rates due to FBC's fixed operating costs being distributed across lower energy sales volumes.

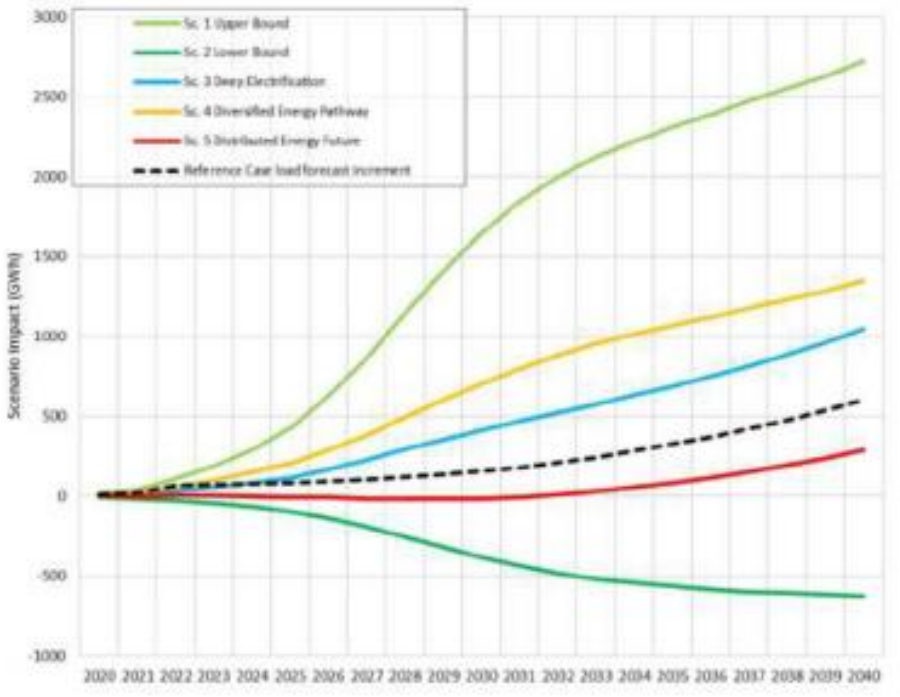
Two additional scenarios were created to reflect possible upper and lower bounds, that reflect the notional limits of increases or decreases that could be expected under (highly improbable) conditions.[38]

FBC also provided its Resource Planning Advisory Group (RPAG) stakeholders with the opportunity to model their own load driver penetration levels and scenario impacts. The stakeholder average scenario was determined by averaging the sum of the individual stakeholders' responses for each load driver in each year of the planning horizon.

[33] Exhibit B-11, BCUC IR 49.1.
[34] Exhibit B-1, p. 96.
[35] Exhibit B-1, p. 174
[36] Ibid., pp. 98-99.
[37] Ibid., pp. 101-102.
[38] Ibid.

The following figure (Figure 2) compares the annual energy impacts of the various load scenarios (excluding the stakeholder average scenario)[39] to the Reference Case.[40]

Figure 2: Annual Energy Impact of the Various Load Scenarios to the Reference Case



FBC confirms that the scenario results are highly dependent on the penetrations assumed for the various load drivers.[41] It provides a table summarising the various scenario assumptions for the nine load drivers included in the scenario analysis, showing the assumed penetration for each load driver in each scenario.[42] Additionally, FBC notes that:

> ...(m)ore large load sector transformation (LLST) was assumed for Scenario 4 (Diversified Energy Pathway) than in Scenario 3 (Deep Electrification) on the basis that additional electrification of space and water heating in Scenario 3 would consume excess system capacity, and hence electricity infrastructure would not be able to keep up with the significant incremental electricity requirements. This would therefore reduce the incentive to attract large loads when compared with Scenario 4, in which electric-to-gas fuel switching would increase available capacity for other electricity loads.[43] [Emphasis added]

The proceeding explored the sensitivity of the scenario results to the underlying assumptions regarding the penetration of, for example, the floor space allocated to large loads and the amount of hydrogen production.[44]

[39] A comparison of the stakeholder average scenario with the Guidehouse load scenarios is available in Exhibit B-1, p. 108.
[40] Exhibit B-8, RCIA IR 21.1.1.
[41] Exhibit B-2, BCUC IR 16.4.
[42] Exhibit B-1, Appendix H, p. vi.
[43] Exhibit B-11, BCUC IR 48.1.
[44] Ibid., BCUC IR 48.2-48.4.

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.[45]

In Section 13 of the Application, FBC provides its action plan, which is a twelve-item list of activities that FBC intends to pursue over the next four years based on the discussion and conclusions provided in the 2021 LTERP (Action Plan).[46] Development of an action plan is an element of BCUC's Resource Planning Guidelines.[47]

As part of the Action Plan, FBC intends to monitor the planning environment and sources of load driver information and update its long-term load forecast annually to determine if changes in planning are warranted, specifically noting tracking of changes in the following areas: customer solar PV installation; EV registration data; and, annual temperature data.[48]

Positions of the Parties

BCOAPO raises concerns with the BAU modelling for the residential UPC, and submits that if FBC is not able to provide a satisfactory explanation in reply, a more appropriate approach would be to assume a modest increase in the annual UPC for at least the initial five years of the forecast period.[49]

In reply, FBC states that BCOAPO's suggestion that the historical residential UPC would have increased annually without DSM is not correct. FBC provides an alternative calculation to support its view.[50]

The CEC finds the BAU forecast is not unreasonable in its relationship to historical growth in the region.[51] However, the CEC notes that the FBC assumptions with respect to the residential UPC have been set as flat going forward, thereby ignoring past evidence of declining UPC, which FBC defends because it finds an assumption of a continuation of the UPC decline to be unrealistic. The CEC does not find the FBC assumptions with respect to UPC for residential customers to be particularly convincing, and recommends that the BCUC direct FBC to develop a more robust understanding of the UPC declines for the next LTERP.[52]

FBC submits in reply that the BCUC should not make such a direction. The historical residential UPC is influenced by many factors, and understanding historical declines in UPC will not resolve the unknown future impacts from factors such as electrification and increased working from home. In the next LTERP, FBC will have more years of actual data to inform its forecast, which will be more informative than any efforts to unravel the multiple causes of historical declines in UPC.[53]

[45] FBC Final Argument, p. 26.
[46] Exhibit B-1, pp. 213-217.
[47] BCUC Resource Planning Guidelines, p. 5.
[48] FBC Final Argument, p. 26.
[49] BCOAPO Final Argument, p. 11.
[50] FBC Reply Argument, p. 18.
[51] The CEC Final Argument, p. 4.
[52] Ibid., p. 6.
[53] FBC Reply Argument, p. 17.

The CEC finds the Reference Case load forecast to be potentially overly optimistic, given electricity use efficiency and effectiveness changes taking place, even with the projected EV transition expected to occur over the next 20 years.[54] The CEC's concern with the Reference Case is that it "is substantially based on individual ownership of vehicles and does not account for any autonomous delivery and transportation future with significant efficiencies nor for technical improvement in vehicle energy use. Nor does the forecast consider potential technical changes in vehicle charging such as with magnetic field induction charging in high use roadways and highways or localized renewable solar energy charging."[55]

In reply, FBC submits the Reference Case includes an EV charging load forecast based on the light-duty EV sales targets in the *Zero-Emissions Vehicles Act*, which is enacted legislation and therefore, reasonably included in the Reference Case. In contrast, innovations like autonomous delivery and charging through magnetic field induction are not commonplace and not yet available in FBC service area, and their potential impact on FBC's load is also unknown.[56]

ICG notes FBC's acknowledgement that that FBC's potential new [Industrial] load growth is very likely to be impacted by BC Hydro's Load Attraction program. ICG submits that given the significant rate advantage realized by BC Hydro customers as compared to FBC customers and the BC Hydro Load Attraction program, the forecast of industrial load growth in the FBC service area should follow the 10-year historic trend of 0.5 percent.[57]

Although ICG does not accept the forecast of industrial growth trends, ICG acknowledges that the options identified by FBC in the event of lower than expected loads under the Reference Case are reasonable and more likely to be implemented than actions identified by FBC to manage the potential for unplanned increases in load.[58]

Given the evidence on the record coupled with the context in which FBC and its prospective industrial customers have been operating in recent years, BCOAPO has no issues regarding FBC's Industrial Load Forecast.[59] BCOAPO submits that, subject to clarification regarding the Residential Reference Load Forecast and the implication of the 2021 heat dome event on the peak demand forecast, FBC's Reference Load Forecast generally meets the requirements of the BCUC's Resource Planning Guidelines as well as section 44.1(2) (a) of the UCA. As a result, BCOAPO considers the forecast to be reasonable for purposes of the 2021 LTERP. [60]

The CEC provides of number of recommendations to improve the load forecast, including recommending that the BCUC direct FBC to provide in its future LTERPs a forecast of summer peaks potentials based on climate change projections and that FBC's long term plans reflect the potential for these peaks to exceed winter peaks.[61]

[54] CEC Final Argument, p. 5.
[55] Ibid., para. 29.
[56] FBC Reply Argument, p. 15.
[57] ICG Final Argument, p. 5.
[58] Ibid., pp. 4-5.
[59] BCOAPO Final Argument, p. 14.
[60] Ibid., p. 17.
[61] CEC Final Argument, p. 4.

FBC submits in reply:

> While FBC appreciates the concern with respect to the impact of climate change, long-term forecasts based on climate change projections should be dealt with through load scenarios, rather than through the load forecast. FBC's load forecasts are based on BCUC-approved methods and include the impacts of weather events from previous years. As noted above, FBC is including the impacts of the 2021 heat dome in its load forecasts going forward. 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. FBC's inclusion of the June 2021 heat event in all system peak forecasts, including the 1 in 20 forecast, is a reasonable foundation for the load forecast. The impacts of more uncertain longer-term climate change projections are more appropriately considered through load scenarios.[62]

MoveUp and BCSEA do not directly comment on the reasonableness of the load forecast.

BCSSIA submits that, other than EV and industrial loads, FBC's Reference Case resource plan does not appear to include any additional initiatives intended to expand electrification as a means to reduce GHG emissions.[63] BCSSIA considers that FBC should have adopted an average of its Deep Electrification and Diversified Energy Pathway for its Reference Case, and should be planning to put the infrastructure in place to meet the higher load driven by government GHG reduction targets.[64] BCSSIA states that "implementing the LTERP's Reference Case resource plan will result in virtually no contribution to reaching the much needed (and Government mandated) GHG reduction targets. To BCSSIA, this appears to be a plan that will fail to achieve at least one of its primary objectives. Such a plan does not satisfy the BCUC's mandate for approval."[65]

In response, FBC submits that, contrary to BCSSIA's view, its Reference Case is the most reasonable forecast on which to base its planning as it is rooted in historical trends, highly certain loads and elements that have been enacted into legislation, such as EV sales targets.[66]

FBC submits that "the various load scenarios depend on trends developing that are not yet apparent in the historical data, such as increasing rates of distributed generation, and the emergence of large new loads, such as through substantial growth in data centre and cannabis cultivation loads, hydrogen production and carbon capture and storage. The uncertainty of future load scenarios is also reflected in the wide range of scenarios provided by stakeholders."[67]

In response to differing views from interveners on the reasonableness of the Reference Case load forecast, FBC submits that it "recognizes the uncertainty in the Reference Case forecast and therefore developed annual energy and winter capacity uncertainty bands around the forecast. FBC also thoroughly analyzed various future load scenarios. Given the potential for a higher load forecast to develop, FBC is taking the appropriate actions to manage the potential for unplanned increases in load, as discussed on pages 26 to 37 of its Final Argument. FBC submits that this approach is reasonable and should be accepted."[68]

[62] FBC Reply Argument, p. 16.
[63] BCSSIA Final Argument, p. 6.
[64] Ibid., p. 17.
[65] Ibid., p. 9.
[66] FBC Reply Argument, p. 14.
[67] FBC Reply Argument, p. 14.
[68] Ibid., p. 15.

We address additional submissions by BCSSIA and other interveners related to future electrification and FBC's role in addressing GHG emissions later in Sections 4 and 5.3 below.

Panel Discussion

Reference Case Load Forecast

The Panel is satisfied on balance that the current Reference Case load forecast in this 2021 LTERP is reasonable, and that FBC has addressed the requirements of section 44.1(2)(a) of the UCA by providing a reasonable estimate of demand for energy FBC would expect to serve prior to any new demand side measures during the planning horizon. We caution, however, that load drivers such as the rate of EV uptake, changes in customer generation and changes in temperature need to be carefully monitored to determine impacts on the plan.

Due to the timing of the 2021 LTERP filing, the Panel accepts FBC's decision to develop the Reference Case load forecast based on then available data which did not include the actual 2021 load. Despite reservations expressed by some interveners, we also find FBC's treatment of the residential UPC to be reasonable. The Panel accepts FBC's explanation that its method of calculating residential load growth is appropriate, and that, contrary to BCOAPO's submission, regression data, which includes both DSM and non-DSM savings, does not equate with the total year over year DSM savings. Therefore, there is no basis upon which to assume a greater UPC or a resulting upward trend in future residential load (as suggested by BCOAPO) as a consequence of increased electrification.

Additionally, the Panel does not consider the CEC's recommendation that the BCUC direct FBC to develop a more robust understanding of the UPC declines for the next FBC LTERP to be necessary, and accepts that a review of the declines in the UPC over the past ten years may be less relevant to understanding future demand forecasts than current trends in electrification and changes in the workplace. The relevance of these trends will likely be more apparent over the upcoming years.

While noting ICG's concerns respecting FBC's potential industrial load loss due to BC Hydro's plan to pursue load attraction, the Panel finds FBC's industrial load forecast to be reasonable. Basing it on known or committed projects presents a realistic projection of growth, which can be assessed and revised in future LTERPs as the scope of changes relating to electrification becomes more apparent.

The Panel rejects the CEC's recommendation that the BCUC direct FBC to provide in future LTERPs a forecast of summer peak potentials based on climate change projections. The Panel notes that FBC's current methodology for developing expected load forecasts is based on the weather events from previous years and is satisfied with FBC's proposal to include the June 2021 heat dome event in its load forecasts going forward in all system peak forecasts. The Panel further agrees with FBC's response that more uncertain longer-term climate change projections are more appropriately considered through its alternative load scenario analysis.

Additional Alternative Load Scenario Analysis

The Panel notes that in addition to developing uncertainty bands around the Reference Case using established load forecast methodologies, FBC also instructed Guidehouse to develop an additional alternative load scenario analysis in the context of the ongoing energy transition and the additional uncertainty this imposes on FBC over

the long-term. The Panel acknowledges that the purpose of this additional load scenario analysis was to test the robustness of possible resource portfolios to possible future pathways for electricity use compared to the Reference Case load forecast and to explore the possible range of outcomes during an energy transition. However, that additional load scenario analysis reveals two potential vulnerabilities in FBC's long-term resource planning.

The first relates to the gap between the Reference Case load forecast and the increases in load attributable to the "Deep Electrification" and "Diversified Energy Pathway" scenarios, as demonstrated by Figure 2, that might result from actions taken in response to government policy. As that figure illustrates, the load will increase beyond FBC's Reference Case load forecast in order to meet the Government's objectives in either case. Should either of these load scenarios emerge earlier than anticipated during the planning horizon, FBC may need to substantially adjust its resource plan in order to meet that increased load. This may well require FBC to file a new resource plan and pursue additional supply side resources earlier than it might otherwise have done. Accordingly, FBC should ensure that it has contingency plans on hand to address that gap.

The second relates to some of the differing assumptions relating to large load (industrial) sector transformation in the "Deep Electrification" and "Diversified Energy Pathway" scenarios which, according to Guidehouse's analysis, results in higher electricity demand in the Diversified Energy Pathway scenario than in the Deep Electrification scenario. This appears to the Panel to be somewhat counter intuitive. By way of example, the Panel is not persuaded by the FBC submission that infrastructure constraints due to the electrification of space and water heating under the Deep Electrification scenario are a reason to remove prospective industrial loads from that scenario. This approach is inconsistent with FBC's treatment of EV charging loads, included in the Reference Case load forecast. In fact, the LT DSM Plan aims to shift part of that load to off peak periods to serve this load growth, despite capacity constraints. Furthermore, the Panel views that the LTERP must consider all plausible scenarios, including those involving both deep electrification of space and water heating in buildings and industrial loads, and provide DSM and resource scenarios to address gaps in the load resource balance. Accordingly, the Panel recommends that FBC consider changing its analysis of future load scenarios in its next LTERP with this expectation in mind.

By way of further comment on FBC's alternative load scenario analysis, the Panel notes that in late 2021, the BCUC initiated a process involving BC Hydro and FortisBC Energy Inc. (FEI) to explore joint energy scenarios as part of their respective long term resource plan proceedings.[69] As part of its 2021 Integrated Resource Plan proceeding, BC Hydro has developed additional electricity load forecasts based upon the gas load scenarios contained in FEI's 2022 Long Term Gas Resource Plan (LTGRP), and vice versa. While FBC was not part of this process, the Panel observes two of the main load scenarios in FBC's 2021 LTERP, namely the Deep Electrification and Diversified Energy Pathway scenarios, reflect the load scenarios in the FEI 2022 LTGRP. In future FBC LTERPs, the Panel encourages FBC to continue exploring a range of load scenarios that align with or are related to scenarios being explored by FEI. Further, to the extent there are any learnings from the joint energy scenarios exercise that may be applicable to FBC, we encourage FBC to consider any opportunities for enhanced collaboration with other utilities in the development of its next LTERP.

[69] https://www.bcuc.com/OurWork/ViewProceeding?applicationid=959

2.2 Supply Side Resources

Having considered the reasonableness of the load forecast and the load scenarios in FBC's 2021 LTERP, we now review its existing supply side resources as of 2021, followed by its supply-side resource options, which are supply-side energy and capacity resource options available to FBC to meet any load-resource balance gaps over the 20-year resource planning horizon

Section 44.1 (2)(e) of the UCA requires a resource plan to include information regarding the energy purchases from other persons that the public utility intends to make in order to serve the estimated demand after taking into account cost-effective demand side measures (discussed in Section 2.4 below). FBC's approach is outlined here in Section 2.2 with respect to both existing and possible supply options, and in Section 2.5 in the context of the overall portfolio analysis.

In addition, the BCUC's Resource Planning Guidelines outline that feasible individual supply resources, both committed and potential, should be listed in the resource plan.[70]

2.2.1 Existing Supply-side Resources

FBC's existing supply-side resources consist of:[71]

- FBC-owned generating plants and the associated entitlements under the Canal Plant Agreement (CPA);
- Brilliant Power Purchase Agreement (BPPA) entitlements;
- Brilliant Expansion (BRX) entitlement purchases;
- Waneta Expansion Capacity Purchase Agreement (WAX CAPA) entitlements;
- Purchases under the BC Hydro Power Purchase Agreement (PPA);
- Purchases from Independent Power Producers (IPPs); and
- Market and other contracted purchases.

FBC's existing available energy and dependable capacity resources as of 2021 are provided in the following table:

[70] BCUC Resource Planning Guidelines, p. 4.
[71] Exhibit B-1, p. 112.

Table 1: FBC's 2021 Available Energy and Dependable Capacity Resources[72]

FBC Existing Resources (2021)	Available Energy (GWh)	Dependable Capacity (MW)
FBC CPA Entitlements	1,596	208
BPPA	919	138
BRX	79	45
PPA (Tranche 1 Energy)	1,041	-
PPA (Tranche 2 Energy)	711	-
IPP	1	-
Market and Other Contracted	302	-
PPA Capacity	-	200
WAX (net of RCA)	-	218
Total Resources	4,648	810

FBC identifies that there are some changes to its existing portfolio of resources over the planning horizon:[73]

- The Residual Capacity Agreement, which contracts FBC to sell a 50 MW block of WAX CAPA to BC Hydro, expires September 30, 2025, and for the purposes of the LTERP, FBC is assuming that it is not renewed. FBC will sell the remaining surplus WAX CAPA residual capacity to Powerex Corp. (Powerex) on a day-ahead basis if and when the capacity is not required to meet FBC load requirements.
- BRX entitlement contracts with FBC expire at the end of 2027 and renewal is not assumed beyond that date. FBC currently purchases a portion of the capacity and energy entitlements attributed to BRX from Brilliant Power Corporation, with the remaining portion of BRX entitlements under contract with BC Hydro. Given BC Hydro's entitlement contracts expire in a similar timeframe, FBC identifies that the entire set of entitlements may be available as a future resource option to meet FBC's resource needs.
- The PPA with BC Hydro expires in 2033. FBC's base assumption for its portfolio analysis is that the BC Hydro PPA will continue in a similar form past the current expiry date in 2033. FBC plans to review the PPA in 2023 to determine if negotiations should begin with BC Hydro to renew the PPA in its current form or some alternate form.

2.2.2 Supply-Side Resource Options

This section discusses the various supply-side energy and capacity resource options that are available to FBC to meet any load-resource balance gaps over the planning horizon. These include base load, peaking and intermittent/variable generation resources as well as purchases from the market and supply from self-generators.[74]

The following table provides a summary of the resource options evaluated in FBC's portfolio analysis including their resource type, dependable capacity, and annual energy:

[72] Ibid., Table 5-1, p. 112.
[73] Ibid., p. 119.
[74] Ibid., p. 173.

Table 2: Resource Options Type and Size Summary[75]

Resource Option[179]	Portfolio Analysis Short Name	Type	Number of Plants in FBC Portfolio Analysis	Average Dependable Capacity (MW)	Annual Energy (GWh)
PPA Tranche 1 Energy	PPA	Baseload	N/A	N/A	Up to 1,041
PPA Tranche 2 Energy	PPA	Baseload	N/A	N/A	Up to 711
PPA Capacity	PPA	Baseload	N/A	Up to 200	N/A
Market Purchases	Market	Baseload	N/A	Up to 75	Up to 3,241
Wood-Based Biomass	Biomass	Baseload	3	9 – 30	73-237
Geothermal	Geothermal	Baseload	4	15 – 75	130 - 657
Gas-Fired Generation (CCGT)	CCGT	Baseload	3	67 – 279	528 – 2,201
Small hydro with storage	Hydro	Baseload	4	8 - 50	77 - 443
Gas-Fired Generation (SCGT) - NG	SCGT	Peaking	3	48 – 100	75 – 158
Gas-Fired Generation (SCGT) - RNG	RNG_SCGT	Peaking	3	48 - 100	75 - 158
Pumped Hydro Storage	PSH	Peaking	2	100 – 1,000	N/A
Onshore Wind[180]	Wind	Intermittent	13	21 – 133	196 – 1,239
Run-of-River Hydro	RoR	Intermittent	3	2 – 6	16 - 52
Utility Scale Solar	Solar	Intermittent	11	4 - 107	28 - 754
Distributed Solar[181]	DistSolar	Intermittent	3	0 - 2	2 - 15
Battery Storage[182]	Battery	Peaking	1	39	N/A
Distributed Battery Storage[183]	DistBattery	Peaking	1	24	N/A

When evaluating the various resource options noted above in its portfolio analysis, which is discussed further in Section 2.5 of this Decision, FBC takes into account various attributes of each resource option.[76] These include:

- Technical attributes, which describe the energy and capacity characteristics of the resource options. FBC has grouped its resource options into three distinct dispatch categories: base load resources, peaking resources and variable/intermittent resources and considers that a balanced resource portfolio could include a combination of these supply-side resource types.[77]
- Financial attributes, which are described by two simplified cost metrics: unit capacity cost (UCC) and unit energy cost (UEC). UCC is the annualized cost of providing dependable capacity for each resource option, expressed in $ per kW-year. UEC is the annualized cost of generating a unit of electrical energy using a specific resource option, expressed in $ per MWh. The unit costs include capital, fixed operating and variable operating, including any fuel costs.[78]
- Environmental Attributes, which describe the estimated environmental impact of the various resource options.[79]

[75] Exhibit B-1, pp. 165-166, Table 10-1.
[76] Ibid., p. 161.
[77] Ibid., pp. 162-163; Appendix K, pp. 5-6.
[78] Ibid., p. 163; Appendix K, pp. 6-7.
[79] Ibid., p. 164.

- Socio-Economic Attributes. FBC has categorized the socio-economic development attributes for each resource option into low, medium and high impact categories using employment contributions as a proxy for all the socio-economic development benefits.[80]

In addition to the resource options identified in Table 2 above, FBC identifies the following resource options that may represent future opportunities:

- Expiring Energy Purchase Agreements (EPAs): FBC states that about 70 of BC Hydro's electricity purchase agreements are expiring over the next 20 years, representing approximately 9,100 GWh of firm energy and 1,300 MW of dependable capacity. FBC identifies that there may be opportunities for it to acquire power from these expiring EPAs on a cost-effective basis in the future and will continue to monitor the BC Hydro contract renewals for any resource option opportunities.[81]
- Purchases from Self Generators: FBC identifies that electricity purchases from self-generating customers may be a supply option for FBC in the future. Self-generating customers, for the purposes of this LTERP, refers to larger, industrial customers that can provide electricity to FBC as opposed to smaller, residential or commercial customers that could provide distributed generation to FBC. FBC states that it is not seeking additional sources of supply at this time and is therefore not actively looking to purchase power from self-generator customers. However, if a self-generator could provide power at a cost lower than FBC's alternatives, there may be an opportunity for FBC to purchase the output of the self-generation.[82]

FBC's Action Plan item #9 identifies that it will continue to monitor developments regarding potential future resource options.[83]

Positions of the Parties

ICG submits that 2021 LTERP is inconsistent with BC's energy objectives because it does not consider self-generation as a resource option and does not include any plans to support self-generation development. ICG submits that the BCUC should direct FBC to investigate and identify the steps necessary to encourage self-generation and consult with existing self-generators in and around its service area for power purchase opportunities.[84]

In reply, FBC states that it did consider self-generation as a resource option and refers to section 10.8 of the Application. FBC states that ultimately, self-generation from larger, industrial customers may or may not be a reliable source of supply depending on the characteristics of the generation and the nature of the agreement that FBC would have in place with the self-generator. As an example, FBC identifies that the industrial self-generation that it currently receives is delivered on a net-of-load, ad hoc basis over which FBC has no control with respect to timing or amount. FBC submits that if it were able to structure these purchases such that the power could be called upon when and in the amount required, it would become a better fit for long-term planning. FBC reiterates its Action Plan item #9, which states that FBC will continue to monitor developments

[80] Exhibit B-1, p. 164.
[81] Ibid., p. 171.
[82] Ibid., pp. 172-173.
[83] Ibid., p. 216.
[84] ICG Final Argument, p. 11.

regarding potential future resource options. FBC states that this will include potential opportunities from self-generators.[85]

With regards to FBC's statement that it plans to review the BC Hydro PPA in 2023 to determine if negotiations should begin with BC Hydro, the CEC views the length of time to negotiate a PPA between the two utilities as being inordinately long. The CEC considers that the basis for renewed agreements and alternatives to renewed agreements should be an assessment of the public interests involved. The CEC recommends that the BCUC direct both FBC and BC Hydro to (1) assess and determine the public interests in the PPA renewal to the point of finding an appropriate balance; and (2) devise a negotiation process that can reliably be carried out to determine appropriate amendments to the existing PPA and/or to achieve substantially greater efficiency in developing a renewed PPA to meet the public interest.[86]

FBC submits in reply that such a direction would not be appropriate. FBC reiterates that it did not say that negotiations would take ten years, and it plans to begin review of the PPA in 2023 to determine if negotiations with BC Hydro should begin. FBC states that FBC and BC Hydro each have their own interests and are sophisticated parties that can and will negotiate the terms of any PPA renewal on their own. FBC also notes that BC Hydro is not the applicant in this proceeding and has no opportunity to respond to the CEC's recommendation. As such, FBC considers it would raise procedural fairness issues for BC Hydro to receive such a direction. Lastly, FBC states that the CEC's recommendations have not been explored in any detail in this proceeding and submits that the BCUC does not have an adequate evidentiary foundation to issue any direction in the nature that the CEC recommends.[87]

The CEC makes several recommendations to the BCUC with respect to FBC's consideration of supply side resources in future LTERPs. First, the CEC recommends that the BCUC direct FBC to examine a wider range of battery options than lithium-ion batteries in its next LTERP or before making battery purchases to ensure that its LTERP planning is more robust than that contained in this 2021 LTERP.[88] Second, the CEC recommends that the BCUC direct FBC to explore a greater range of SCGT RNG profiles in its next LTERP. [89] Lastly, the CEC recommends that the BCUC direct FBC to consider potential geothermal technologies for their potential to change the presumptions with respect to energy options that are 100 percent renewable, 100 percent scalable, 100 percent dispatchable and 100 percent flexible for full loading uses. [90]

FBC submits in reply that no such direction is required and reiterates the LTERP's Action Item #9, i.e., FBC will continue to monitor developments regarding potential future resource options. FBC states that it will continue to consider the battery options that are appropriate for FBC in its next LTERP, the range of RNG SCGT profiles that are suitable for its resource-balance gaps and potential opportunities for geothermal.[91]

[85] FBC Reply Argument, pp. 24-25.
[86] The CEC Final Argument, pp. 8-9.
[87] FBC Reply Argument, p. 28.
[88] The CEC Final Argument, p. 14.
[89] Ibid.
[90] Ibid., p. 15.
[91] FBC Reply Argument, pp. 22, 25-26.

Panel Discussion

Based on Table 2 above, the Panel is satisfied that FBC has identified feasible supply resources, including their various financial and other attributes, as part of this LTERP. These supply-side resource options are inputs into FBC's portfolio analysis, as further discussed in section 2.5 of this Decision, which assesses FBC's optimal mix of resources to meet its future energy and capacity requirements.

The Panel acknowledges ICG's and the CEC's recommendations with respect to FBC's consideration of specific supply side resource options, namely, opportunities for self-generation, ranges of battery technologies, ranges of RNG SCGT's and opportunities for geothermal. In general, the Panel is satisfied with FBC's identification and evaluation of the various potential supply-side resources available to FBC in this 2021 LTERP. However, the Panel considers that FBC's evaluation of self-generation as a resource option appears to be somewhat cursory when compared to the other options considered in Appendix K to the Application. As such, the Panel encourages FBC to continue to explore self-generation as a resource option in greater detail, including potential solutions to the barriers associated with ad hoc, net-of-load generation, and to include this analysis as part of the next LTERP.

2.2.3 Market Resources

FBC includes market resources as one of its supply-side resource options available to FBC to meet its load-resource balance gaps. [92]

FBC identifies that market purchases of energy can be a cost-effective and reliable resource within the FBC portfolio. FBC plans to rely on market purchases for energy purposes and has also assumed that future market energy purchases are sourced from clean or renewable generation.[93]

With respect to capacity, however, FBC does not believe that market supply can be relied on as a long-term capacity resource option due to longer term market risks. As such, FBC has assumed capacity self-sufficiency for LTERP planning purposes (i.e., no market purchases), with the exception of the month of June until 2030.

The sections that follow address FBC's plans to rely on the market to fill June capacity gaps until 2030 and to be capacity self-sufficient thereafter as well as transitioning to clean market energy including the use of a clean market adder as a proxy to represent the cost of purchasing only clean market power.

2.2.3.1 Market Capacity

In the 2016 LTERP, FBC set out an objective of achieving electricity self-sufficiency and assumed that after 2025, it would become self-sufficient, which meant that incremental supply would come from its own generation and/or long-term contracts from BC suppliers and there would be no reliance on market purchases. At that time, FBC was of the view that self-sufficiency at some point within the planning horizon was a more prudent approach to resource planning as it could mitigate market risks and provide consistency with the CEA's objective of achieving electricity self-sufficiency.[94]

[92] Exhibit B-1, p. 169.
[93] Ibid., pp. 169-170.
[94] FortisBC Inc. 2016 Long Term Resource Plan and Long Term Demand Side Management Plan Decision and Order G-117-18 dated June 28, 2018, p. 4; Exhibit B-6, BCSEA IR 12.1.

Contrary to FBC's view at the time, the BCUC, in its decision on the 2016 LTERP, found that FBC's objective to achieve electricity self-sufficiency was not in the public interest, and the BCUC rejected self-sufficiency as a valid planning objective for FBC. The BCUC was not persuaded that a provincial target of electricity self-sufficiency, as articulated in the CEA, logically translates into a case for FBC itself (as opposed to BC Hydro) to be self-sufficient. Further, the BCUC did not accept the line of reasoning that expected market conditions require the pursuit of a self-sufficiency objective for FBC at that time.[95] More specifically, the BCUC stated the following:[96]

> … the Panel views the imperative for FBC to consider the energy self-sufficiency objective to obligate FBC to evaluate the extent to which its plan furthers or impedes achieving the provincial objective, *but does not obligate FBC to actively pursue its own self-sufficiency.* [Emphasis added]

In this 2021 LTERP, FBC states that it plans to rely on market purchases for energy purposes and submits its plan not to be energy self-sufficient is consistent with the BCUC's Decision on FBC's 2016 LTERP.[97] With respect to its capacity needs, however, FBC considers that market supply cannot be relied on as a long-term capacity resource option due to longer term market risks. As such, FBC has assumed capacity self-sufficiency for LTERP planning purposes (i.e.: no market purchases), with the exception of the month of June until 2030. However, beginning in 2030, FBC plans to be capacity self-sufficient for all months of the year. 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 thereafter is reasonable and in the public interest.[98]

FBC considers that relying too heavily on wholesale markets to purchase capacity, especially during peak periods, could significantly increase price and reliability risk.[99] FBC states with recent coal plant retirements and the variability of renewable energy, reliance on natural gas-fired generation is expected to increase during peak demand periods in the Western Electricity Coordinating Council (WECC) region. FBC states that this could lead to higher volatility in natural gas prices and in turn increased wholesale power prices if multiple regions within the WECC experience increased demand at the same time, as occurred during the rolling blackouts in California in August 2020 and the Polar Vortex in February 2021. Following these events, FBC identifies that there have been higher wholesale market forward prices, primarily for Q3 2021 capacity power prices, which demonstrate 'scarcity pricing' and potential supply shortages, as utilities and wholesale buyers are concerned about the inability to meet load during peak demand periods, which could lead to loss of load or blackouts. FBC considers that a market facing adequacy concerns and volatile market prices should not be relied upon to meet expected load.[100]

As noted above, the exception to FBC's assumption that it would be capacity self-sufficient is the month of June between now and 2030. For the purposes of this 2021 LTERP, FBC assumes that it will be able to purchase up to 75 MW of June capacity from the market, on a forward block basis as opposed to in 'real time', reliably and cost-effectively until 2030.[101]

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[95] FortisBC Inc. 2016 Long Term Resource Plan and Long Term Demand Side Management Plan Decision and Order G-117-18 dated June 28, 2018 , p. i.
[96] Ibid., p. 7.
[97] FBC Final Argument, pp. 20, 41.
[98] Ibid., pp. 14, 20.
[99] Exhibit B-1, p. 64.
[100] Ibid.
[101] Ibid., p. 64.

FBC states that its plan to rely on firm, fixed-priced market block purchases of up to 75 MW in June between now and 2030 is a significant change from its historical practice of relying on short-term market purchases. FBC explains that it has historically relied on a significant amount of day-ahead and real-time capacity from the market in June. [102] FBC identifies that there is a higher cost for purchasing market blocks than there is for purchasing real-time market capacity on a planning basis. However, FBC believes this higher cost is reasonable due to the increased certainty that capacity will be available to meet customer demand in June.[103]
FBC submits that the June 2021 heat dome event served as a trigger for FBC to re-evaluate its supply-side policies as it 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. FBC considers, however, its 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.[104]

FBC considers that purchasing market blocks in June is more cost effective for customers than building a new resource, because FBC only has a capacity gap in one month of the year (i.e. June) until 2030. FBC states that the forecast cost of market capacity in June from 2021 to 2030 is lower than the forecast cost of other capacity-orientated supply-side resources, as demonstrated by the following table:[105]

Table 3: Forecast of Market Capacity from 2021 to 2030

Year	June Market Capacity ($ per MW-Month)	Battery Storage ($ per MW-Month)	Distributed Battery Storage ($ per MW-Month)	RNG SCGT ($ per MW-Month)
2021	$11,570	$21,572	$18,194	$10,778 to $12,243
2022	$8,328	$20,901	$17,583	$10,759 to $12,224
2023	$7,483	$20,230	$16,971	$10,740 to $12,204
2024	$6,687	$19,559	$16,360	$10,802 to $12,267
2025	$6,400	$18,888	$15,749	$10,883 to $12,348
2026	$5,833	$18,555	$15,446	$10,877 to $12,343
2027	$5,761	$18,222	$15,142	$10,839 to $12,304
2028	$5,019	$17,889	$14,839	$10,845 to $12,310
2029	$4,543	$17,555	$14,535	$10,796 to $12,261
2030	$4,348	$17,222	$14,231	$10,784 to $12,248

FBC explains that the large amount of clean and renewable resources being developed in the Pacific Northwest region results in the forecast June market capacity price decreasing over time, although noting that the volatility in prices may increase and is not reflected here.[106]

FBC states that certain market signals and risks could cause it to change its assumptions from being able to purchase June capacity from the market to instead requiring capacity self-sufficiency (i.e.: not requiring market purchases). For example, one signal that its criteria should be revised would be if FBC were to be unsuccessful in

[102] FBC Final Argument, p. 17.
[103] Exhibit B-26, Panel IR 3.2.
[104] FBC Final Argument, p. 18.
[105] Exhibit B-11, BCUC IR 43.2.
[106] Ibid.

procuring the June capacity it required from the forward market on an ongoing basis.[107] If the Pacific Northwest region were to experience persistent supply shortages and/or increased load requirements during June of each year, likely resulting in higher market prices, FBC states that it would likely move toward capacity self-sufficiency rather than relying on the market. However, FBC considers that it is unlikely that June market prices alone would be the driver behind a June capacity self-sufficiency requirement for FBC because even if market prices were to become very high, it would still likely be more cost-effective to purchase market power at elevated prices for one month of the year, rather than to build a new capacity resource to serve that month's capacity need only. [108]

If FBC were to assume capacity self-sufficiency for all months prior to 2030, instead of relying on market purchases during the month of June as planned, FBC would require new supply-side resources immediately. The earliest, though, that FBC could realistically target capacity self-sufficiency in all months is 2026, as all new resource options considered within the portfolio analysis entail lead times for resource development and construction.[109] FBC identifies that in 2030, load resource balance gaps begin to appear in other months in addition to June, such that it becomes more cost effective to acquire new resources. Therefore, planning for year-round capacity self-sufficiency beginning in 2030 will allow for 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.[110]

Positions of the Parties

BCSEA, BCOAPO and RCIA all agree that FBC's 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.[111]

ICG supports FBC's plans to meet June gaps until 2030 and agrees that it is reasonable to expect market power to be available during June for the foreseeable future. However, ICG submits that the BCUC should not now find that capacity self-sufficiency after 2030 to be reasonable and prudent. ICG submits that whether the price and reliability risk of capacity market purchases may continue to be acceptable beyond 2030 will largely depend on the then prevailing market conditions and the load resource balance at that time. Therefore, ICG considers that the BCUC is going to be in a much better position to assess risks after the filing of the next LTERP, which is expected in 2026. ICG submits that the BCUC should limit its findings and directions to those applicable to the period prior to the expected filing date of FBC's next LTERP.[112]

In reply to ICG, FBC submits that at this time, based on the evidence in this 2021 LTERP, the BCUC should accept its plan to be capacity self-sufficient beginning in 2030. FBC considers that relying on the market for capacity on a long-term basis comes with material risk and is not in the interests of customers. FBC considers that ICG's sole submission to the contrary is that circumstances may change. FBC submits that ICG's position is fundamentally inconsistent with the purpose of filing a long-term resource plan. As conditions can always change before the next LTERP, FBC submits that according to ICG's logic, the BCUC could never accept a long-term plan.[113] FBC

[107] Ibid., BCUC IR 43.1.
[108] Ibid.
[109] Ibid., BCUC IR 43.3.
[110] FBC Final Argument, pp. 19-20.
[111] BCSEA Final Argument, p. 14; BCOAPO Final Argument, p. 35; RCIA Final Argument, p. 11.
[112] ICG Final Argument, pp. 6-7.
[113] FBC Reply Argument, p. 31.

states that the LTERP has a 20-year outlook and requires that some actions take place in the near term to carry out the 20-year plan. Specifically, given long lead times for new resources, FBC needs to plan in advance for new resources and may not be able to wait until the next LTERP. FBC states that the regulatory process provides a way to deal with such changes. Specifically, FBC will need to apply for acceptance of an expenditures schedule or the granting of a CPCN for any new resource such that any changes or new information can be considered by the BCUC at that time. [114]

The CEC submits that FBC's intent to continue to access power markets is in the public interest. The CEC anticipates that it will be important for FBC and the BCUC to determine how self-sufficiency is defined as of 2030 and what the specific impacts are for adopting this strategy. The CEC is concerned that if self-sufficient is defined as the 1st kWh of deficiency not provided from a BC jurisdiction requiring an increment of resource expenditure leading to a supply side resource addition, then the CEC would find this to be less than cost-effective. The CEC would find the definition of self-sufficiency more suitable if it incorporated an averaging over time, such that incremental surpluses and incremental deficits balanced each other out and would lead toward a closer matching of demand and supply over time, which the CEC submits would be in the public interest. The CEC recommends that the BCUC direct FBC to provide a robust analysis of resource planning including different approaches to defining self-sufficiency in order to address the optimum public interest approach in its next LTERP.[115]

In reply, FBC submits that it will consider the CEC's comments in this regard and continue to assess the appropriate level of self-sufficiency and capacity resources in future LTERPs.[116]

Panel Determination

The Panel considers that the goal of self-sufficiency is not limited to a point in time but instead, should be evaluated in the context of an energy transition and changes in market conditions. As already mentioned above, in reviewing FBC's 2016 LTERP, the BCUC found that electricity self-sufficiency for FBC was not a legislative imperative and was not in the public interest based on the prevailing circumstances and market outlook at that time. In particular, the BCUC stated that unlike BC Hydro, which is specifically referenced in CEA, FBC is not, which lead the BCUC to conclude as follows: [117]

> … the Panel views the imperative for FBC to consider the energy self-sufficiency objective to obligate FBC to evaluate the extent to which its plan furthers or impedes achieving the provincial objective, but does not obligate FBC to actively pursue its own self-sufficiency.

Regarding risks related to changes in market conditions, in 2016 the BCUC was not persuaded that events were likely to unfold in a way that either compromises a continuation of the market purchase strategy beyond 2024 and/or that the Planning Reserve Margin (PRM) could fail at some time in the future. For these reasons, it did not accept the line of reasoning that expected market conditions required the pursuit by FBC of a self-sufficiency objective at that time.

[114] Ibid., pp. 31 – 32.
[115] The CEC Final Argument, p. 10.
[116] FBC Reply Argument, p. 32.
[117] FortisBC Inc. 2016 Long Term Resource Plan and Long Term Demand Side Management Plan Decision and Order G-117-18 dated June 28, 2018, p. 7

The Panel acknowledges that there is no legislative imperative for FBC to consider self-sufficiency under the CEA. However, the Panel is persuaded that circumstances relating to market conditions have changed since the BCUC's decision on the 2016 LTERP such that a market purchase strategy beyond 2030 and the goal of self-sufficiency, at least with respect to capacity self-sufficiency, should be re-evaluated for FBC. The increase in electrification, risks related to severe weather events, and a growing demand for clean energy resources in the Pacific Northwest market all have projected impacts on market prices for electricity which should not be ignored. Given these factors, the Panel finds that FBC's goal of pursuing year-round capacity self-sufficiency beginning in 2030 to be an appropriate part of its long-term resource planning. The Panel also accepts, as do all interveners, FBC's plan to meet the June capacity gap using firm market block purchases until 2030 as an appropriate interim measure.

That said, the Panel acknowledges that we are in the midst of an uncertain energy transition and circumstances may change between now and 2030 requiring a re-examination of the 2030 goal for year-round capacity self-sufficiency and the need for an earlier implementation. Accordingly, **the Panel directs FBC to provide the following information with respect to capacity self-sufficiency in its next LTERP:**

1. **An updated assessment of market risks and ability to meet demand;**
2. **An update on the ability to secure firm market blocks for June capacity and timing for planned capacity self-sufficiency for all months (currently scheduled for 2030); and**
3. **An assessment of the cost-effectiveness of capacity self-sufficiency as compared to other options.**

The Panel also agrees with the CEC's submission on the importance of determining how self-sufficiency is defined as of 2030 and reviewing the specific impacts of adopting this strategy.

In the meantime, the Panel is satisfied that should new resources be required by FBC prior to the filing of its next LTERP, FBC is free to apply for a certificate of public and convenience and necessity (CPCN) or acceptance of an expenditure schedule for such resources as needed.

2.2.3.2 Clean Market Energy and the Clean Market Adder

As noted above, FBC plans to rely on market purchases for energy purposes and has assumed that future market energy purchases are sourced from clean or renewable generation. FBC submits that its plan to transition to clean market purchases is in the public interest.[118]

In the 2021 LTERP, FBC adds a clean market adder of $2 per MWh to the electricity market price forecast as a proxy (Clean Market Adder) that is used to represent the cost of purchasing only clean market power.[119] The Clean Market Adder is based on a high-level assessment by IHS Markit[120] to determine the potential cost, if such a market were available. FBC notes that WECC currently does not have a centralized Renewable Energy Certificate (REC) market. FBC states that 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

[118] FBC Final Argument, p. 41.
[119] Exhibit B-1, Section 2.5.7, p. 80.
[120] IHS Markit is a third-party market subscription service used by FEI and FBC. IHS Markit provides market analysis and data as part of the subscription service. Exhibit B-1 p. 68.

of the UCA.[121] FBC notes that it is likely that the Clean Market Adder costs will decline as additional renewable energy projects are built in the Pacific Northwest, resulting in oversupply of RECs in the future.[122]

FBC confirms that the 2021 LTERP includes the concept of a Clean Market Adder in item #8 of FBC's Action Plan. As such, it is seeking acceptance of the concept of such adder as part of the 2021 LTERP. FBC submits that BCUC acceptance of the 2021 LTERP, including the concept of the Clean Market Adder, would only be sufficient to encourage FBC to proceed with negotiation of an agreement for clean market purchases incorporating a Clean Market Adder. FBC anticipates that any negotiated Clean Market Adders would qualify as energy supply contracts, which would be subject to review and acceptance by the BCUC under section 71 of the UCA.[123]

Specifically, FBC confirms that:

> it would seek an approval or acceptance specific to some form of Clean Market Adder as part of the approval or acceptance of any agreement with Powerex that contained a Clean Market Adder, or a similar provision. At the current time, FBC cannot determine whether the form of such a provision would be a specific amount or a formulaic determination. When FBC files the agreement with Powerex, the BCUC would have the opportunity to review the amount, cost and other aspects of any Clean Market Adder.[124]

FBC goes on to clarify that it 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. Where FBC is required to go to the market and clean power under the terms of FBC's contract with Powerex is not available, FBC will purchase non-clean energy into its portfolio as needed to avoid a loss of load event.[125]

FBC clarifies that the BCUC's acceptance of concept of the Clean Market Adder as part of the 2021 LTERP would not amount to approval of any rate, project, program, or expenditure for which FBC would otherwise be required to seek approval or acceptance under the UCA.[126] If the BCUC rejects the 2021 LTERP, however, or specifically rejects the concept of the Clean Market Adder in the 2021 LTERP, then FBC would need to carefully consider the BCUC's reasoning in its decision and determine whether it would still proceed with any negotiations for clean market purchases and file any agreements relating to same with the BCUC.[127]

Positions of the Parties

RCIA supports FBC's argument that the transition to clean market purchases is in the public interest.[128]

ICG submits that BCUC should not approve a Clean Market Adder as part of the 2021 LTERP and should consider approval after the cost of the Clean Market Adder is filed by FBC.[129]

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[121] Exhibit B-27, Panel IR 6.4; FBC Final Argument, p. 42.
[122] Exhibit B-6, BCSEA IR 3.6.
[123] Exhibit B-27, Panel IR 6.1; 6.3.
[124] Ibid., Panel IR 6.1
[125] Ibid., Panel IR 6.4; FBC Final Argument, pp. 41-42.
[126] Ibid., Panel IR 6.3.1.
[127] Ibid., Panel IR 6.3.
[128] RCIA Final Argument, p. 15.
[129] ICG Final Argument, p. 12.

BCSEA supports FBC's argument that the transition to clean market purchases over the planning horizon is in the public interest. [130] BCSEA considers a proxy addition of $2 per MWh to the electricity market price forecast to be a reasonable approach.[131] BCSEA urges the Panel not to reject the concept of the Clean Market Adder in the 2021 LTERP and instead allow the concept to be developed step by step as FBC proposes. [132]

BCOAPO, BCSSIA and MoveUP do not provide submissions on this matter.

Panel Discussion

The Panel agrees in principle with FBC, RCIA and BCSEA that the transition to clean market purchases over the planning horizon is in the public interest and encourages FBC to continue to pursue that strategy as part of its LTERP in order to align with government policy, including the development of portfolios that incorporate clean market purchases. However, the Panel considers blanket acceptance of the concept of a Clean Market Adder to be premature at this time, given the lack of specifics of the quantum of that adder and the circumstances under which it would be invoked.

While an adder might be a reasonable approach for FBC to obtain additional renewable or clean energy in the market, the Panel agrees with ICG that the appropriateness of such a proposal should be considered in the context of a proceeding that reviews the supporting evidence respecting the options and costs and applicability of the adder in the particular circumstances. Furthermore, although a Clean Market Adder using a proxy of $2 per MW may appear on its face to be a reasonable amount, it is purely speculative and may not reflect the actual amount negotiated with a counterparty. The Panel views that FBC's pursuit of clean market purchases, while appropriate as part of long-term resource planning, cannot be at *any* cost to ratepayers who will ultimately have to pay for such purchases. Furthermore, the Panel observes that there are other possibly more effective and efficient means by which to incent utilities to pursue clean market purchases for the benefit of ratepayers, such as direct government subsidies.

Since the Panel views that there is insufficient evidence about the Clean Market Adder in this proceeding to justify a blanket endorsement of this concept, FBC may wish to bring it before the BCUC in a proceeding that can more comprehensively review the specifics of the proposal and the implications on rates. In the meantime, the Panel declines to opine on the appropriateness of an adder in the abstract as part of this proceeding.

As for the impact of the inclusion of the Clean Market Adder on FBC's portfolio analysis, we address this in Section 2.5.2 below.

2.3 Transmission and Distribution

Section 44.1(2)(d) of the UCA provides that a long-term resource plan must include a description of the facilities that the public utility intends to construct or extend in order to serve its estimate of the demand after it has taken cost-effective demand-side measures.[133] This is discussed in section 6 of the Application, which provides the facilities on FBC's transmission and distribution system that it may need to upgrade or construct over the

[130] BCSEA Final Argument, p. 27.
[131] Ibid., p. 25.
[132] Ibid., p. 27.
[133] UCA, Section 44.1(2)(d).

planning horizon, as well as section 11 of the Application, which provides FBC's portfolio analysis and a description of generation facilities that may be needed over the planning horizon.[134] We review the former in this section and the latter in Section 2.6 below.

The subsections that follow describe FBC's system planning methodology that it uses to determine the requirements of its transmission and distribution system along with the anticipated system reinforcements it expects to need over the next ten years. Section 2.3.3 provides an overview of how FBC's transmission and distribution system may be impacted by various emerging technologies and loads that may materialize in future.

2.3.1 System Planning Methodology

This section provides an overview of FBC's load forecasting for system planning purposes, planning criteria and studies, which together help to define the requirements of FBC's power system over the planning horizon.

First, FBC develops its load forecast for system planning purposes, which is a "1 in 20" peak demand forecast.[135] FBC explains that it develops load forecasts for two different purposes: system planning (for transmission and distribution infrastructure planning) and resource planning (for capacity and energy resource planning). FBC states that in order to ensure that FBC's network infrastructure is sufficient to provide a safe and reliable electricity supply to all customers, the transmission and distribution system must be planned, constructed, and operated to meet peak load requirements during extreme weather conditions. This contrasts with the resource planning requirement to acquire energy resources to meet energy and peak demand requirements under "normal" or "expected" weather conditions as set out in the Reference Case load forecast presented in Section 2.1.[136]

Second, FBC provides its planning criteria, which requires that the system be planned, designed and operated to serve all customer loads both during normal operations and during contingency operations (i.e. one or more system elements out of service). FBC considers that its planning criteria are consistent with those used by other utilities in the Western Interconnection.[137]

Lastly, FBC identifies that its transmission planning group conducts system studies to ensure that the system will continue to reliably meet capacity demand in the presence of growing customer load during the planning horizon used for these studies, which is typically 20 years. FBC states that these studies are performed annually and result in the identification of transmission system upgrades required in the short and medium term. FBC notes that the results of these annual studies are shared with BC Hydro as the Balancing Authority to coordinate the overall FBC and BC Hydro electrical system.[138]

2.3.2 Anticipated System Reinforcements

Using the system planning load forecast, planning criteria and studies summarized in the previous section, FBC identifies system reinforcement projects to meet these requirements. FBC states that at the present time, six transmission reinforcement projects have been identified for the FBC system within the next ten years of the 20-

[134] Exhibit B-1, p. 7.
[135] Ibid., Figure 6-2, p. 127.
[136] Ibid., pp. 125-126.
[137] Ibid., pp. 127-128.
[138] Ibid., p. 128.

year planning horizon, which are provided in the following table.[139] The BCUC has already granted FBC a CPCN for one of these projects, the Kelowna Bulk Transformer Capacity Addition.[140]

Table 4: Transmission Reinforcement Projects (2021 to 2030)[141]

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

FBC identifies that the high-level preliminary estimated cost of the projects included in the table above is approximately $128 million.[142]

2.3.3 Potential Impacts of Emerging Technologies and Loads

FBC states that as part of the system planning process associated with the development of the 2021 LTERP, FBC has explored the potential impacts of various emerging technologies and loads that may materialize in future.

As part of its analysis, FBC explored the potential peak demand impacts of the load scenarios described in Section 2.1.2 above on FBC's transmission and distribution system, in terms of potential projects required to meet the additional load and their associated costs. In its analysis, FBC simulated the impacts of the load scenarios only on the Kelowna area and states that this is because Kelowna is the area of FBC's system that is experiencing the highest load growth and would likely have more significant impacts than other parts of the system. FBC did not include the rest of the system in this simulation exercise and assumed that fifty percent of the scenario loads would materialize in the Kelowna area based on the current proportion of system loads between the Kelowna area and the rest of the FBC system.[143]

[139] Exhibit B-1, p. 129.
[140] FortisBC Inc. Application for a Certificate of Public Convenience and Necessity for the Kelowna Bulk Transformer Addition Project Decision and Order C-4-20, dated November 30, 2020.
[141] Exhibit B-1, Table 6-3, p. 130.
[142] Ibid., p. 130.
[143] Ibid., p. 135.

The results of FBC's analysis indicate that should the load scenarios materialize, some planned projects many need to be advanced in time as well as additional projects may be required to meet the additional peak demand.[144]

FBC identifies that all of the load scenarios except for the Distributed Energy Future exceed a level of 550 MW of peak demand by 2040, which is a level that FBC states would require significant additional transmission projects to be completed to meet the Kelowna area peak demand. FBC estimates these additional projects could have an additional estimated project cost of $710 million. However, it notes that if mitigation strategies were employed to reduce these peak demand requirements, then the additional projects could be deferred. FBC also notes that the timing of these additional projects is very dependant on the peak demand forecast and how it materializes over time.[145]

As illustrated by FBC Action Plan item #11, FBC plans to continue to assess transmission and distribution capital infrastructure requirements.[146]

Positions of the Parties

The CEC considers that FBC's transmission and distribution planning in this 2021 LTERP is reasonable and appropriate for the timeframe before the next LTERP.[147]

No other intervener provided submissions on this topic.

Panel Discussion

The Panel is satisfied that FBC has addressed the requirement to include a description of the facilities that it intends to construct or extend in order to serve the estimated demand referred to in section 44.1(2)(d) of the UCA. However, while the Panel considers FBC's transmission and distribution planning to be appropriate, we recommend that as part of its next LTERP, FBC include a system-wide analysis of potential impacts of emerging technologies and increases in load on peak demand and not simply an analysis that is limited to the Kelowna area. Such an analysis will assist in refining where and when new assets are needed, and where best to situate them on FBC's system.

2.4 DSM Resources

As stipulated by section 44.1(2)(b) of the UCA, FBC must plan to meet any future load-resource balance (LRB) gaps using demand-side resources, before considering supply side options. As part of the LT DSM Plan, FBC has evaluated scenarios of different levels of DSM to respond to future load growth, and identified a preferred level of DSM which we review below. In accordance with section 44.1(2)(f) of the UCA, FBC has also provided an explanation of where supply side resources are preferred to additional levels of DSM,[148] as discussed in Section 2.4.1 below. Section 3 below addresses the adequacy and cost-effectiveness of the LT DSM Plan.

[144] Ibid., pp. 136-138; Exhibit B-2, BCUC IR 23.9.
[145] Exhibit B-1, pp. 137-138.
[146] Exhibit B-1, p. 217.
[147] The CEC Final Argument, p. 11.
[148] Exhibit B-1, p. 160.

2.4.1 DSM Scenarios and the Proposed Level of DSM

FBC developed five different DSM scenarios ranging from Low, Base, Medium (Med), High, and Maximum (Max) cases, that were subsequently tested with various supply-side resource options in FBC's resource planning portfolio analyses.

The DSM scenarios considered by FBC are based on increasing incentive amounts to ever larger proportions of the DSM measures' incremental costs, going as high as 100 percent, with steps of 50, 62, 72, 84 percent. The same DSM measures were included in all five of the DSM scenarios, and the uptake was based on the market response to those increasing incentives. This approach supplants the prior metric of expressing DSM savings targets as a percent of load growth offset, used as a voluntary response to the 2007 Energy Plan and 2010 Clean Energy Act targets, the former of which did not go beyond 2020.[149]

The table below shows the projected energy and capacity savings and average resource cost of the various DSM scenarios, as well as the incremental cost of incurring higher incentive levels in the Medium, High and Maximum scenarios compared to the Base scenario. [150]

Table 5: 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

Category	DSM Scenario				
	Low	Base	Med	High	Max
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

While the cumulative results of the five DSM scenarios increase from the 435 GWh/yr in the Base DSM scenario as the level of incentive increases, there is expected to be a non-linear response to increasing incentive levels, resulting in small incremental savings at significantly higher portfolio costs.[151] Notably, the incremental cost of energy savings above the Base DSM scenario per MWh rises rapidly, indicating the declining returns on higher incentive levels, as can be seen from the table above. FBC chose the Base DSM scenario over the Med, High, or Max DSM scenarios because the achievable savings amount of the Base DSM scenario was within 14 percent of

[149] Exhibit B-1, p. 149.
[150] Ibid., Table 8-1, pp. 152-153.
[151] Ibid., p. 150.

the Max DSM scenario, while having an average resource cost ($ per MWh) that was 41 percent lower than the Max DSM scenario. [152]

FBC notes the Base DSM scenario can be characterized as a continuation of the 2016 LT DSM Plan's "High" scenario, [153] which the BCUC accepted as being the preferred DSM portfolio at that time.[154]

Consistent with the BCUC Directives from the 2016 LTERP and LT DSM Plan, FBC used average rather than incremental costs to compare between DSM Portfolios.[155] FBC has employed a non-levelized average cost method for the purposes of comparing the DSM portfolios.[156] Average non-levelized costs ignore the time-value of expenditures and savings achieved across proposed measures.[157] As noted above, FBC reports an average non-levelized cost of $44 per MWh for its Base DSM scenario.[158]

When comparing DSM options with other supply resource options, a levelized unit energy cost is used.[159] The average levelized cost of the proposed DSM level is $38 per MWh, which is well below the DSM cost-effectiveness threshold long-run marginal cost (LRMC) of approximately $90 per MWh.[160] The LRMC is discussed further in Section 3.3.

In further support of FBC's selection of the Base DSM scenario as its preferred scenario in the LT DSM Plan, FBC states that while the Low DSM scenario is more cost-effective, it would require pullback of program offerings, and would limit FBC's ability to scale up programs in the future, should this be required. With respect to the higher DSM scenarios, these were less cost-effective than other resource options, such as market electricity purchases, when comparing the relative costs of resources in Section 10.2.2 of the Application. In addition, given the voluntary nature of DSM participation, FBC considers that the higher DSM scenarios present a higher risk of insufficient customer participation.[161]

FBC cites the 2016 LTERP Decision,[162] which noted "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 it has provided a compelling explanation for why it has chosen the Base DSM scenario, and therefore adequately explained why demand served is not planned to be replaced by DSM measures.[163]

[152] FBC Final Argument, p. 9.
[153] Exhibit B-1, p. 152.
[154] FortisBC Inc. 2016 Long Term Resource Plan and Long Term Demand Side Management Plan Decision and Order G-117-18 dated June 28, 2018, p. 12
[155] Exhibit B-1, p. 14.
[156] Exhibit B-4, BCOAPO IR 39.1.
[157] Exhibit B-17, BCOAPO IR 85.1.
[158] Exhibit B-1, pp.151-152.
[159] Average levelized costs discount future expenditures and savings achieved across proposed measures by FBC's discount rate. (Exhibit B-1, p. 163; Exhibit B-17, BCOAPO IR 85.1) The average levelized cost of DSM is calculated by conducting a net present value calculation that considers all the measure incentive and administration expenditures over the planning horizon and then dividing the resulting amount by the achievable savings. (Exhibit B-17, BCOAPO IR2 85.1).
[160] Exhibit B-1, p.160.
[161] Ibid., pp. 152-153.
[162] Decision and Order G-117-18, p. 12.
[163] FBC Final Argument, pp. 7, 9.

Positions of the Parties

ICG recommends the Base DSM scenario as the preferred DSM scenario.[164]

The CEC notes that FBC employs a single metric to analyze alternate DSM scenarios. The CEC recommends that the BCUC direct FBC in its next LTERP to review the potential to devise alternatives which have other dimensions than incentives for its DSM options and frame them with respect to their upside potential for cost-effective savings versus the uncertainties and the risk for achieving the results.[165]

In reply to the CEC, FBC submits that its current approach of analyzing DSM scenarios based on incenting ever larger proportions of the DSM measures' incremental costs is reasonable because it follows a primary mechanism that customer participation increases if the offered incentive increases. Further, FBC submits that the CEC's suggestion on framing DSM levels with respect to their upside potential has not been explored in this proceeding and its meaning and feasibility are not clear to FBC. FBC submits that potential changes to development of DSM scenarios can be developed as part of FBC's consultation on the next LTERP.[166]

FBC further notes that BC Hydro's 2021 draft Integrated Resource Plan outlines four DSM scenarios, where the higher levels of DSM are characterised by increased incentives (up to 100 percent of incremental customer costs) and marketing efforts relative to the Base Energy Efficiency portfolio. FBC submits that BC Hydro's DSM scenarios generally follow the same principles employed by FBC in this LTERP.[167]

BCSEA submits the preferred Base DSM scenario maintains the "high" DSM scenario from the 2016 LTERP and FBC has satisfactorily explained its selection in the 2021 LTERP of the Base DSM scenario over the other four DSM scenarios.[168]

RCIA notes that all the potential DSM scenarios have average costs that are lower than the LRMC of $90/MWh. However, since the incremental cost compared to the Base DSM scenario for the Med, High and Max DSM scenarios ($183, $190, and $234 per MWh respectively) exceeds the LRMC comparator, RCIA accepts that the Base DSM scenario is cost effective and appropriate. RCIA agrees with FBC that selecting a more aggressive DSM scenario would result in residential ratepayers 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.[169]

RCIA is concerned by FBC's failure to reach target energy savings in recent DSM program results. As such, RCIA asserts that DSM program stability is important to achieving future increases in residential ratepayer participation without burdening ratepayers with unnecessary costs that could result from FBC's inability to field DSM programs that perform to target. RCIA submits this is supported by FBC's selection of the Base DSM scenario, and the rationales given for that selection.[170]

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[164] ICG Final Argument, p. 4.
[165] The CEC Final Argument, p. 11.
[166] FBC Reply Argument, pp. 7-8.
[167] Exhibit B-2, BCUC IR 25.2.
[168] BCSEA Final Argument, pp. 3, 9.
[169] RCIA Final Argument, p. 8.
[170] Ibid., pp. 8-9.

BCOAPO agrees with FBC's preference for the Base DSM scenario over the Low DSM scenario. In BCOAPO's view it is important, given the uncertainty regarding future load growth and the continued uptake of DSM programs, to maintain flexibility and capability with respect to DSM programming.[171]

However, BCOAPO submits it is not clear why the comparison of the DSM scenarios is done on a non-levelized average cost basis when the levelized approach is consistent with FBC's past practice and is the method used in FBC's 2016 LT DSM Plan. In BCOAPO's view, FBC should use a standard definition of average cost throughout its Application and, preferably, one that is consistent with past BCUC decisions.[172]

In reply, FBC acknowledges that it uses both levelized and non-levelized cost approaches, but submits that neither are inconsistent with past BCUC decisions. Nonetheless, FBC will consider this feedback for future LTERPs.[173]

Panel Discussion

The UCA requires the BCUC to consider the future level of DSM as a plan to reduce the demand that the utility intends to serve through cost-effective demand-side measures.[174] The 20-year DSM plan can have a material impact on the load-resource balance and the potential for future supply-side resource needs to fill any gaps.

The Panel comments on two aspects of DSM: first, the methodology used by FBC to establish and evaluate scenarios for DSM; and second, the specific scenario selected for planning purposes.

Firstly, regarding the methodology, FBC considered DSM program scenarios based on increasing incentive amounts to ever larger proportions of the DSM measures' incremental costs. This represents the level of subsidy provided to customers that participate in the DSM program as a proportion of the incremental cost to invest in a more efficient product or practice, upwards to 100 percent. FBC submits the approach supplants the prior metric of expressing DSM savings targets as a percentage of load growth offset and is similar to that used for the BC Hydro 2021 draft Integrated Resource Plan. As clarified by FBC during the proceeding, the other metrics, such as average resource cost of DSM, were also derived from the DSM scenarios.

The CEC recommends that the BCUC direct FBC in its next LTERP to review the potential to devise alternatives which have dimensions other than incentives. The Panel agrees that there is merit to this suggestion and makes a recommendation in this regard for the following reasons.

We consider that metrics based on total savings and costs, as opposed to level of subsidy, to be more appropriate. While the level of subsidy speaks to the level of investment in DSM, it only covers part of the overall DSM costs, does not provide the specific contribution of DSM to the load-resource balance, and cannot be used to directly determine the overall cost-effectiveness which is a principal objective of the legislative requirement in the UCA and the associated DSM Regulation. The level of savings in GWh of electricity and MW of capacity are both constituents of benefit-cost ratios considered in Section 3.0 of this Decision in evaluating

[171] BCOAPO Final Argument, p. 30.
[172] Ibid., p. 28.
[173] FBC Reply Argument, p. 10.
[174] UCA, section 44.1(2)(b).

the cost-effectiveness of the LT DSM Plan. The percentage of load growth, used in the previous LTERP, can be used to determine those savings as well, when considered alongside the load forecast.

The Panel recommends that in FBC's next LTERP, it consider basing its DSM scenarios on metrics such as cumulative DSM savings (e.g., GWh and MW) and/or cost-effectiveness of DSM (e.g., varying Total Resource Cost (TRC) benefit-cost ratios) for defining DSM scenarios in its next LTERP, rather than the level of subsidy or incentives.

Our second comment relates to the selection of the primary scenario for DSM to inform the overall long-term resource plan. FBC submits that the Base scenario, despite being less cost-effective than the Low scenario, maintains consistency with the 2016 LTERP decision which had support from customers and stakeholders. Furthermore, the Base scenario avoids several disadvantages of transitioning to the low scenario, including a necessary pullback of program offerings that would limit FBC's ability to scale up programs in the future, should this be required. The Panel agrees with FBC's assessment.

In our view, the Base DSM scenario provides flexibility to meet future market demands and includes additional budget to further investigate demand response programs that have the potential to cost-effectively defer capacity costs. All of the parties agree with the Base DSM scenario, although some have proposed specific refinements for future DSM scenario development as part of the next LTERP.

The Panel finds that the Base DSM scenario is cost-effective, as the average cost of conserved energy is $38/MWh, well below the avoided long run marginal cost (LRMC) of $90/MWh. Furthermore, the medium, high and maximum DSM scenarios have declining cost-effectiveness with incremental costs of $183, $190, and $234/MWh, respectively, despite maintaining average costs below the LRMC of supply. The Panel notes, however, that the incremental benefits in terms of GWh and MW of savings are not commensurate with the increased incremental costs, thus contributing to the declining cost effectiveness.

In summary, the Panel finds that, on balance, the level of projected electricity consumption and demand savings under the Base DSM scenario to be a reasonable estimate of DSM impacts for the purpose of long-term resource planning and estimating the demand for energy that FBC expects to serve after it has taken cost-effective DSM. Furthermore, the Panel observes that FBC's Base DSM scenario is aligned with the LT DSM Plan that is considered in Section 3.0 below.

2.4.2 Demand Response Pilots

In addition to reducing demand to help meet energy and capacity needs, DSM can include programs that encourage customers to shift their energy consumption from peak demand periods.

FBC is exploring the business case for ongoing DSM programs to scale up demand response (DR) capacity over time, the benefits of which may include deferral of new capacity generation resources and transmission and distribution infrastructure upgrades. In 2019-2020, FBC undertook the first phase of a DR pilot with commercial and industrial customers that focused on (but was not limited to) offsetting summer loads in the Kelowna area, to test the opportunity, and customer willingness, to undertake load shifting during peak demand periods.[175]

[175] Exhibit B-1, p. 153.

FBC is also pursuing a residential DR pilot, which will seek to control and shift demand associated with key household end-uses. The scope includes controls of residential home EV charging, which has been identified as the largest demand growth factor in this 2021 LTERP. [176] 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, and increasing rates for customers.

FBC has considered several strategies to shift at-home EV charging from peak times, including time of use (TOU) rates, a hardware-based approach, and a software-based approach.[177] FBC's preference is to implement a software-based incentive program to encourage shifting home EV charging from peak demand periods while requiring minimal customer involvement, despite noting that TOU rates are widely used by other utilities. The software-based approach shifts load by using software that controls charging directly through the vehicle or through the EV charger. FBC would provide a rebate/bill credit upon verification that peak load has been shifted on a continuous basis. [178] FBC began implementing a pilot program in 2021 to help determine how much shifting of EV charging from peak periods it might be able to achieve. If successful, 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 other options such as TOU rates to meet the objective of shifting EV charging from peak demand periods.[179]

FBC's proposed Action Plan item #4 outlines FBC's intention to implement an EV charging pilot project as part of the wider residential demand response pilot.[180]

Positions of the Parties

BCSEA supports FBC's proposed Action Plan item #4 to implement a program to help shift the timing of home EV charging.[181] BCSEA notes that if the BCUC accepts the 2021 LTERP and FBC proposes to implement a demand response program related to shifting home EV charging, then FBC would be required to seek approval from the BCUC for the program, whether in the next DSM expenditure plan, or separately.[182]

The CEC agrees with the direction FBC is taking to provide a specific solution for EV charging versus more general TOU rates.[183]

ICG agrees with FBC that the need for a program to shift EV charging load is clear.[184] ICG submits that the TOU rate option can be expected to shift more EV charging loads than any of the other options, and states "most regulators have approved TOU rates for EV load charging" but does not provide further details.[185] Instead of TOU rates, FBC proposes incentives to encourage home EV charging during off-peak periods as part of the FBC DSM Program, where the costs will be borne by all customers.[186] ICG submits that FBC should mandate, as soon as

[176] Ibid.
[177] Exhibit B-1, p. 42.
[178] Ibid., pp. 42, 215.
[179] Ibid., p. 44.
[180] Ibid., p. 215.
[181] BCSEA Final Argument, p. 19.
[182] Exhibit B-6, BCSEA IR 4.1.
[183] The CEC Final Argument, p. 6.
[184] ICG Final Argument, p. 8.
[185] Ibid.
[186] Ibid.

possible, a special time of use rate for EV charging (Level 2). Eligible customers could be limited to those with EV chargers, and the TOU rate would apply to the EV charger and the rest of the house load would remain in the standard electric rate.[187] Should the BCUC disagree and find that FBC should implement the proposed software-based pilot program for EV shifting, then ICG recommends that a TOU rate should be introduced at the same time as the software-based approach that is to be considered in a future DSM expenditure plan.[188]

FBC submits in reply that ICG has not substantiated its claim that TOU rates are a superior option, and that FBC should carry out its pilot to test a software approach given the benefits of this approach compared to TOU rates.[189] FBC lists the cons of TOU as follows:

- The utility has no direct control over charging, limiting the effectiveness of peak load shifting and demand response programs;
- The 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 a separate meter, resulting in low adoption; and
- The cost basis for justifying significantly differentiated time-based rates is limited/insufficient.

RCIA agrees that the need for a program to shift EV charging load is clear, and that shifting EV charging to off-peak hours will allow FBC to better utilize its existing capacity resources. However, RCIA has concerns about the probability of success for FBC's proposed plans in this area and the asserted scale of the problem. RCIA accepts that the plan to implement a program to shift EV charging demand is in the public interest. However, this acceptance is provided in the context that the LT DSM Plan is a guide that informs but does not supplant detailed planning.[190]

BCOAPO supports the implementation of EV charging pilot projects to further assess this opportunity in FBC's proposed Action Plan.[191]

Panel Discussion

All parties agree with FBC that managing residential EV charging loads is worthy of dedicated treatment, as this is the largest source of residential demand growth for FBC. The Panel also agrees. The issue is how best to achieve this goal.

Parties in this proceeding have presented two options as opposing solutions. The first is a software-based incentive program that provides a financial "carrot" for shifting load to off-peak periods, as proposed in the Application, which would be made available to customers on a voluntary sign-up basis. This is supported by FBC, the CEC, BCSEA, BCOAPO as well as RCIA, although the latter suggests additional consideration of program design and planning. The Panel notes that other details relating to this pilot program, such as whether a separate class of service would be established for EV owners, were not raised in this proceeding. The Panel expects, however, that this would be dealt with through an application by FBC for acceptance of a DSM

[187] Ibid., p. 9.
[188] Ibid., pp. 9-10.
[189] FBC Reply Argument, p. 33.
[190] RCIA Final Argument, p. 14.
[191] BCOAPO Final Argument, p. 37.

expenditures schedule or a rates application including changes to FBC's tariff terms and conditions should the pilot be proposed for continuance as a permanent program. In such event, the Panel encourages FBC to file the appropriate application as soon as practicable.

The second option, submitted by ICG, is a TOU rate for EV charging that encourages shifting to off-peak periods with a financial disincentive of a higher rate that discourages load that is coincident with the peak(s) and an incentive for charging during off-peak periods with lower rates. Despite claiming that most other regulators have approved TOU for managing residential EV charging, ICG provided no specific evidence as to the effectiveness of TOU rates where they have been implemented.

The Panel agrees with FBC's submission that a software-based incentive pilot program should be implemented at this time to evaluate the effectiveness of such an approach to managing residential EV charging loads. The proposed approach gives the utility direct control over the timing of EV charging, following agreement by participating residential customers. However, given this is a new program, no specific evidence was provided on the effectiveness of the approach, such as the level of participation among eligible residential customers and the retention of those participants.

In addition to the software-based incentive pilot program, however, the Panel is of the view that a TOU approach should be considered more seriously, as proposed by ICG. Further, consideration of TOU rates could, for instance, be based on the relevant evidence from other utilities' experience in delivering TOU rates for residential EV charging. Although FBC has briefly highlighted the pros and cons of TOU rates in this Application,[192] it appears to have dismissed that option as a solution at this time by focussing on the software based pilot program for shifting EV charging load.

The Panel finds that both the incentive and TOU rates approaches to shifting EV charging from peak demand periods merit consideration. However, the Panel declines to adopt ICG's suggestion to mandate that FBC develop a special TOU rate at this time, because ICG has not substantiated its claim that TOU rates are a superior option. Furthermore, the BCUC has not to date endorsed a TOU rate for any utility and thus does not have sufficient evidence from other utilities' experience to support such a directive at this time.

Instead, the Panel recommends that FBC compare both approaches in the future, based on the results of its software-based incentive program pilot and a desk study of the results from other utilities' TOU rates for EV charging, along with any other relevant evidence. This comparison would enable FBC to assess the customer response to "incentives" versus "disincentives," along with the associated peak load shifting that both approaches could achieve for individual customers and in total across its service area over time. Should FBC pursue a TOU rate in the future, it will be important for FBC to also explore equity concerns regarding customers' ability to participate in TOU rates (e.g., shift workers who may need EV charging during peak hours).

2.5 Portfolio Analysis

Having considered the forecast load, and possible demand and supply side resources to meet that load, we review the load resource balance (LRB) after DSM, followed by the portfolio analysis undertaken by FBC to determine its preferred portfolio. We conclude with a review of FBC's contingency plans in the event there are changes in the underlying assumptions and conditions of the preferred portfolio.

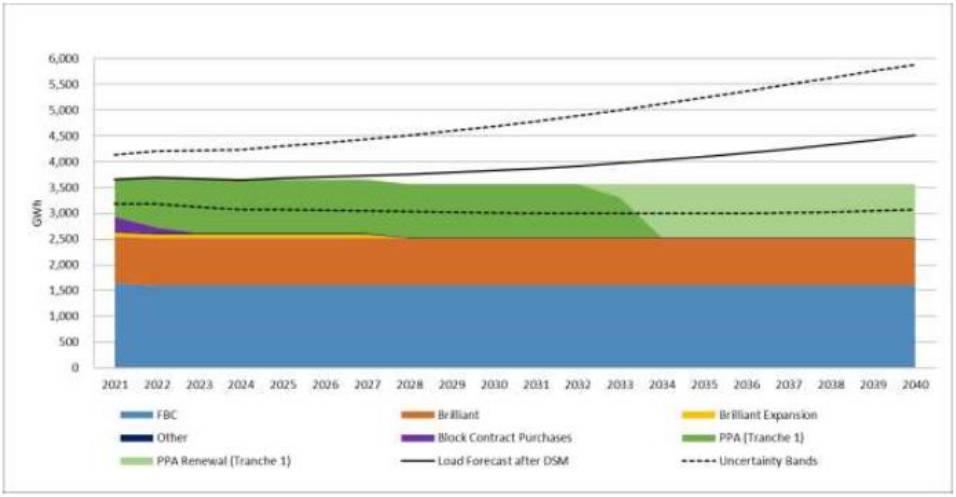
[192] Exhibit B-1, Table 2-1, p. 42.

2.5.1 FBC's Portfolio Analysis Load Resource Balance after DSM

This section examines the LRB for annual energy and capacity after the proposed level of DSM and discusses the capacity LRB assuming some amount of EV charging shifting from peak demand periods.

The following figure shows the LRB for annual energy after adjusting for the proposed level of DSM savings from the Reference Case load forecast.[193]

Figure 3: Energy Load-Resource Balance after DSM



FBC notes that that, after netting off the proposed level of DSM from the Reference Case forecast:

- There are no winter capacity gaps that need to be filled until 2031;[194]
- There are no summer capacity gaps that need to be filled until 2030;[195]
- There are June capacity gaps in all years through to 2040.[196]

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.[197]

The following table summarizes the forecast approximate 2040 load-resource balance gaps for annual energy and winter, summer and June capacity, with and without the PPA renewal, and after the proposed level of DSM but before any supply-side resource options are included to meet the gaps.[198]

[193] Ibid., Figure 9-1, p. 154.
[194] Exhibit B-1, p. 155.
[195] Ibid., pp. 156-157.
[196] Ibid., p. 158.
[197] Ibid., pp. 155-159.
[198] Ibid., Table 9-1, p. 159.

Table 6: Load-Resource Balance Gaps

	First Year of Gap	2040 Gap With PPA Renewal	2040 Gap Without PPA Renewal
Annual Energy (GWh)	2023	950	1,990
Winter Capacity (MW)	2031	175	375
Summer Capacity (MW)	2030	180	380
June Capacity (MW)	2021	230	430

2.5.2 Portfolio Analysis and the Preferred Portfolio

In the 2021 LTERP, FBC assesses different portfolios of resource options to meet its potential load-resource balance gaps. The resource options available include different levels of DSM, as discussed in Section 2.4 above, and supply-side resources as described in Section 2.2 of this Decision. The available supply resources also include the existing PPA, which includes energy and capacity that FBC can adjust up or down subject to the terms of the PPA agreement. The portfolios are designed to meet both energy and capacity gaps on a monthly and annual basis for the reference-case load forecast as well as the load scenarios for the twenty-year planning horizon.[199]

FBC evaluates portfolios of resources based on several different characteristics (indicated by the prefixes A through F as shown below), and the sensitivities related to them (represented by numbered portfolios within each characteristic). The base characteristics explored include:

- The level of DSM (portfolios A1 to A6);
- The degree of reliance on market purchases, distinguishing between energy and capacity self-sufficiency (portfolios B2 to B4);
- The impact of requiring clean or renewable resources, including the role of SCGT including and excluding RNG, and carbon prices (portfolios C2 to C5);
- Varying load scenarios based on the scenarios provided by Guidehouse and a stakeholder average scenario (portfolios D2 to D5);
- The degree of shifting EV charging from peak demand periods (portfolios E3 to E5); and
- The impact of PPA renewals and the associated pricing (portfolios F2 to F5).[200]

Each of these portfolio sets is compared to portfolio A1, which represents the base portfolio with the base level of DSM, and includes PPA, market energy, battery storage, solar and SCGT plants using conventional gas and RNG to meet the LRB gaps and has a LRMC of $78 per MWh.[201]

[199] Exhibit B-1, pp. 174-175.
[200] Ibid., pp. 175-176.
[201] Ibid., p. 180.

FBC identifies several key findings which helped to inform its selection of preferred portfolios, namely: [202]

1. Higher levels of DSM than the base DSM level are less cost effective than other resource options. FBC provides an explanation for the preferred level of DSM, which it submits satisfies the requirements of Section 44.1(2)(f) of the UCA, namely, that the cost of higher levels of DSM is less cost-effective than other resource options over the term of the LTERP;[203]
2. Based on current price forecasts, market energy is more cost effective than other resource options;
3. Clean or renewable resource portfolios that include SCGT plants using RNG are more cost effective than portfolios that exclude SCGT plants;
4. Shifting EV charging loads from peak periods reduces the need for capacity resources and lowers portfolio costs;
5. Renewing the PPA is a more cost effective and flexible option than replacing it with other resource options. No new generation resources are required before 2030 except for portfolios based on higher load scenarios, which require new resources in 2025 or 2028. The PPA and market energy are the most optimal energy resources while batteries and SCGT plants are the most optimal capacity resource in terms of cost and meeting LRB gaps.

FBC provides the following caveat:

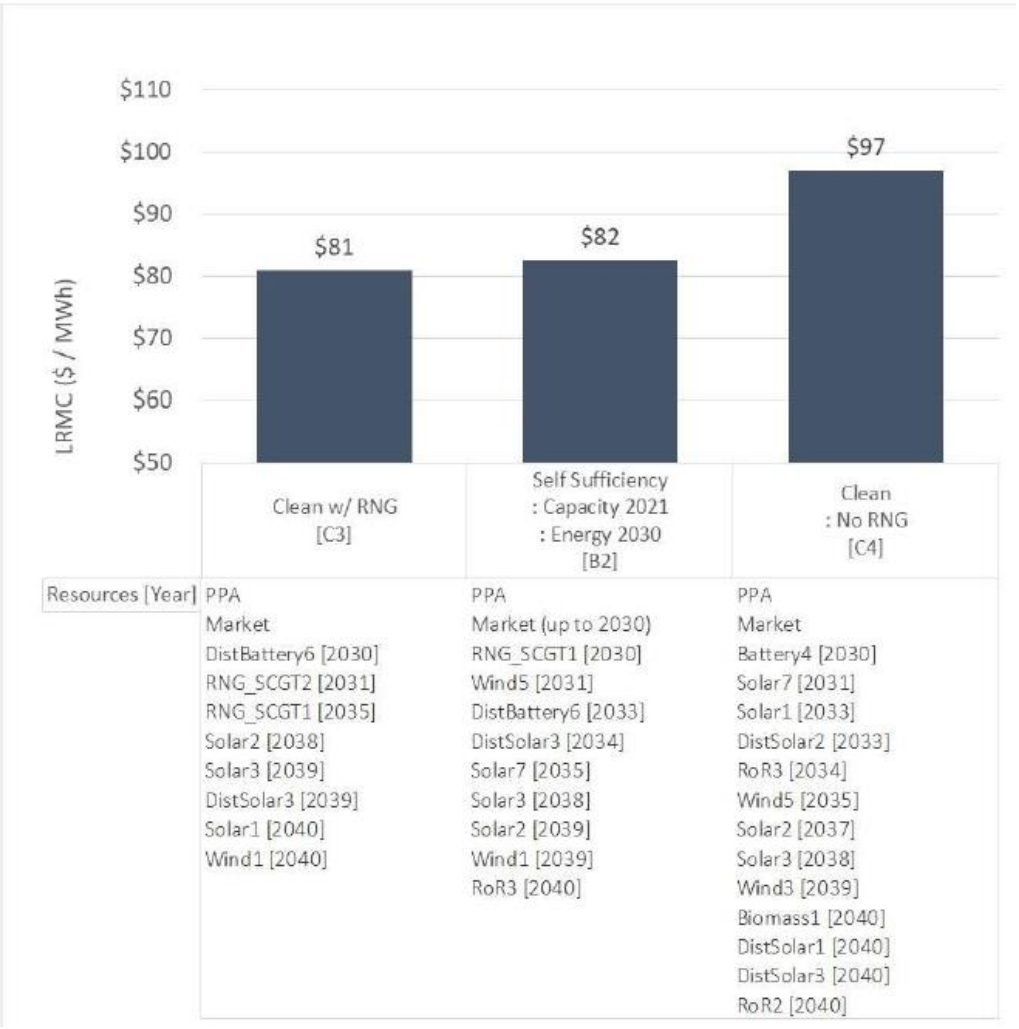
> It is important to note that the portfolio analysis presented in this section provides a high-level indication of how load-resource balance gaps may be filled in the future. It is likely that before specific resource options are required, load forecasts, load-resource balances and resource options and costs will change. Based on the portfolio analysis results presented in this section, and assuming the reference case load forecast, proposed DSM level and continued market access, FBC will not require any new generation resources until at least 2030.[204]

FBC's final choice of 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 consideration of BC's energy objectives. FBC has not included portfolios with SCGT plants using conventional natural gas as fuel, such as portfolio A1, in its set of preferred portfolios based on the feedback received during the June 2021 RPAG meeting. FBC believes that portfolios only including clean or renewable resources best reflects the energy priorities of its customers, stakeholders and Indigenous communities.[205]

The preferred candidates for choice of preferred portfolio are portfolios C3, B2 and C4, outlined in the figure below.[206] All three of these portfolios maintain capacity self-sufficiency with the exception of June, which permits 75MW of market capacity up to 2030.[207]

[202] Ibid., pp. 188-189.
[203] Ibid., p. 160.
[204] Ibid., p. 174.
[205] ibid., p. 191.
[206] Ibid., Figure 11-7, p. 190.
[207] Ibid., p. 190; Exhibit B-2, BCUC IR 31.8; FBC Final Argument, p. 38.

Figure 4: Portfolios Considered for Preferred Portfolios



Of these three, portfolio C3 has the lowest LRMC of the portfolios which include only clean or renewable resources and so ranks favourably in terms of cost effectiveness and environmental attributes.[208] Portfolio C3 includes a mix of PPA, market energy, battery storage, gas plants using RNG fuel, solar, wind and run of river generation, and would apply to new generation resources for 2030 and beyond.[209]

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.[210]

[208] Exhibit B-1, LTERP, pp. 193-194.
[209] Exhibit B-1, Executive Summary, p. 16.
[210] Exhibit B-1, p. 195.

FBC has clarified that the BCUC's acceptance of the LTERP does not imply approval for FBC to implement the recommended portfolio. The preferred portfolio is rather an indication of the types of resources FBC may need to implement in the future. Updated information in future may mean that FBC later determines that other new resources may be required. FBC expects that, when the time comes to commit to acquiring new resources or supply contracts, it would then submit a request, such as a CPCN application, to the BCUC for approval. [211]

Positions of the Parties

FBC submits that portfolio C3 should be accepted as being in the public interest, because it "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."[212]

ICG, BCSEA and RCIA agree with FBC's choice of portfolio C3 as the preferred portfolio.[213]

BCOAPO also supports FBC's selection of portfolio C3 as its preferred portfolio,[214] noting there may be instances where it is appropriate to consider portfolios that include SCGT plants using natural gas to the extent permitted under the CEA if such portfolios were significantly more cost effective. BCOAPO supports FBC's exclusion of A1 as a preferred portfolio, given the intensifying and pressing impacts of climate change on all BC residents and submits FBC has adequately explained its concerns about the development of a SCGT plant using conventional natural gas in the context of this proposed plan.

BCSEA notes that "FBC is not at this time seeking BCUC approval of a new SCGT gas plant, regardless of whether such a plant would use RNG or conventional natural gas."[215]

The CEC agrees with the basic conclusions of FBC regarding its preferred portfolios based on the information presented in this proceeding, while recommending that the BCUC make a number of directions with respect to FBC's next LTERP including more advanced planning for the issues identified by the CEC.[216]

Panel Discussion

The interveners were generally supportive of FBC's portfolio analysis and its results. Although the CEC would like BCUC to make a number of directives, there was insufficient evidence to endorse these recommendations. However, the FBC may wish to consider them in its future LTERP as appropriate. Overall, the Panel considers that FBC's portfolio analysis methodology and the results of its analysis of the preferred portfolios to be reasonable.

In endorsing FBC's preference for portfolio C3, the Panel notes that not only can it be ramped up quickly, but it also contemplates a transition to clean energy, thereby meeting the objectives of the CEA, while doing so at a reasonable cost. The Panel further notes that portfolio C3 has a lower environmental land footprint than the

[211] Exhibit B-6, BCSEA IR1 5.1.
[212] FBC Final Argument, p. 40.
[213] BCSEA Final Argument, p. 24; ICG Final Argument, p. 10; RCIA Final Argument, pp. 21-22.
[214] Ibid., p. 41.
[215] BCSEA Final Argument, p. 23.
[216] The CEC Final Argument, p. 17.

other portfolios. We are also persuaded that this portfolio offers high levels of resiliency given the geographic diversity of the resource mix, operational flexibility with two SCGT plants using RNG fuel, as well as flexibility to handle new, large or unexpected loads. The variety of supply resources in this portfolio also addresses reliability concerns relating to wind and solar resources. The Panel is therefore satisfied that FBC's preferred portfolio appropriately balances the relevant considerations for long-term resource planning in an environment of uncertainty. In short, the Panel agrees with FBC's submission that 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."[217]

The Panel acknowledges that all three of the portfolios considered by FBC for its choice of preferred portfolio incorporate clean or renewable energy, including the Clean Market Adder using a proxy of $2 per MW. As already discussed earlier in our Decision, while there is merit to FBC pursuing clean or renewable power as part of long-term resource planning, absent further evidence, we decline to opine on the appropriateness of incorporating a Clean Market Adder as part of these portfolios without certainty of the actual amount of that adder and the circumstances under which it would be invoked. In any event, we note that the inclusion of the proxy amount is immaterial to FBC's choice of preferred portfolio as it appears in all of the three portfolios that were considered by FBC as candidates for the preferred portfolio.

2.5.3 Contingency Plans

The BCUC's Resource Planning Guidelines state the utility should provide a contingency plan that specifies how the utility would respond to changed circumstances, such as changes in loads, market conditions or technology and resource options.[218] FBC discusses its contingency plans both in the context of the preferred portfolio, and also in the Action Plan in sections 11 and 13 of the Application, respectively.

FBC states that the preferred portfolios include a diverse mix of resource options, including the PPA, market energy, battery storage, SCGT plants using RNG, solar, wind and run of river generation. This diversity means that FBC is less exposed to potential changes in the cost of any one particular resource type than if FBC had a less-diverse resource mix. However, FBC identifies the following situations as examples of instances where contingency plans may be required:

> increases in market power prices or RNG costs, permanent increases in load requirements over time, unexpected temporary load events such as the June 2021 heat wave […] or lower customer load requirements than those in the Reference Case load forecast.[219]

In the event of load increases greater than the Reference Case in the shorter term, FBC outlines the following contingency options as set out in the following table, which compares total resource size, potential prices and anticipated lead times for each contingency option:[220]

[217] FBC Final Argument, p. 40.
[218] BCUC's Resource Planning Guidelines, p. 5.
[219] Exhibit B-1, p. 196.
[220] Exhibit B-9, CEC IR 57.1.

Table 7: Contingency Options

	Energy	Capacity	Cost	Lead Time [18]	Comments
Increase Market Purchases (Up to approximately 3,241 GWh)	Yes	*[19]	$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.
Implement other EV Peak shifting options		Yes	$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 also outlines the following options, in the event of lower loads than expected under the Reference Case, including:

- Decrease market energy purchases;
- Decrease PPA energy and capacity (if not already at its minimum); and
- Defer implementation of resources identified in the preferred portfolios.[221]

Given the four-year lead time for a Simple Cycle Gas Turbine (SCGT) plant, FBC expects to initiate project development work, including land acquisition, front-end engineering design, permitting, and stakeholder and Indigenous consultation in the near future.[222]

[221] Exhibit B-1, p. 197.
[222] Exhibit B-2, BCUC IR 31.18; FBC Final Argument, p. 34.

FBC submits it is taking appropriate action to manage the potential for unplanned increases in load, including:

- 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.[223]

Positions of the Parties

BCOAPO generally views FBC's contingency planning as reasonable and agrees that "FBC is taking appropriate actions to manage the potential for unplanned increases in load." However, BCOAPO recommends FBC ensure DSM program adjustments are included into its contingency planning not only in the event of increased load, but also decreased load.[224]

BCOAPO agrees with FBC's proposal to initiate the process of preparing to acquire new resources now, particularly given the recent infrastructure development delays FBC and other utilities have been experiencing. BCOAPO considers FBC's proposed Action Plan to be appropriate, and notes its support for initiatives that will assist FBC in managing the addition of new large loads to its system.[225]

BCSEA accepts that FBC is taking appropriate actions to manage the potential for unplanned increases in load,[226] and agrees that the 2021 LTERP contingency portfolio supply plans enable FBC to effectively manage load changes over time.[227]

Although ICG submits the forecast growth trends are too high, it notes that FBC has identified options available in the event of lower loads than expected under the Reference Case. ICG accepts the above options as being reasonable and more likely to be implemented than those actions FBC has identified to manage unplanned increases in load.[228] ICG accepts as reasonable FBC's options to address risks of higher loads in order to maintain a cost-effective supply portfolio.[229]

However, ICG submits that although FBC plans to move forward more definitively on its development plans for new resources in 2022, such efforts should be limited to "discussions with developers and/or consultants with expertise in this area so that FBC could obtain more specific information regarding resource options." Such efforts should not include "land acquisition, front-end engineering design, permitting, and stakeholder and indigenous consultation."[230]

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[223] FBC Final Argument, p. 26.
[224] BCOAPO Final Argument, p. 42.
[225] Ibid., pp. 36; 44.
[226] BCSEA Final Argument, p. 20.
[227] Ibid., p. 21.
[228] ICG Final Argument, p. 5.
[229] Ibid., p. 6.
[230] Ibid.

FBC replies that such an arbitrary restriction would not be a sound planning approach, and that FBC should prudently proceed with development plans given the potential for increases in load. FBC notes it may take some time to fully define the available resources, particularly given the long development timelines of major projects in BC. Given the four-year lead time for an SCGT plant FBC expects to initiate project development work, including land acquisition, front-end engineering design, permitting, and stakeholder and Indigenous consultation in the near future.[231]

RCIA generally accepts the FBC plan to manage the potential for unplanned increases in load but wants to emphasize to the BCUC the particular importance of FBC's Action Plan to advance the generation supply resource options identified in the LTERP should loads grow more quickly than expected.[232] Consequently, it is important that the RNG SCGT generation options in the preferred portfolio be advanced to a stage where their development risk and FBC's ability to deliver these assets on a knowable timeline is assured. As a result, RCIA supports FBC's project development work to de-risk RNG SCGT generation options in the preferred portfolio.[233]

Panel Discussion

The Panel disagrees with IGC that FBC should be limited in its ability to move forward on development plans for new resources. It is not clear to this Panel how FBC could make meaningful progress on the development of new resources without pursuing the predevelopment activities and consultation needed to advance these new initiatives. In any event, the prudency of costs of such activities is a matter for review by the BCUC in the context of future proceedings.

We agree that a reduction in load is unlikely given government and public expectations for increased electrification, and find FBC's overall approach to managing unplanned changes in load to be reasonable in the meantime. FBC has identified viable options for additional resources and more than adequately addressed how and when these resources will be brought on-stream during the planning horizon of this LTERP.

3.0 FBC's 2021 Long Term Demand Side Management Plan

FBC's LT DSM Plan, attached as part of 2021 LTERP, is filed pursuant to section 44.1(2)(b) of the UCA. The key objective for the LT DSM Plan is to determine the appropriate level of cost-effective DSM resource acquisition to support the FBC's resource needs over the LTERP's planning horizon (2021 to 2040). [234] The level of DSM for the purpose of the 2021 LTERP scenarios was addressed in Section 2.4 above. The LT DSM Plan serves as a planning exercise to guide future DSM expenditure planning and is consistent with the resource planning goals of the LTERP.[235] Therefore, FBC is not seeking acceptance of the DSM proforma cost estimates presented in section 3.3 of the LT DSM Plan.[236]

[231] FBC Reply Argument, p. 35.
[232] RCIA Final Argument, p. 14.
[233] Ibid., p. 15.
[234] Exhibit B-1, Volume 2: 2021 LT DSM Plan, p. 1.
[235] FBC Final Argument, p.13.
[236] Exhibit B-1, Volume 2: 2021 LT DSM Plan, p. 1.

In determining whether to accept or reject the 2021 LTERP as being in the public interest, the BCUC is required pursuant to 44.1(8)(c) of the UCA to consider whether the plan shows that the public utility intends to pursue adequate, cost-effective demand-side measures.
The DSM Regulation, enacted pursuant to the UCA, defines what DSM measures must be included in the public utility's DSM plan for it to be "adequate."[237] The LT DSM Plan was developed in compliance with the DSM Regulation and considers program measures mandated to meet the DSM Regulation adequacy provisions, including measures for rental and low-income customers, education (elementary and secondary), post-secondary schools, and specified codes and standards expenditures.[238]

Section 4 of the DSM Regulation also defines the basis for FBC's marginal electricity costs and sets out the TRC test to determine cost effectiveness.[239]

3.1 Development of the LT DSM Plan

FBC's objective for DSM activities is to offer customers in its service territory a range of programs within a cost-effective portfolio of measures that address the majority of end uses for each major customer sector. [240]
FBC engaged Lumidyne Consulting Ltd. (Lumidyne) to perform a conservation potential review (FBC CPR), to determine the energy efficiency potential for electricity across the FBC service territory in the residential, commercial, and industrial sectors over the 20-year planning horizon.[241]

The FBC CPR uses the model initially developed for the 2016 CPR and estimates the following for each conservation measure: [242]

1. Technical potential - energy savings that could be achieved if all existing end uses were immediately replaced with efficient measures, wherever technically feasible, regardless of the cost, market acceptance, or whether a measure has failed the economic test.
2. Economic potential - subset of technical potential but includes only measures that have passed the TRC or mTRC test using the LRMC and DCE avoided cost values.
3. Market potential – potential uptake by customers of the economic potential and resulting savings over the planning horizon, taking into account factors such as the propensity of customers to participate in DSM program offers.

The CPR used three distinct steps to estimate potential: generating a reference case forecast, characterizing energy savings measures, and estimating the economic savings potential.[243]

As a first step, Lumidyne developed the base year and a reference case forecast of energy consumption. In the next step, a comprehensive list of energy efficiency measures was developed and included in the analysis. Once

[237] Exhibit B-1, Volume 2: 2021 LT DSM Plan, p. 2.
[238] FBC Final Argument, pp. 9-10.
[239] Exhibit B-1, Volume 2: 2021 LT DSM Plan, p. 3.
[240] FBC Final Argument, p. 13.
[241] Exhibit B-1, Volume 2: 2021 LT DSM Plan, pp. 6-7.
[242] Ibid., pp. 7-8.
[243] Ibid., p. 7.

the reference case forecast and list of measures were established, Lumidyne estimated the technical, economic and market savings potential for electric energy and demand across FBC's service territory.[244]

FBC engaged stakeholders in discussion of the 2021 CPR through its Resource Planning Advisory Group (RPAG) process. CPR results, based on FBC's range of DSM scenarios and avoided costs (LRMC and DCE), were presented during the LTERP RPAG stakeholder meeting in June 2021. Key topics discussed in that meeting include DSM scenarios, EV charging peak demand mitigation, Load-Resource Balance after DSM, Preliminary portfolio analysis results, and Transmission and distribution.[245]

FBC provided the following feedback to RPAG during the meeting:[246]

- Each of the five DSM Scenarios had a different TRC and passed the TRC.
- All DSM Scenarios included the same selection of cost-effective DSM measures.
- DSM savings were calculated on both a cumulative and annual incremental basis.
- Detailed rate impact analysis was not part of the scope of the LT DSM plan and would be presented in the next DSM expenditures plan under the rate impact measure (RIM) test.
- 2021 CPR reflects known changes to Codes and Standards (C&S) in its model. FBC notes that gradual changes in BC Energy Step Code reduce new construction savings potential as each lower step is adopted by municipalities.

As discussed in Section 2.4, FBC considered the following five DSM scenarios over its planning horizon: Low, Base, Med, High and Max.[247] The proposed DSM Scenario target, derived from the Base DSM scenario, is to acquire 435 GWh of cost-effective savings over the 20-year planning period.[248]

The Base DSM scenario can be characterized as a continuation of the 2016 LT DSM Plan's "High" scenario.[249]

FBC has offered DSM programs to customers since 1989 to eligible customers served by FBC and its wholesale customers of Grand Forks, Nelson Hydro, Penticton, and Summerland. The LT DSM Plan portfolio includes DSM programs for the Residential, Commercial, and Industrial customer classes. There are also low-income programs, portfolio-level supporting initiatives, and planning and evaluation activities required to support the DSM Plan.[250]

The LT DSM Plan captures market potential savings over the planning horizon and considers DSM program offerings that target key end uses with cost effective measures identified in the FBC CPR.

A summary of DSM program offerings and initiatives within each customer class and program area is presented below: [251]

[244] Ibid., pp. 7-8.
[245] Exhibit B-1, pp. 202-203.
[246] Exhibit B-1, Volume 2: 2021 LT DSM Plan, p. 15.
[247] FBC Final Argument, p. 7.
[248] Exhibit B-1, Volume 2: 2021 LT DSM Plan, p. 1.
[249] Exhibit B-1, p. 152.
[250] Exhibit B-1, Volume 2: 2021 LT DSM Plan, p. 19.
[251] Ibid., pp. 19-27.

- Residential Sector Programs – home renovation debates, retail rebates, new home rebates, rental apartment program.
- Low-Income Household Programs – self-install program, direct install program, other initiatives.
- Commercial Sector Programs – product rebate program, custom efficiency program, commercial new construction program, continuous optimization program.
- Industrial Sector Programs – product rebate program, custom efficiency program, strategic energy management.
- Supporting Initiatives – my energy use, community energy planning, trade ally network/trades training, education programs.
- Portfolio Initiatives – planning and evaluation, codes and standards, demand response pilots, innovative technologies.

Cumulative electric energy savings of 435 GWh are projected over the planning horizon (2021-2040) in the Base DSM scenario.[252] In contrast, FBC has reported 491 GWh of DSM program savings over the prior twenty years (2001-2020 inclusive).[253] While the first table (Table 8)[254] below shows the Base DSM scenario slightly exceeds the 2016 LT DSM "High" scenario, the second (Table 9)[255] shows that the recent actual saving according to the 2019-2022 DSM Plan aligns closely with the 2021 LT DSM Base scenario.

Table 8: Annual Incremental Energy Savings

Source	Annual Incremental Energy Savings (GWh per year)			
	2019	2020	2021	2022
2016 LT DSM Plan "High" Scenario	26.4	26.4	28.4	30.4
2021 LT DSM Plan Base Scenario	-	-	29.0	33.1
Actual Energy Savings to Date	25.8	26.2	29.8[8]	33.1[9]

Table 9: Forecast/Actual Energy Savings

Forecast/Actuals	Energy Savings (GWh)			
	2019	2020	2021	2022
2016 LTERP	26.4	26.4	28.4	30.4
2019-2022 DSM Plan	32.6	32.1	32.4	33.1
2019-2022 DSM Actuals	25.8	26.2	29.8*	Forecast not yet created

**Forecast values as of October 2021*

[252] Exhibit B-1, p. 151.
[253] Exhibit B-1 Volume. 2: 2021 LT DSM Plan, p. 14.
[254] Exhibit B-4, BCOAPO IR 40.1.
[255] Exhibit B-6, BCSEA IR 15.5.

3.2 Adequacy of DSM

The adequacy requirements of the LT DSM Plan are prescribed by section 3 of the DSM Regulation.[256] With regard to requirements to include specific programs, the table below summarizes the programs where FBC submits that the LTDSM Plan meets each of the adequacy requirements of the DSM Regulation.[257]

Table 10: BC Demand-Side Measures regulation Adequacy Requirements

Section of the DSM Regulation	Adequacy Requirement	Summary of Programs in LTDSM Plan
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	Low Income Household Program: 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	Rental Apartment Program: energy assessments and direct install of energy efficiency measures (such as screw-in light bulbs) to property managers of rental apartments.
3(c)	An education program for students enrolled in schools in the public utility's service area	Online education program and funding support for external third party non-profit educational organizations
3(d)	An education program for students enrolled in post-secondary institutions in the public utility's service area	financial support for post-secondary initiatives such as curriculum-based class-room instruction, energy efficiency related curriculum development and 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	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	The BC Energy Step Code and other standard policies or regulations to increase minimum performance of electrical equipment. Supporting Initiatives - community energy efficient strategic plans, energy efficient design practices and energy efficiency building code bylaws.

[256] BCSEA Final Argument, p. 11.
[257] FBC Final Argument, pp. 11-12.

Positions of the Parties

BCSEA, RCIA and BCOAPO agree that the LT DSM Plan meets the adequacy requirements of the DSM Regulation.[258]

Panel Discussion

The Panel finds that the LT DSM Plan shows that FBC intends to pursue adequate demand-side measures. The DSM Regulation prescribes six categories of required DSM programs that are summarized in the table in Section 3.2 above. In that table above, FBC has described the specific programs that align with the six categories. The Panel has reviewed the evidence and agrees with FBC that each of the categories includes one or more programs as required by the DSM Regulation.

The Panel also notes that no parties disputed FBC's evidence supporting the overall adequacy of the LT DSM Plan.

3.3 Cost-Effectiveness of DSM

The key indicator of cost effectiveness of a LT DSM Plan is the TRC ratio, which compares total benefits against total costs (i.e. a TRC value greater than 1.0 delivers positive benefits, and the higher the value above 1.0, the more cost effective the portfolio).[259] As prescribed in section 4 of the DSM Regulation, and for the purposes of UCA section 44.1 (8) (c) or 44.2 (5) (d), the cost-effectiveness of a demand-side measure proposed in a plan portfolio, may either compare the costs and benefits of the individual demand-side measure, or the demand-side measure and other demand-side measures in the portfolio, or alternatively, the portfolio as a whole.[260] FBC submits that the BCUC has consistently applied the TRC at the portfolio level, and this approach is appropriate for FBC's current LT DSM Plan.[261]

FBC has developed a LRMC for DSM purposes, based on BC clean and renewable resources, of $90 per MWh, which reflects the cost of firm energy that is 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.[262]

Based on avoided costs and FBC's proposed Base DSM Scenario level outlined in Section 2.5, the CPR model estimates the portfolio TRC test to be 2.05. Therefore, FBC believes the LT DSM Plan meets the applicable requirements of the DSM Regulation for cost effectiveness, as amended March 24, 2017. [263]

FBC calculated the TRC test at the measure level in the 2021 Conservation Potential Review (2021 CPR) modelling tool and screened out those measures that were not cost effective.[264] While the LT DSM Plan excludes

[258] BCSEA Final Argument, p. 12; RCIA Final Argument, p. 10; BCOAPO Final Argument, p. 31.
[259] Ibid., p. 6.
[260] DSM Regulation, pp. 5-6.
[261] FBC Final Argument, p. 6.
[262] Exhibit B-1, Volume 2: 2021 LT DSM Plan, p. 4.
[263] Ibid.
[264] FBC Final Argument, p. 6.

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. [265]

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.[266] A summary of cost-effectiveness across the entire 2020-2040 forecast horizon is provided below: [267]

Table 11:Benefit-to-Cost Ratios across 2022-2040 Horizon (ratio)

Sector	Total Resource Cost Test	Utility Cost Test	Participant Cost Test	Rate Impact Measure Test
Commercial	2.45	3.95	3.37	0.80
Industrial	2.91	4.39	3.15	0.97
Residential*	2.26	2.33	4.68	0.63
Portfolio	2.05	2.62	3.65	0.73

Source: Lumidyne

**Note: the residential sector relied on a modified Total Resource Cost (mTRC) test.*

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 building performance level. The BC Energy Step Code is a notable example of such policies and regulation.

While FBC's LRMC appropriately takes into account the capacity savings benefits of the DSM measures, the Base DSM Scenario would continue to be cost-effective even if an energy-only LRMC were used.[268]

Positions of the Parties

BCSEA considers that the cost-effectiveness of the Base DSM scenario is a robust conclusion, noting that the Base DSM Scenario would continue to be cost-effective even if an energy-only LRMC were used.[269]

BCOAPO notes that no distinction is made for DSM program evaluation purposes between transmission and distribution losses. All analyses were performed using the common system losses value of 7.6 percent. While noting FBC's explanation that this was done for simplicity, BCOAPO submits that use of a common system losses value will result in the cost effectiveness analysis overstating the TRC values for DSM measures targeted at transmission-connected customers, and at the same time, understating the TRC values for DSM measures targeted at residential and other distribution-connected customers.[270]

The CEC recommends that the BCUC direct FBC in its next LTERP to review the potential to devise alternatives which have other dimensions than incentives for its DSM options and frame them with respect to their upside potential for cost-effective savings versus the uncertainties and the risk of achieving the results.[271]

[265] Ibid., p. 13.
[266] Ibid., pp. 6-7.
[267] Exhibit B-1, Volume 2: 2021 LT DSM Plan, Appendix A, p. 54.
[268] FBC Final Argument, p. 7.
[269] BCSEA Final Argument, p. 8.
[270] BCOAPO Final Argument, p. 25.
[271] CEC Final Argument, p. 11.

FBC considers that its current approach to analyzing DSM levels is reasonable and any potential changes can be explored as part of its consultation on the next LTERP.[272]

ICG submits that FBC's use of Program Cost Administrator tests does not consider costs and benefits to DSM program participants. In ICG's view, FBC fails to realize societal benefits of DSM incentives and limits its consideration of benefits in the TRC test to savings only realized by FBC. ICG request the BCUC to not endorse FBC's alternate definition of the TRC test. [273]

FBC does not agree with ICG's characterization, noting the BCUC's previous determination[274] that in order for projects to be aligned with the objectives of RS90, the end use efficiency has to contribute to reducing the demand for the utility's energy services. In FBC's view, since the kraft pulp and paper customer primarily self-generates its electricity, the majority of DSM savings would not result in reduced demand to FBC. Regardless of any TRC result, FBC did not consider that it should be recovering from customers the costs of additional incentives to a customer that will not result in a reduction to FBC's load beyond what is currently available.[275]

RCIA supports FBC's statement that FBC's 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.[276]

FBC submits that its LT DSM Plan is cost-effective and includes 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.[277]

Panel Determination

The Panel finds that FBC's LT DSM Plan shows that it intends to pursue cost-effective demand-side measures as required by the DSM Regulation. The Panel observes that the DSM Regulation authorizes consideration of cost-effectiveness of demand side measures at any of three different scales – for individual measures, groups of measures and/or for the whole portfolio of measures. We agree with FBC that applying the portfolio level TRC test is appropriate, using the mTRC test for residential sector measures as demonstrated in the Application. The aggregate, portfolio-level demand reduction from DSM is needed to assess load scenarios after DSM in order to consider the energy and capacity that must be met by supply side options. Furthermore, the LTERP applies generic incentive levels for DSM scenarios, suitable for consideration at the DSM portfolio level. Therefore, reviewing cost-effectiveness of the LT DSM Plan at an individual demand side measure level, rather than on a portfolio basis, is inappropriate.

The constituents of the portfolio level TRC are the avoided cost of supply, the forecast DSM savings over the plan's timeframe, the NPV costs for DSM Programs, supporting and portfolio initiatives, and the consideration of

[272] FBC Reply Argument, p. 7.
[273] ICG Final Argument, pp. 3-4.
[274] Letter L-13-18 dated June 25, 2018.
[275] FBC Reply Argument, p. 9.
[276] RCIA Final Argument, p. 7.
[277] FBC Final Argument, p. 5.

prescribed financial adjustments in the DSM Regulation for the modified TRC, low-income programs and non-energy benefits.
The Panel finds the LRMC based on clean and renewable resources of $90 per MWh to be appropriate for determining the benefits of DSM for the purpose of calculating the portfolio-level TRC. The Panel agrees with FBC's use of a price signal that reflects the cost of firm energy that is inclusive of generation capacity. None of the parties disputes the LRMC.

FBC submits that the cumulative electrical energy savings will be 425 GWh over the planning horizon (2021-2040). FBC has reported 491 GWh of DSM program savings over the prior twenty years (2001-2020 inclusive), thereby reinforcing the viability of the forecast. None of the interveners directly challenged the projected savings with one minor exception from BCOAPO regarding the use of two differing average costs for DSM in the Application and associated discounting of savings. As noted earlier in Section 2.4 of the Decision, FBC uses two different average DSM costs (levelized and non-levelized) and will consider BCOAPO's feedback about this inconsistency for future LTERPs.

FBC used the CPR to inform the costs for the DSM portfolio. The Panel observes the previous DSM expenditures were below or aligned with their associated forecasts, illustrating that the budgeting was conservative. The parties did not dispute the budgetary figures.

The Panel is satisfied with the resultant calculation of the TRC which FBC submits provides a portfolio benefit to cost ratio of 2.05, based on reliance on the mTRC for the residential sector. The Panel finds that the portfolio-level TRC calculation is reasonable and that it is greater than 1.0, indicating that the LT DSM Plan is cost-effective. BCSEA, BCOAPO and RCIA support this overall conclusion on cost-effectiveness and ICG did not comment.

The CEC recommended that the BCUC direct FBC in its next LTERP to review the potential to devise alternatives which have other dimensions than incentives for its DSM options and frame them with respect to their upside potential for cost-effective savings versus the uncertainties and the risk for achieving the results. The Panel agrees with using alternate metrics for devising DSM scenarios in the next LTERP and LT DSM Plan, such as cumulative DSM savings (e.g., GWh and MW) and/or cost-effectiveness of DSM (e.g., varying TRC benefit-cost ratios), rather than the level of subsidy or incentives.

4.0 Is Acceptance of the 2021 LTERP Including the LT DSM Plan in the Public Interest?

Section 44.1(2) of the UCA outlines the filing requirements associated with a long-term resource plan, which have been reviewed in detail above.

In determining whether to accept or reject a long-term resource plan under section 44.1(6) of the UCA, in whole or in part, as being in the public interest, this Panel must consider the following under section 44.1(8):

a) the applicable of British Columbia's energy objectives;

b) the extent to which the long-term resource plan is consistent with the applicable requirements under sections 6 and 19 of the CEA;

c) whether the plan shows that the public utility intends to pursue adequate, cost-effective demand-side measures; and

d) the interests of persons in British Columbia who receive or may receive service from the public utility.

Clause b) refers to section 6 of the CEA which deals with electricity self-sufficiency. While British Columbia's electricity self-sufficiency applies primarily to BC Hydro, other utilities such as FBC must take it into consideration in planning for construction of generation facilities or energy purchases. Section 19 of the CEA which deals with clean or renewable resources does not apply to FBC as it is not a prescribed public utility.

Positions of the Parties

FBC summarizes the relevant considerations for the BCUC's acceptance of the 2021 LTERP, in the table below:

Table 12: BCUC Considerations for Accepting a Long-Term Resource Plan[278]

Section of the *UCA*	Considerations for Acceptance	Section of LTERP Addressing Requirement
44.1(8)(a)	The applicable of British Columbia's energy objectives	Section 1.4.2 and 1.4.3 below discuss the BC energy objectives applicable to the LTERP.
44.1(8)(b)	The extent to which the plan is consistent with the applicable requirements of Sections 6 and 19 of the *CEA*	While sections 6 and 19 of the *CEA* do not apply directly to FBC, FBC has considered self-sufficiency and clean and renewable resources in its Portfolio Analysis Section 11.
44.1(8)(c)	Whether the plan shows that the public utility intends to pursue adequate, cost-effective demand-side measures	LT DSM Plan and Section 8 discuss demand-side measures.
44.1(8)(d)	The interests of persons in British Columbia who receive or may receive service from the public utility	Portfolio analysis results include DSM and supply-side resource options which are cost-effective, environmentally-sound and provide socio-economic benefits to the region and FBC's customers as discussed in Section 11.

FBC submits the 2021 LTERP is in the public interest, citing the following in support:

- 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 thereafter;
- 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.[279]

[278] Exhibit B-1, Table 1-2, p. 8.
[279] FBC Final Argument, pp. 3-4.

FBC's submits the 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 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.[280]

BCSSIA submits that the BCUC should reject at least a portion of the 2021 LTERP for the following reasons:

> [I]t appears that implementing LTERP's Reference Case resource plan will result in virtually no contribution to reaching the much needed (and Government mandated) GHG reduction targets. To BCSSIA, this appears to be a plan that will fail to achieve at least one of its primary objectives. Such a plan does not satisfy the BCUC's mandate for approval.
>
> BCSSIA submits that the BCUC has the duty, and the power, to reject at least a portion of the LTERP. FBC could resubmit the rejected portion to include some significant initiatives aimed at achieving the Government's objectives with regard to reducing GHG emissions, both overall and by sector. This new plan should also include quantifiable benchmark metrics against which progress can be measured over the duration of the plan.[281]

FBC submits that its efforts and plans to reduce GHG emissions are reasonable and appropriate at this time, and that BCSSIA has not identified a basis for rejecting any particular part of the 2021 LTERP.[282]

BCSEA acknowledges that FBC does not have direction from the Provincial Government to pursue electrification like BC Hydro has, and that FBC does not have an energy surplus for the mid-term like BC Hydro has. .[283]

The remaining interveners support accepting the 2021 LTERP including the LT DSM Plan as being in the public interest, with additional commentary as noted below.

MoveUP submits that the Plan is in the public interest and should be accepted on that basis. MoveUp further notes that "the 2021 LTERP and the planning process that produced it are significant guideposts on this stage of our journey into the complex period that lies ahead, as the province's energy sector undergoes radical transformation in the face of the gathering climate crisis. It is a useful exercise in pausing and assessing our situation before engaging the emerging challenges, but caught on the verge of major transformations it will need early rewriting."[284]

Similar to MoveUP, BCSEA supports the BCUC's acceptance of the 2021 LTERP, including the LT DSM Plan, as being in the public interest under section 44.1(6) of the UCA.[285] BCSEA concurs with FBC that the 2021 LTERP including the LT DSM Plan satisfies 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.[286] BCSEA notes that the BCUC's

[280] Ibid., p. 3.
[281] BCSSIA Final Argument, pp. 9-10.
[282] FBC Reply Argument, p. 12.
[283] BCSEA Final Argument, p. 35.
[284] MoveUp Final Argument, p. 1.
[285] BCSEA Final Argument, pp. 2-3.
[286] Ibid., p. 5.

acceptance of the LTERP does not constitute approval of any rate, project, program, or expenditure for which FBC would otherwise be required to seek approval under the UCA.[287]

The CEC supports the FBC 2021 LTERP for acceptance by the BCUC, and makes a number of recommendations for improving the process for the next LTERP, along with several recommendations to the BCUC to direct FBC to undertake specific actions in the development of its next LTERP.[288]

ICG supports FBC's request that the 2021 LTERP including the LT DSM Plan be accepted as being in the public interest. ICG submits that the BCUC Panel should limit its finding and directions in this proceeding so that FBC has an opportunity in the next LTERP to exercise considerable discretion appropriate for the circumstances at that time.[289] ICG believes that many issues that were tested are best left for consideration in the next LTERP. For example, in the Reference Case no new supply-side resources are required before the next LTERP, so although ICG submits the Reference Case load forecast should be lower, this would not change the conclusion that no new supply-side resources are required before 2030.[290]

RCIA concludes that the FBC 2021 LTERP is generally in the public interest, while submitting the initial Application is deficient given concerns around the consideration of resiliency in the 2021 LTERP.[291] (The issue of resiliency is addressed further in Section 5.1 below.) RCIA submits that FBC's LT DSM Plan for residential ratepayers is in the public interest and should be accepted, [292] and that 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.[293]

BCOAPO recommends that the BCUC accept FBC's 2021 LTERP, including the LT DSM Plan, as being in the public interest.[294]

Panel Determination

The Panel is satisfied that FBC has met the filing requirements for its 2021 LTERP as specified in section 44.1 (2) of the UCA, and as detailed in Section 2 of the Decision.

With respect to section 44.1(6) of the UCA, the Panel finds that FBC's 2021 LTERP including the LT DSM Plan satisfies the applicable criteria set out in section 44.1(8) and accordingly, accepts the plan in whole as being in the public interest.

Based on the evidence presented in the Application, the Panel is satisfied that FBC's 2021 LTERP is aligned with the applicable of BC's energy objectives as expressed in the CEA. The Panel is also satisfied that the LTERP has adequately considered self-sufficiency and clean and renewable resources in the development of its resource portfolios. As discussed in Section 3, the Panel finds that the Base DSM Plan is cost-effective and adequate.

[287] Ibid., p. 5.
[288] CEC Final Argument, p. 18.
[289] ICG Final Argument, pp. 2-3.
[290] ICG Final Argument, pp. 2-3.
[291] RCIA Final Argument, p. 11, p. 20.
[292] Ibid., p. 10.
[293] Ibid., p. 7.
[294] BCOAPO Final Argument, pp. 3, 44.

The Panel is satisfied that FBC's Reference Case load forecast is reasonable, and that the level of DSM proposed under the Base DSM scenario is a reasonable estimate of DSM impacts for the purpose of long-term resource planning and estimating of the demand for energy that FBC expects to serve after it has taken cost-effective DSM.

The additional alternative load scenarios developed by FBC are helpful in analyzing the possible range of outcomes in a changing environment, but we agree that load drivers such as the rate of EV uptake, changes in customer generation and changes in temperature need to be carefully be monitored to determine impacts on the plan.

Based on this analysis, the LTERP shows FBC does not require any new supply-side resources until at least 2030. According to FBC's analysis, existing supply resources and contracts, continued access to reliable and cost-effective market energy, and the level of DSM proposed in the Base DSM scenario are expected to be sufficient to meet the needs of FBC's customers until that time. In that respect, the Panel considers that the LTERP may be reassuring to those who receive service from FBC in confirming that there is no need to invest in costly system expansions in order to serve load, at least between now and 2030.

FBC has noted its goal of pursuing year-round capacity self-sufficiency for long-term resource planning purposes beginning in 2030. Notwithstanding the BCUC's determination in the 2016 LTERP Decision that FBC is not obligated to actively pursue the goal of self-sufficiency, the Panel considers that the goal of self-sufficiency is not limited to a point in time but instead, should be evaluated in the context of an energy transition and changes in market conditions. As discussed in Section 2.2.3.1 above, the Panel is persuaded that the evidence in this proceeding demonstrates that FBC's goal of pursuing year-round capacity self-sufficiency beginning in 2030 is an appropriate part of its long-term resource planning and that FBC's plan to meet the June capacity gap using firm market block purchases until 2030 is an appropriate interim measure.

However, as also noted in Section 2.2.3.1, the Panel acknowledges that we are in the midst of an uncertain energy transition and circumstances may change between now and 2030 requiring a re-examination of FBC's 2030 goals for year-round capacity self-sufficiency and the need for earlier implementation. Accordingly, the Panel has directed that FBC provide updated information and robust analysis with respect to capacity self-sufficiency as part of its next LTERP.

The Panel is further satisfied that FBC's preferred portfolio appropriately balances the relevant considerations for long-term resource planning in an environment of uncertainty, and agrees with FBC's submission that portfolio C3 best meets the 2021 LTERP objectives in terms of balancing cost-effectiveness, reliability, inclusion of cost-effective DSM and consideration of BC's energy objectives. FBC's overall approach to managing unplanned changes in load is reasonable. The Panel notes that should new resources be required by FBC prior to the filing of its next LTERP, FBC is free to apply for a CPCN or acceptance of an expenditure schedule for such resources as needed.

With the exception of BCSSIA, all interveners submit the 2021 LTERP should be accepted as being in the public interest. BCSSIA recommends that the BCUC should reject "at least a portion of the LTERP" given the absence of significant initiatives aimed at achieving the BC Government's GHG reduction targets. However, as acknowledged by BCSEA, the BC Government has not as yet allocated explicit GHG reduction targets to FBC. Accordingly, given the absence of legislated GHG reduction targets for FBC, the Panel declines to reject a portion

of the 2021 LTERP solely based on FBC's failure to explicitly address GHG emissions in this 2021 LTERP. In Section 5.3 below, the Panel discusses interveners' further submissions on the role of GHG emissions reduction in the 2021 LTERP.

Lastly, the Panel agrees with ICG that FBC requires some discretion as to how it undertakes its long-term planning.

To the extent that interveners have remaining concerns that they wish FBC to address, the Panel encourages them to work with FBC to resolve them through consultation on the development of its next LTERP.

5.0 Other Issues Arising

In the course of the proceeding, some interveners raise other issues which merit consideration. These include:

- The need for LTERPs to take into account resiliency as well as reliability as an explicit planning criterion;
- Climate change impacts; and
- Electrification and GHG emissions reduction.

We review their submissions in the following sub-sections.

5.1 Resiliency as a Planning Criterion

Notwithstanding its ultimate support for acceptance of the 2021 LTERP, RCIA requested the opportunity to submit intervener evidence on a "framework for evaluating alternative resource portfolio performance under plausible scenarios, to determine investment priority for achieving optimal portfolios." RCIA commissioned Midgard Consulting Incorporated (Midgard) to provide an expert report[295] on resiliency in April 2022. FBC provided rebuttal evidence,[296] and all parties had an opportunity to ask IRs on both sets of evidence.[297]

The Panel considers it worthwhile to review the issue and evidence related to resilience in the context of long-term resource planning to provide guidance to FBC for future filings.

Definitions of Resiliency

Midgard's evidence explored the definition of resiliency; portfolio development in a resilient framework; the concept of scenario planning; and potential portfolio evaluation frameworks incorporating resiliency.[298]
In response to Midgard's definition, FBC filed rebuttal evidence providing the following definition of resiliency:

[295] Exhibit C8-6, RCIA Evidence.
[296] Exhibit B-21, FBC Rebuttal Evidence.
[297] Exhibit C8-7, RCIA responses to IRs on Intervener Evidence; Exhibits B-22 through B-25, FBC IR responses on Rebuttal Evidence.
[298] Exhibit C8-6, RCIA Evidence; RCIA Final Argument, pp. 16-20.

> Resiliency refers to the ability to prevent, withstand, and recover from system failures or unforeseen events.[299]

RCIA accepts this definition of resiliency referenced by FBC is being "effectively equivalent" to Midgard's definition, and is "functional" to the three (3) key resiliency elements set out in Midgard's evidence: Withstand, Rapid Recovery and Adapt (i.e., a form of "prevention" which is materially equivalent to "pre-emptively Adapt").[300]

FBC provided the following explanation of how reliability differs from resiliency in its rebuttal evidence:

> Reliability refers to designing and operating a system to ensure it meets the expected customer demand at all times, and is a combination of two concepts: adequacy and security. Adequacy refers to the ability to ensure a sufficient supply of energy, whereas security refers to the ability to consistently deliver that supply to customers.
>
> Reliability is required to achieve resiliency and so resiliency builds on reliability. A reliable system is one in which supply and demand are balanced to keep electricity flowing and is robust enough to minimize the risk of disruptions. A resilient system is one that is able to quickly and efficiently restore the electricity flow after an outage has occurred. The more robust and reliable the system is, the better it is able to lower the impact of outages on customers and increase the system's resiliency.[301]

Midgard provided the following quote from the Ontario Energy Board discussing both reliability and resiliency:

> Resiliency is a different characteristic than reliability. Reliability is defined as the ability of the grid to deliver electricity consistently when demanded, while resiliency is defined as the ability of the grid to recover quickly and effectively from an event.[302]

BCSSIA notes the distinctions being made between the two terms (reliability and resilience) by FBC and RCIA are distinctions without a difference that almost none of FBC's customers will understand. BCSSIA questions whether "the planning for these [weather] variations [is] supposed to be done under the heading "reliability" or "resiliency" or does it matter as long as it is done?"[303]

FBC's 2021 LTERP and its Approach to Resiliency

RCIA's intervener evidence takes issue with FBC's approach to resiliency, stating that FBC's resiliency framework is under-developed and proposing a different framework for evaluating resiliency.[304]

FBC submits it addresses resiliency in the 2021 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.[305]

[299] Exhibit B-21, Rebuttal Evidence, p. 3.
[300] RCIA Final Argument, pp. 17; 18.
[301] FBC Rebuttal Evidence, p. 3.
[302] Exhibit C8-6, RCIA Evidence, pdf p. 7 of 27.
[303] BCSSIA Final Argument, p. 24.
[304] Exhibit C8-6.
[305] FBC Final Argument, pp. 49-50.

- FBC evaluated future resource portfolios based on high-level resiliency criteria, namely operational flexibility and geographic diversity.[306]
- FBC submits it 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.[307]

Midgard was not able to identify any utilities in North America that practice resiliency evaluation in their long-term planning as described by Midgard.[308] FBC submits that Midgard has not identified any aspect of FBC's LTERP that is out of step with long-term resource planning practices.[309]

ICG agrees that FBC's consideration of resiliency in this 2021 LTERP is adequate and if further investigation of resiliency issues is warranted, then such further investigations should be reviewed in future capital planning.[310]

BCSEA accepts that FBC is taking seriously the threat that global climate change presents to FBC's infrastructure and operations.[311] BCSEA considers that the primary strength of the Midgard evidence is to highlight the importance of resiliency as an aspect of a public utility's long-term plan and, in particular, FBC's 2021 LTERP. BCSEA is not persuaded that the BCUC should rely on the Midgard evidence to conclude that the 2021 LTERP is deficient regarding resilience. Also, BCSEA does not agree with the Midgard evidence's suggestion that load forecast scenarios should be used to test low-probability high-consequence risks. BCSEA is satisfied that FBC's 2021 LTERP adequately addresses and provides for resiliency.[312]

BCOAPO notes that evidence filed by RCIA questioned whether the considerations of operational flexibility and geographic diversity that FBC included in its assessment of "resiliency" were sufficient to adequately test the ability of a portfolio to respond to unforeseen circumstances, but makes no submission on this aspect of the current 2021 LTERP.[313]

The CEC's only comment on resiliency is to note that "the robustness of the resiliency for both the FEI and FBC systems" is noticeably absent from FBC's assessment of its planning environment.

Next Steps and Future Frameworks to Address Resiliency

FBC notes in its Rebuttal Evidence its agreement with the need to expand its approach to more systematically consider resiliency in its next LTERP.[314] FBC submits that the proper response to the resiliency concerns raised by Midgard is for FBC to consider methods to improve its consideration of resiliency in the 2021 LTERP, develop an approach in consultation with stakeholders, and propose an approach in its next LTERP for the BCUC's review.[315]

[306] Ibid., pp. 51-53.
[307] FBC Final Argument, pp. 53-54
[308] Exhibit C8-7, RCIA's response to BCSEA IR1 3.6.
[309] Exhibit B-21, p. 11.
[310] ICG Final Argument, p. 11.
[311] BCSEA Final Argument, p. 28.
[312] Ibid., p. 32.
[313] BCOAPO Final Argument, p. 38.
[314] Exhibit B-21, p. 11.
[315] FBC Final Argument, pp. 54-55.

RCIA supports FBC's offer "to consider methods to improve its consideration of resiliency in the 2021 LTERP, develop an approach in consultation with stakeholders, and propose an approach in its next LTERP for the BCUC's review". Further, it submits that it "can accept this approach in good faith, with the expectation that RCIA will be one of the stakeholders consulted by FBC, and also that the scope of what are considered resiliency scenarios/events is a topic open for exploration in that consultation."[316]

BCSEA supports FBC's proposal "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."[317]

ICG supports FBC's plans to consider more systematic approaches to evaluating resiliency in the next LTERP, but not with increased costs for additional resources.[318]

BCOAPO commends FBC's responsiveness to the timely issue of resiliency and submits that the BCUC should direct FBC to pursue this initiative in its next LTERP filing after consulting with stakeholders through the LTERP RPAG process and other avenues. [319]

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, given FBC's stated intention to explore 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.[320]

BCSEA supports FBC's submission that "BCUC need not make any determination on the appropriate way to improve FBC's framework for considering resiliency at this time." BCSEA prefers FBC's suggested approach, as stated above.[321]

MoveUP recommends that the BCUC conduct a process to consider ways to adapt resource planning at both the utility and oversight levels to better fit emerging dynamics and demands, including resiliency,[322] noting that the existing the BCUC's Resource Planning Guidelines were adopted in 2003.[323]

FBC notes in reply that the current guidelines provide ample room for flexibility on the part of utilities to adapt to changing circumstances, such as the impacts of climate change, and this flexibility is something that should continue in the future. FBC further notes that the BCUC is currently reviewing the long-term resource plans of the two largest utilities in this Province, FEI and BC Hydro. FBC submits that the BCUC may want to consider the results of the review of those resource plans before initiating any process to update the guidelines.[324]

[316] RCIA Final Argument, p. 20.
[317] BCSEA Final Argument, pp. 3; 32.
[318] ICG Final Argument, p. 13.
[319] BCOAPO Final Argument, p. 39.
[320] FBC Final Argument, p. 56.
[321] BCSEA Final Argument, p. 33.
[322] MoveUP Final Argument, p. 5.
[323] Ibid., pp. 2; 7.
[324] FBC Reply Argument, p. 38.

Need for Additional Resources to Address Resiliency

FBC notes that this expanded approach to resilience may require increased resources.[325]

ICG believes that further steps related to resiliency will increase costs that are unlikely to be justified by customer benefits. Therefore, ICG does not support FBC's suggestion to add more resources to expand its approach to more systematically consider resiliency. ICG notes that Midgard was not able to identify any utilities in North America that practice resiliency evaluation in their long-term planning as described by Midgard.[326]

Given the increasing volatility of weather conditions and accelerated frequency of extreme climate events, BCOAPO submits that developing a more systemic approach to resiliency considerations will create additional value for FBC customers through more robust resiliency and cost avoidance. BCOAPO submits the reasonableness of costs incurred in resilience planning should be assessed in the next LTERP filing.[327]

FBC acknowledges that ICG does not support FBC incurring the additional costs to address resilience, but notes that carrying out a more systematic approach will require more resources. If the BCUC does not support the incurring of additional costs to undertake a more systematic analysis of resiliency, FBC has stated it would expect that to be reflected in the BCUC's Decision on this Application.[328]

Panel Discussion

In light of the increasing risks associated with climate change, the frequency of extreme weather events, energy market uncertainty, and ongoing recurrence of pandemics, the Panel supports FBC's willingness to explore an enhanced approach to resiliency with input and feedback from stakeholders, such as through the LTERP RPAG process. The Panel views resilience as an element of ensuring the ongoing reliability of utility service, the ability to recover from unexpected external events and an important lens for considering scenarios in the context of a long-term electricity resource plan. These aspects align with section 6 of the BCUC Resource Planning Guidelines, which states with reference to evaluation and selection of resource portfolios that this should include an "(a)nalysis of the tradeoffs between portfolios and how they perform under uncertainty" in order to "facilitate determining which portfolio performs best relative to the stated objectives."[329]

With respect to ICG's concerns about the costs associated with considering resiliency for a future LTERP, the Panel notes that acceptance of the 2021 LTERP does not entail explicit or implicit approval of any specific expenditures. Rather, a LTERP is concerned with planning, not cost-recovery. However, any cost-effective measures undertaken by FBC to address reliability or enhance resiliency or provide benefits to ratepayers, and which are deemed necessary, would normally be recoverable in rates.

Similarly, the Panel sees no need to recommend, as submitted by MoveUP, a BCUC review of the Resource Planning Guidelines to incorporate resiliency as a specific planning criterion at this time. The Panel observes that there are several other proceedings ongoing at the same time where resiliency is being raised as an issue not only by the applicants but by interveners and the BCUC. Pending the completion of those proceedings, it is

[325] FBC Final Argument, p. 56; FBC Reply Argument, p. 11.
[326] ICG Final Argument, p. 11.
[327] BCOAPO Final Argument, p. 39.
[328] FBC Reply Argument, p. 37.
[329] BCUC Resource Planning Guidelines, p. 4.

premature for us to opine on any potential changes to the Resource Planning Guidelines based only on our review of FBC's 2021 LTERP. Changes to the Resource Planning Guidelines should not be made in a piecemeal fashion in response to a particular filing but should be made following their comprehensive review by all affected stakeholders in the Province.

5.2 Impacts of Climate Change

FBC states that it is taking seriously the threat that global climate change presents to FBC's infrastructure and operations. FBC has identified wildfires as the most significant climate related risk to its system, while other risks include flooding and extreme weather. FBC considers that it continues to take into account climate change impacts, as reflected in the following activities:[330]

- FBC has been building climate resiliency using its standards and practices over time. FBC provides examples of this, such as working to harden the power system to withstand higher wind speeds and other environmental factors through updated designs and material selection.
- FBC is proactively adapting to climate change related risks. FBC states that it is proactively developing a roadmap for climate change adaption, which it expects to be complete in Q4 2022. FBC is also developing a business case to assess various mitigation strategies for wildfires and will be looking to develop business cases for flooding and extreme weather events in subsequent years.
- FBC is monitoring developments regarding climate change impacts on water availability that may impact FBC's resources. To date, FBC identifies that it has not observed any material changes to water availability. However, it continues to monitor developments in this regard by several means, including working with other utilities such as BC Hydro. During the proceeding, FBC was asked if it supported a generic review of risk to BC's hydroelectric generation resources by changes in long-term water availability. FBC responded that such a review would help identify/quantify potential impacts to FBC's entitlements under the Canal Plant Agreement and FBC's energy supply portfolio. However, if FBC or the BCUC were to engage in a generic review of this risk, it would have to be in cooperation with BC Hydro due to mutual interests under the Canal Plant Agreement as well as the overall complexity of such an analysis.
- FBC is updating its 1 in 20 peak demand forecast method to take into account the June 2021 heat dome event in British Columbia. FBC identifies that including this data in its load forecast will ensure that its system will be designed to be reliable even during extreme weather.

Positions of the Parties

BCSEA accepts that FBC is taking seriously the threat that global climate change presents to FBC infrastructure and operations and encourages FBC to continue to monitor climate change impacts on FBC's supply resources, and to take action where appropriate. [331]

RCIA accepts that FBC has been taking steps to adapt to climate change impacts with the caveat that RCIA does not agree that all the actions listed as examples of resiliency are resiliency actions, since some appear to be

[330] FBC Final Argument, pp. 43-48. Exhibit B-26, response to Panel IR 1.1.
[331] BCSEA Final Argument, pp. 28-30.

reliability (planning, mitigation, actions) as specified in industry standard asset management and design practices.[332]

BCSSIA submits that "(w)hile credit should be given to FBC for taking seriously the threat that global climate change presents to FBC infrastructure and operations, a lot more work needs to be done. As soon as possible. For example, and it is but one example, the risk associated with long term water availability can be reduced by including a greater diversity of renewable generation, such as solar generation. The BCSSIA is not aware of any evidence on the hearing record where the topic of a broader mix of renewable generation is discussed in any detail. If it is too late to address this oversight in the LTERP that is before the BCUC, then it should be addressed in the next resource plan."[333]

In reply, FBC states that it did consider a broad mix of renewable generation, as indicated by the resource options report included as appendix K to the Application, which contains an extensive discussion of supply-side resource options. Amongst other analysis, FBC states that it evaluated portfolios that include only clean or renewable resources against ones that are not clean and renewable, as presented in Figure 11-3 of the LTERP. Also, FBC notes that its preferred portfolios themselves include a broad mix of renewable resources, including solar and wind resources.[334]

BCSSIA fully supports the idea of a generic review of the risk posed to BC's hydro-electric generation resources by changes in long-term water availability.[335]

Other interveners did not provide submissions on this specific topic.

Panel Discussion

The Panel views that there is merit in the suggestion that the BCUC consider initiating a generic review of long-term water availability and its impact on British Columbia's hydro-electric generation resources. However, the Panel notes that this would require input, coordination and cooperation amongst various key stakeholders including BC Hydro, FBC, provincial and municipal governments and Indigenous communities, none of which, with the exception of FBC, is party to this proceeding.

5.3 Electrification and GHG Emissions Reduction

Several interveners raised the role of FBC in addressing GHG emissions reduction in their final arguments.

Positions of the Parties

BCSSIA submits that some confusion can arise when the plans and objectives of the gas utility FEI, are conflated with those of the electric utility FBC, particularly with respect to FBC's approach to reducing GHG emissions of its customers.[336] BCSSIA notes the Application does clearly state that the Clean Growth Pathway[337] is a plan which

[332] RCIA Final Argument, p. 15.
[333] BCSSIA Final Argument, p. 25
[334] FBC Reply Argument, p. 27.
[335] BCSSIA Final Argument, p. 25.
[336] Ibid., pp. 3, 6.
[337] Appendix C of the Application.

encompasses both the gas utility (FEI) and FBC. However, it does not make clear exactly how much contribution each is expected to make.[338]

In response to IRs, FBC stated that "FBC's customers GHG emissions are believed to be not significant, considering that the electricity delivered by FBC to its customers was and continues to be primarily generated from renewable sources, particularly from hydroelectric resources." BCSSIA notes its disappointment with this response, submitting that:

> The cleanness of the electricity they receive is not really the issue. The real issue is how much fossil fuel are they now burning, which could be replaced with renewable electricity. Knowing what that amount is, would give FBC a real target for electrification efforts. As it stands, without that information, FBC has no meaningful target, and there is no benchmark against which to measure progress. [339]

In Section 4.0 above, the Panel noted BCSSIA's submission that the BCUC should reject a portion of the 2021 LTERP given that implementing the Reference Case resource plan will result in virtually no contribution to reaching the much needed (and Government mandated) GHG reduction targets. BCSSIA submits FBC could resubmit a portion "to include some significant initiatives aimed at achieving the Government's objectives with regard to reducing GHG emissions, both overall and by sector. This new plan should also include quantifiable benchmark metrics against which progress can be measured over the duration of the plan."[340]

FBC submits that its efforts and actions to reduce GHG emissions are reasonable and appropriate at this time, given that FBC's emissions represent only 0.08 percent of total BC emissions. FBC offers that FBC's main contribution to GHG reductions is in the transportation sector, by providing EV charging infrastructure. Other FBC activities aimed at reducing emissions include transitioning to clean market purchases; administering the BC Government's CleanBC fuel-switching incentives for its customer; and undertaking an electrification study to inform any incentives or special rates outside of FBC's DSM programs.[341]

The CEC finds that the FBC assessment of its planning environment is useful and relevant as far as it goes. The CEC suggests that the potential for FBC to be contributing to the solutions for FEI in transition to a clean gas system from a fossil fuel natural gas system is noticeably absent from the planning environment as is the robustness of the resiliency for both the FEI and FBC systems.[342] The CEC finds that it would be even more important to have analysis covering the potential electrical requirements if FBC were to become engaged with FEI in producing inexpensive synthetic natural gas as a form of renewable natural gas for the FEI gas delivery system in the region and or elsewhere.[343]

The CEC recommends that the BCUC direct FBC in its next LTERP to adopt a broader understanding of its planning environment, particularly assisting FEI in its transition to clean renewable gas supply.[344]

[338] BCSSIA Final Argument, p. 8.
[339] Ibid.
[340] BCSSIA Final Argument, pp. 9-10.
[341] FBC Reply Argument, pp. 12-13.
[342] CEC Final Argument, p. 4.
[343] Ibid., p. 6.
[344] Ibid., pp. 1, 3-4.

In reply, FBC recognizes the importance of FEI's GHG emissions reduction efforts and submits it has included an appropriate level of information on FBC's contribution to those efforts, section 2.2.6 of the 2021 LTERP, which includes investing in renewable gases to decarbonize the gas supply, and refers to the indirect support FBC provides for FEI's initiatives to decarbonize the gas network.[345]

MoveUp submits that,

> unlike issues presented to utility regulators in earlier times, electrification is not a solo utility performance. Fundamentally, it is about a hand-off between the fossil fuel sector and electric utilities. Gas utilities face a diminishing role as provincial and municipal climate policy constrains the construction of GHG-emitting buildings, powerful incentives encourage gas customers to replace furnaces with electric heat pumps, and the gas utility sector will be subject to an aggressive net reduction of emissions province-wide. Silo-walls between utilities obstruct the task at hand. The utilities' plans cannot be examined in perfect isolation if we expect the net result to succeed. [346][Emphasis added]

ICG believes the BCUC should continue to ensure the first priority for long-range planning is cost-effective reliable service. From a societal perspective, other portfolio objectives such as low environmental impacts and economic development should be determined by government policy, not by economic regulation.[347]

BCSEA acknowledges that FBC does not have direction from the Provincial Government to pursue electrification like BC Hydro has, and that FBC does not have an energy surplus for the mid-term like BC Hydro has. However, BCSEA would like to see FBC examine the potential GHG emissions reduction benefits of an electrification program in the development of its next LTERP.[348]

In response to BCSEA's comments, FBC expects that its next LTERP will be informed by the results of its electrification study.[349]

Panel Discussion

The Panel considered whether FBC compared different resource types and how such resources could address GHG reduction. We agree with several interveners' observations about the lack of benchmarks or other measures relating to GHG reduction and electrification. Furthermore, we agree that FBC will need to address the impacts of any legislated GHG targets and government's CleanBC Roadmap to 2030 in its next LTERP, along with the associated energy transition and electrification. With respect to the latter, we note that FBC will be informed by the results of its electrification study. If it becomes apparent that there is a significant change in load as a result of electrification prior to the next LTERP, FBC may need to implement its contingency scenarios.

The Panel also notes that although the Provincial Government did not specifically direct FBC to pursue deep electrification as it has recently done with BC Hydro, several interveners point out that FBC has not fully addressed how it intends to contribute to GHG emissions reduction. We encourage FBC to explore ways that it can work with its sister utility, FEI, to achieve the objectives of greater GHG emissions reduction going forward.

[345] FBC Reply Argument, p. 13.
[346] MoveUp Final argument, p. 6.
[347] ICG Final Argument, p. 10.
[348] BCSEA Final Argument, p. 35.
[349] FBC Final Argument, p. 13.

Like BCSEA, we also encourage FBC to examine the potential GHG emissions reduction benefits of an electrification program in the development of its next LTERP. In our view, GHG emissions reduction is not a goal that is achievable by BC Hydro and FEI working in silos, but requires active participation and collaboration by all players including FBC.

6.0 Timing of the Next LTERP

Given that no new supply-side resources are forecast to be required before 2030, FBC expects that it would submit its next LTERP in approximately five years from the submission date of this LTERP, in 2026.[350] This would provide FBC with sufficient lead-time to assess the load drivers and load forecast, updated load resource balance, assess transmission and distribution requirements and DSM and available supply-side resource options and costs before any new resources may be required after 2030.

FBC will likely file another LTERP or supplemental update sooner than five years hence if:

- Periodic assessments of Load Resource Balance (LRB) indicate the need for new generation resources. Due to recent events like the extreme heat and record loads, FBC may bring forward an application for a new resource to the BCUC for approval prior to the development of the next LTERP. [351]
- Market energy is no longer a reliable or a cost-effective resource. FBC will continue to assess resource options and examine the LRB to determine which new resources may be required and when. Given the long development timelines for new generation, FBC will likely make a determination to initiate project development work numerous years in advance of physically needing the assets.[352] Updates will be provided in FBC's next LTERP.[353]

In the meantime, FBC provides timeframes for the completion of the following:[354]

- FBC's roadmap on climate change adaptation is under development and FBC expects that it will be completed in Q4 2022;
- The alternative material pole type pilot program was completed for the Creston wetlands areas in November 2021;
- FBC's business case relating to wildfire mitigation and adaptation strategies will be completed in Q2 2022;
- The flooding business case will be completed in 2023/2024, followed by the extreme weather business case in 2025 to 2027.

FBC does not consider it feasible to complete the extreme weather business case sooner than the 2025 to 2027 timeframe as several steps will need to be completed in order to develop the extreme weather business case.[355] The business cases for wildfire and flooding have been prioritized as important risks to be mitigated for which supporting data is currently available.

[350] Exhibit B-1, p.217; Exhibit B-2, BCUC IR 9.3.
[351] FBC Final Argument, p. 33.
[352] Exhibit B-2, BCUC IR 36.2.
[353] Exhibit B-1, p.199.
[354] Exhibit B-11, BCUC IR 52.4.
[355] Exhibit B-26, Panel IR 2.2.

Positions of the Parties

No interveners commented on the timing of the next LTERP.

Panel Determination

The Panel considers that FBC's proposal to submit the next LTERP in five years to be reasonable. This should allow sufficient time to address electrification, assessment of the system beyond that presented in this LTERP (which is limited to Kelowna), and the role of resiliency in long-term resource planning. However, the Panel notes that if there is significant change in load due to greater electrification, FBC may want to make an earlier filing.

FBC has indicated that it will likely submit an LTERP or supplemental update filing sooner than five years from the submission of the 2021 LTERP if periodic assessments of Load Resource Balances indicate the need for new generation resources; or if market energy is no longer a reliable or a cost-effective resource. The Panel agrees with this approach.

FBC has also indicated that "due to recent events like the extreme heat and record loads, FBC may bring forward an application for a new resource to the BCUC for approval prior to the development of the next LTERP." While the Panel encourages FBC to continue to plan for climate change events, it recognizes that during this time of uncertain energy transition, FBC may need to respond to unanticipated events. Should FBC find the need to seek approval for new resources, this will be assessed by a future panel under the relevant provisions of the UCA in light of the prevailing circumstances at that time. In the meantime**, the Panel directs FBC to file its application for review and acceptance of its next LTERP no later than December 31, 2026, unless otherwise directed by the BCUC.** As the Panel observed above, changing circumstances and unexpected increases in load may require FBC to file a revised plan and pursue additional supply side resources sooner than 2026.

Lastly, the Panel acknowledges that several interveners, in particular the CEC, have made specific recommendations for improvements for the development of FBC 's next LTERP in the course of this proceeding and in their final arguments. While we have highlighted some of their recommendations in our Decision, we have not attempted to exhaustively address each and every one of those recommendations as we consider that the more appropriate forum for parties to follow up on them is through the LTERP RPAG consultation process leading up to the development of FBC's next LTERP. We encourage them to do so.

DATED at the City of Vancouver, in the Province of British Columbia, this 21st day of December 2022.

A. K. Fung, KC
Panel Chair / Commissioner

C. M. Brewer
Commissioner

A. Pape-Salmon
Commissioner

FortisBC Inc.
2021 Long-Term Electric Resource Plan and
2021 Long-Term Demand-Side Management Plan

ACRONYM LIST

ACRONYM	DESCRIPTION
Application	2021 Long-Term Electric Resource Plan (LTERP) including 2021 Long-Term Demand-Side Management Plan (LT DSM Plan)
BAU	Business as Usual
BC Hydro	British Columbia Hydro and Power Authority
BCOAPO	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
BCSEA	BC Sustainable Energy Association
BCSSIA	BC Solar and Storage Industries Association
BRX	Brilliant Expansion
C&S	Codes and Standards
CEA	*Clean Energy Act*
CEC	Commercial Energy Consumers Association of BC
CPA	Canal Plant Agreement
CPCN	Certificate of Public and Convenience and Necessity
CPR	Conservation Potential Review
DCE	Deferred Capital Expenditure
DSM	Demand-side Management
EV	Electric Vehicle
FBC	FortisBC Inc.
FEI	FortisBC Energy Inc.
GHG	Greenhouse Gas

ACRONYM	DESCRIPTION
Guidehouse	Guidehouse Canada Ltd.
GWh	Gigawatt hour
ICG	Industrial Consumers Group
IHS Markit	A third-party market subscription service used by FEI and FBC. IHS Markit provides market analysis and data as part of the subscription service
IPP	Independent Power Producer
IRs	Information Requests
LLST	Large Load Sector Transformation
LRMC	Long Run Marginal Cost
LT DSM Plan	Long-Term Demand-Side Management Plan
LTERP	Long-Term Electric Resource Plan
LTGRP	Long Term Gas Resource Plan
Lumidyne	Lumidyne Consulting Ltd.
Midgard	Midgard Consulting Incorporated
MoveUP	Movement of United Professionals
mTRC	Modified Total Resource Cost Test
MW	Megawatt
Powerex	Powerex Corp.
PPA	Power Purchase Agreement
PRM	Planning Reserve Margin
RCIA	Residential Consumer Intervener Association
RIM	Rate Impact Measure
RNG	Renewable Natural Gas
Roadmap	CleanBC Roadmap to 2030
RPAG	Resource Planning Advisory Group

ACRONYM	DESCRIPTION
SCGT	Simple Cycle Gas Turbine
TOU	Time of Use
TRC	Total Resource Cost
UCA	*Utilities Commission Act*
UCC	Unit Capacity Cost
UEC	Unit Energy Cost
UPC	Use-per customer
WAX CAPA	Waneta Expansion Capacity Purchase Agreement
WECC	Western Electricity Coordinating Council

FortisBC Inc.
2021 Long-Term Electric Resource Plan and
2021 Long-Term Demand-Side Management Plan

EXHIBIT LIST

Exhibit No.	Description
COMMISSION DOCUMENTS	
A-1	Letter dated August 23, 2021 – Appointing the Panel for the review of FortisBC Inc.'s 2021 Long-Term Electric Resource Plan and Long-Term Demand-Side Management Plan
A-2	Letter dated September 9, 2021 – BCUC Order G-265-21 establishing a regulatory timetable
A-3	Letter dated October 12, 2021 – BCUC Order G-292-21 amending the regulatory timetable
A-4	Letter dated October 21, 2021 – BCUC Information Request No. 1 to FBC
A-5	Letter dated October 28, 2021 – BCUC response to CEC extension request
A-6	Letter dated November 3, 2021 – BCUC Order G-314-21 amending the regulatory timetable
A-7	Letter dated January 13, 2022 – BCUC request regarding Notice of Intent to File Evidence
A-8	Letter dated February 3, 2022 – BCUC Order G-24-22 establishing a further regulatory timetable
A-9	Letter dated February 17, 2022 – BCUC Information Request No. 2 to FBC
A-10	Letter dated April 21, 2022 – BCUC Information Request No. 1 to RCIA on Intervener Evidence
A-11	Letter dated May 13, 2022 – BCUC Order G-130-22 establishing a further regulatory timetable
A-12	Letter dated June 16, 2022 – Panel Information Request No. 1 to FBC
A-13	Letter dated June 16, 2022 – BCUC Information Request No. 3 to FBC
A-14	Letter dated July 20, 2022 – BCUC Order G-199-22 establishing a further regulatory timetable
A-15	Letter dated July 25, 2022 – Panel Information Request No. 2 to FBC
A-16	Letter dated September 9, 2022 – BCUC response to BCOAPO extension request to file Final Argument

A-17	Letter dated September 12, 2022 – BCUC response to CEC's extension request to file Final Argument
A-18	Letter dated September 27, 2022 – BCUC response to FBC's extension request to file Reply Argument

APPLICANT DOCUMENTS

B-1	**FORTISBC INC. (FBC)** - 2021 Long-Term Electric Resource Plan (LTERP) and Long-Term Demand-Side Management Plan (LT DSM Plan) dated August 4, 2021
B-2	Letter dated December 23, 2021 – FBC submitting response to BCUC Information Request No. 1
B-2-1	**CONFIDENTIAL** - Letter dated December 23, 2021 – FBC submitting confidential response to BCUC Information Request No. 1 28.4.1
B-3	Letter dated December 23, 2021 – FBC submitting response to BCSSIA Information Request No. 1
B-4	Letter dated December 23, 2021 – FBC submitting response to BCOAPO Information Request No. 1
B-5	Letter dated December 23, 2021 – FBC submitting response to ICG Information Request No. 1
B-6	Letter dated December 23, 2021 – FBC submitting response to BCSEA Information Request No. 1
B-7	Letter dated December 23, 2021 – FBC submitting response to MoveUP Information Request No. 1
B-8	Letter dated December 23, 2021 – FBC submitting response to RCIA Information Request No. 1
B-9	Letter dated December 23, 2021 – FBC submitting response to CEC Information Request No. 1
B-10	Letter dated January 26, 2026 – FBC submitting comments to RCIA Notice to File Evidence
B-11	Letter dated March 31, 2022 – FBC responses to BCUC Information Request No. 2
B-12	Letter dated March 31, 2022 – FBC responses to BCSEA Information Request No. 2
B-13	Letter dated March 31, 2022 – FBC responses to CEC Information Request No. 2
B-14	Letter dated March 31, 2022 – FBC responses to ICG Information Request No. 2
B-15	Letter dated March 31, 2022 – FBC responses to MoveUP Information Request No. 2

B-16	Letter dated March 31, 2022 – FBC responses to RCIA Information Request No. 2
B-17	Letter dated March 31, 2022 – FBC responses to BCOAPO Information Request No. 2
B-18	Letter dated March 31, 2022 – FBC responses to BCSSIA Information Request No. 2
B-19	Letter dated April 21, 2022 – FBC Information Request No. 1 to RCIA Intervener Evidence
B-20	Letter dated May 11, 2022 – FBC providing Notice o Intent to file Rebuttal Evidence on RCIA Intervener Evidence
B-21	Letter dated May 26, 2022 – FBC submitting Rebuttal Evidence
B-22	Letter dated July 7, 2022 – FBC submitting response to BCUC Information Request No. 3 on Rebuttal Evidence
B-23	Letter dated July 7, 2022 – FBC submitting response to RCIA Information Request No. 3 on Rebuttal Evidence
B-24	Letter dated July 7, 2022 – FBC submitting response to CEC Information Request No. 3 on Rebuttal Evidence
B-25	Letter dated July 7, 2022 – FBC submitting response to BCSEA Information Request No. 3 on Rebuttal Evidence
B-26	Letter dated July 7, 2022 – FBC submitting response to BCUC Panel Information Request No. 1
B-27	Letter dated August 4, 2022 – FBC submitting response to BCUC Panel Information Request No. 2
B-28	Letter dated September 26, 2022 – FBC submitting extension request to file Reply Argument

INTERVENER DOCUMENTS

C1-1	**BC SUSTAINABLE ENERGY ASSOCIATION (BCSEA) –** Letter dated September 16, 2021 submitting request to intervene by William Andrews
C1-2	Letter dated October 29, 2021 – BCSEA submitting extension request to file Information Request No. 1
C1-3	Letter dated November 8, 2021 – BCSEA submitting Information Request No. 1 to FBC
C1-4	Letter dated January 5, 2022 – BCSEA will not be submitting intervener evidence
C1-5	Letter dated January 27, 2026 – BCSEA submitting comments to RCIA Notice to File Evidence

C1-6 Letter dated February 24, 2022 – BCSEA submitting Information Request No. 2 to FBC

C1-7 Letter dated April 21, 2022 – BCSEA Information Request No. 1 to RCIA on Intervener Evidence

C1-8 Letter dated June 16, 2022 – BCSEA submitting Information Request No. 3 to FBC

C2-1 **INDUSTRIAL CONSUMERS GROUP (ICG) –** Letter dated September 18, 2021 submitting request to intervene by Robert Hobbs

C2-2 Letter dated October 29, 2021 – ICG submitting extension request to file Information Request No. 1

C2-3 Letter dated November 9, 2021 – ICG submitting Information Request No. 1 to FBC

C2-4 Letter dated January 6, 2022 – ICG will not be submitting intervener evidence

C2-5 Letter dated January 27, 2026 – ICG submitting comments to RCIA Notice to File Evidence

C2-6 Letter dated February 24, 2022 – ICG submitting Information Request No. 2 to FBC

C3-1 **BRITISH COLUMBIA HYDRO AND POWER AUTHORITY (BC HYDRO) –** Letter dated September 27, 2021 submitting request to intervene by Chris Sandve

C4-1 **BC SOLAR AND STORAGE INDUSTRIES ASSOCIATION (BCSSIA)–** Letter dated October 14, 2021 submitting request to intervene by Steve Davis

C4-2 Letter dated October 29, 2021 – BCSSIA submitting extension request to file Information Request No. 1

C4-3 Letter dated November 9, 2021 – BCSSIA submitting Information Request No. 1 to FBC

C4-4 Letter dated February 24, 2022 – BCSSIA submitting Information Request No. 2 to FBC

C4-5 Letter dated April 21, 2022 – BCSSIA Information Request No. 1 to RCIA on Intervener Evidence

C5-1 **COLUMBIA POWER CORPORATION (CPC), BRILLIANT POWER CORPORATION (BPC), BRILLIANT EXPANSION POWER CORPORATION (BEPC) AND WANETA EXPANSION POWER CORPORATION (WEPC) (CPC, BPC, BEPC & WEPC) –** Letter dated October 14, 2021 submitting request to intervene by Michael Manhas

C6-1 **COMMERCIAL ENERGY CONSUMERS ASSOCIATION OF BC (CEC) -** Letter dated October 20, 2021 submitting request to intervene by David Craig

C6-2 Letter dated October 27, 2021 – CEC submitting extension request to file Information Request No. 1

C6-3 Letter dated November 9, 2021 – CEC submitting Information Request No. 1 to FBC

C6-4 Letter dated January 6, 2022 – CEC will not be submitting intervener evidence

C6-5	Letter dated January 27, 2022 – CEC submitting comments to RCIA Notice to File Evidence
C6-6	Letter dated February 24, 2022 – CEC submitting Information Request No. 2 to FBC
C6-7	Letter dated April 21, 2022 – CEC Information Request No. 1 to RCIA on Intervener Evidence
C6-8	Letter dated June 16, 2022 – CEC submitting Information Request No. 3 to FBC
C6-9	Letter dated September 8, 2022 – CEC submitting extension request to file Final Argument
C7-1	**BRITISH COLUMBIA OLD AGE PENSIONERS' ORGANIZATION, DISABILITY ALLIANCE BC, COUNCIL OF SENIOR CITIZENS' ORGANIZATIONS OF BC, AND THE TENANT RESOURCE AND ADVISORY CENTRE (BCOAPO) –** Letter dated October 20, 2021 submitting request to intervene by Kristin Barham
C7-2	Letter dated November 9, 2021 – BCOAPO submitting Information Request No. 1 to FBC
C7-3	Letter dated February 24, 2022 – BCOAPO submitting Information Request No. 2 to FBC
C7-4	Letter dated April 21, 2022 – BCOAPO Information Request No. 1 to RCIA on Intervener Evidence
C7-5	Letter dated September 8, 2022 – BCOAPO submitting extension request to file Final Argument
C8-1	**RESIDENTIAL CONSUMER INTERVENER ASSOCIATION (RCIA) -** Letter dated October 21, 2021 submitting request to intervene by Matthew Matusiak
C8-2	Letter dated November 3, 2021 – RCIA submitting Information Request No. 1 to FBC
C8-3	Letter dated January 6, 2022 – RCIA will be submitting intervener evidence
C8-4	Letter dated January 20, 2022 – RCIA submitting additional information regarding evidence as requested
C8-5	Letter dated February 24, 2022 – RCIA submitting Information Request No. 2 to FBC
C8-6	Letter dated April 7, 2022 – RCIA submitting evidence
C8-7	Letter dated May 12, 2022 – RCIA responses to Information Request No. 1 on RCIA Intervener Evidence
C8-8	Letter dated June 16, 2022 – RCIA submitting Information Request No. 1 on FBC Rebuttal Evidence
C9-1	**MOVEMENT OF UNITED PROFESSIONALS (MOVEUP) –** Letter dated November 4, 2021 Request to Intervene by James Quail
C9-2	Letter dated November 4, 2021 – MoveUP submitting Information Request No. 1 to FBC

C9-3	Letter dated January 6, 2022 – MoveUP will not be submitting intervener evidence
C9-4	Letter dated January 27, 2026 – MoveUP submitting comments to RCIA Notice to File Evidence
C9-10	Letter dated February 21, 2021 – MoveUP submitting Information Request No. 2 to FBC
C9-11	Letter dated April 19, 2022 – MoveUP submitting Information Request No. 1 to RCIA

INTERESTED PARTY DOCUMENTS

D-1	Macrae, R. (Macrae) - Submission dated September 27, 2021 – Request for Interested Party status
D-2	Stevenson, B. (Stevenson) - Submission dated October 15, 2021 – Request for Interested Party status
D-3	Ward, J. (Ward) - Submission dated October 16, 2021 – Request for Interested Party status
D-4	Ong, R. (Ong) - Submission dated October 19, 2021 – Request for Interested Party status
D-5	Adams, R. (Adams) - Submission dated October 21, 2021 – Request for Interested Party status
D-6	Barnlund, G. (Barnlund) – Submission dated November 17, 2021 – Request for Interested Party status
D-7	Salish Sea Renewable Energy Co-op – Submission dated February 18, 2022 – Request for Interested Party status by Peter Nix
D-8	Heller, M. (Heller) – Submission dated April 6, 2022 – Request for Interested Party status
D-9	Cebulko, B. (Cebulko) – Request for Interested Party status dated April 26, 2022

LETTERS OF COMMENT

E-1	Macrae, R. - Letter of Comment September 26, 2021
E-2	Mergens, J. - Letter of Comment May 23, 2022