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FortisBC Inc.

Application for a Certificate of Public Convenience and Necessity for the Kelowna Bulk Transformer Addition Project

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Decision
and Order C-4-20

November 30, 2020

Before:
R. I. Mason, Panel Chair
W. M. Everett, QC, Commissioner
T. A. Loski, Commissioner

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Executive summary

FortisBC Inc. (FBC) filed an application on April 24, 2020, with the British Columbia Utilities Commission (BCUC) for a Certificate of Public Convenience and Necessity (CPCN) pursuant to sections 45 and 46 of the *Utilities Commission Act* (UCA) for the Kelowna Bulk Transformer Addition Project (KBTA Project or the Project) (Application). The Project consists of purchasing and installing a third terminal transformer at the F.A. Lee Terminal Station on McCurdy Road in the City of Kelowna, including the reconfiguration of the existing 138 kV bus into an industry standard ring bus configuration. The estimated cost of the Project is $23.288 million, including allowance for funds used during construction and the cost of equipment removal.

The BCUC established a written hearing process for the Application which comprised notice and intervener registration, two rounds of information requests, and final and reply arguments. Four interveners registered in the proceeding: British Columbia Old Age Pensioners' Organization *et. al. (BCOAPO)*; the Commercial Energy Consumers Association of British Columbia (CEC); Industrial Customers Group (ICG); and Tower Ranch Community Association (TRCA). Two letters of comment were submitted to the BCUC.

The Panel finds that FBC has established the need for the Project to maintain and improve reliability in the Kelowna area and further finds that the increase in transformation capacity provided by the Project will be needed beginning in 2023.

The Panel finds that the Project is the most appropriate alternative to meet the reliability needs in the Kelowna area. The Panel is satisfied that FBC has identified a wide range of alternatives to meet the reliability needs of the Kelowna area, has properly rejected those which were infeasible or clearly inferior, and properly evaluated the three credible alternatives. The Panel agrees that the proposed Project is the most appropriate alternative to meet the reliability needs in the Kelowna area.

The Panel finds that FBC's consultation with local government, residents and Indigenous communities to date has been adequate, but is concerned about the noise levels at the station once the third transformer is in service. As a result, the Panel directs FBC to submit the results of its noise measurement study and any mitigation measures in its final report.

The Panel is satisfied with FBC's plan to complete the Project and its cost estimate and finds that the Project is consistent with the objectives of the *Clean Energy Act*.

The Panel finds the public convenience and necessity require the construction and operation of a new transformer in Kelowna, and accordingly grants a CPCN to FBC for the Project. The Panel directs FBC to provide a final report within three months of substantial completion of the Project, and material change reports as required.

1.0 Introduction

1.1 Background

On April 24, 2020, FortisBC Inc. (FBC) filed an application with the British Columbia Utilities Commission (BCUC) for a Certificate of Public Convenience and Necessity (CPCN) pursuant to sections 45 and 46 of the *Utilities Commission Act* (UCA) for the Kelowna Bulk Transformer Addition Project (KBTA Project or the Project) (Application).[1]

Kelowna's distribution system is supplied by FBC's 138 kV and 230 kV transmission systems. While capacity on the 230 kV system is sufficient, capacity on the 138 kV system, which directly feeds the Kelowna area's distribution substations, is becoming increasingly constrained.[2]

FBC has experienced high levels of customer load growth in the Kelowna area, and it expects that electricity demand will exceed system planning reliability criteria by the summer of 2022. FBC states it will not be able to meet the N-1 system reliability planning criteria in order to reliably maintain service to the area load during peak periods in the event of an outage or failure of one of the two existing 230/138 kV transformers at the F.A. Lee Terminal Station (LEE), which currently provides service to the Kelowna area.[3]

Without expanding FBC's current capacity resources, FBC states that load will need to be shed in 2022 in the event of an outage or failure of one of the two existing transformers at LEE. The likelihood and duration of the required load shedding under these contingency conditions will increase as load grows in the Kelowna area.[4]

1.2 The Applicant

Incorporated in 1897, FBC is an investor-owned utility that serves approximately 179,000 customers, both directly and indirectly, through the generation, transmission, distribution and sale of electricity in the southern interior of British Columbia.[5]

FBC has a rate base of approximately $1.3 billion. This includes four hydroelectric generating plants, with an aggregate capacity of 225 MW, and approximately 7,300 km of transmission and distribution power lines for the delivery of electricity to major load centres and customers in its service area. FBC has approximately 500 full-time and part-time employees.[6]

1.3 Approvals Sought

In its Application, FBC applies for approval from the BCUC to purchase and install a third terminal transformer at LEE on McCurdy Road in the City of Kelowna, including the reconfiguration of the existing 138 kV bus into an industry standard ring bus configuration.[7]

The estimated cost of the Project is $23.288 million, including allowance for funds used during construction (AFUDC) and the cost of equipment removal.[8]

[1] Exhibit B-1, Section 1.1, p. 1.
[2] Exhibit B-1, Section 1.1, p. 1.
[3] Exhibit B-1, Section 1.1, p. 1.
[4] Exhibit B-1, Section 1.1, p. 1.
[5] Exhibit B-1, Section 2.1, p. 8.
[6] Exhibit B-1, Section 2.2, p. 8.
[7] Exhibit B-1, Section 1.1, p. 1.
[8] Exhibit B-1, Section 1.1, p. 1.

1.4 Regulatory Process

By Order G-107-20, dated May 5, 2020, the BCUC established a regulatory timetable for reviewing the Application which comprised notice and intervener registration, two rounds of information requests (IRs), and written final and reply arguments.

Four interveners registered in the proceeding: British Columbia Old Age Pensioners' Organization *et. al.* (BCOAPO); the Commercial Energy Consumers Association of British Columbia (CEC); Industrial Customers Group (ICG); and Tower Ranch Community Association (TRCA). Two letters of comment were submitted to the BCUC.

1.5 Legal and Regulatory Framework

1.5.1 *Utilities Commission Act*

Section 45(1) of the UCA provides that except as otherwise provided, after September 11, 1980, a person must not begin the construction or operation of a public utility plant or system, or an extension of either, without first obtaining from the BCUC a certificate that public convenience and necessity require, or will require, the construction or operation of the plant or system.[9]

Section 46(3.1) of the UCA provides that in deciding whether to issue a CPCN applied for by a public utility other than the authority (as defined in the UCA), the BCUC must consider:[10]

(a) the applicable of British Columbia's energy objectives,

(b) the most recent long-term resource plan filed by the public utility under section 44.1, if any, and

(c) the extent to which the application for the certificate is consistent with the applicable requirements under sections 6 and 19 of the *Clean Energy Act*.

1.5.2 CPCN Guidelines

The BCUC's CPCN Guidelines provide general guidance regarding the BCUC's expectation of the information that should be included in a CPCN application while providing the flexibility for an application to reflect the specific circumstances of the applicant, the size and nature of the project and the issues raised by the application.[11]

A CPCN application submitted under sections 45 and 46 of the UCA should contain information on the following:[12]

- Applicant;
- Project Need, Alternatives and Justification;
- Consultation;
- Project Description;
- Project Cost Estimate;
- Provincial Government Energy Objectives and Policy Considerations; and
- New Service Areas.

[9] *Utilities Commission Act* [RSBC 1996] Chapter 473.
[10] *Utilities Commission Act* [RSBC 1996] Chapter 473.
[11] BCUC 2015 Certificate of Public Convenience and Necessity Application Guidelines (CPCN Guidelines), Final Order G-20-15, dated February 12, 2015, p. 1.
[12] CPCN Guidelines, Appendix A to BCUC Order G-20-15.

1.6 Decision Framework

The structure of this Decision largely follows that of the Application and the BCUC's CPCN Guidelines. Relevant evidence submitted by the applicant and interveners is summarized in each section:

- Section 2 addresses the Project need, alternatives and justification as well as FBC's long-term resource plan;
- Section 3 addresses consultation;
- Section 4 provides a description of the proposed KBTA Project;
- Section 5 outlines the Project costs and indicative rate impacts;
- Section 6 addresses alignment with provincial energy objectives;
- Section 7 provides the Panel determinations; and
- Section 8 outlines reporting requirements for the Project.

2.0 Project Need and Alternatives

2.1 Project Need

2.1.1 Overview

FBC states that it has experienced high levels of customer load growth in the Kelowna area and it expects electricity demand will exceed system planning reliability criteria by the summer of 2022. Specifically, FBC states that it will not be able to meet the N-1 system reliability planning criteria in order to reliably maintain service to the area during peak periods in the event of an outage or failure of one of the two existing 230/138 kV transformers at the LEE station. FBC states that without expanding its current resources, in the event of an outage or failure of one of the two existing transformers at LEE, load will need to be shed in 2022. During an N-1 contingency event, the consequences of the required load shedding will increase as load grows in the Kelowna area.[13]

FBC explains that N-1 reliability "means that an outage of a single element with all other elements of the power system in service (a single transmission line, transformer, generating unit, power conditioning unit like a shunt capacitor bank, a shunt reactor bank, a series capacitor, a series reactor, etc.) results in no load loss."[14]

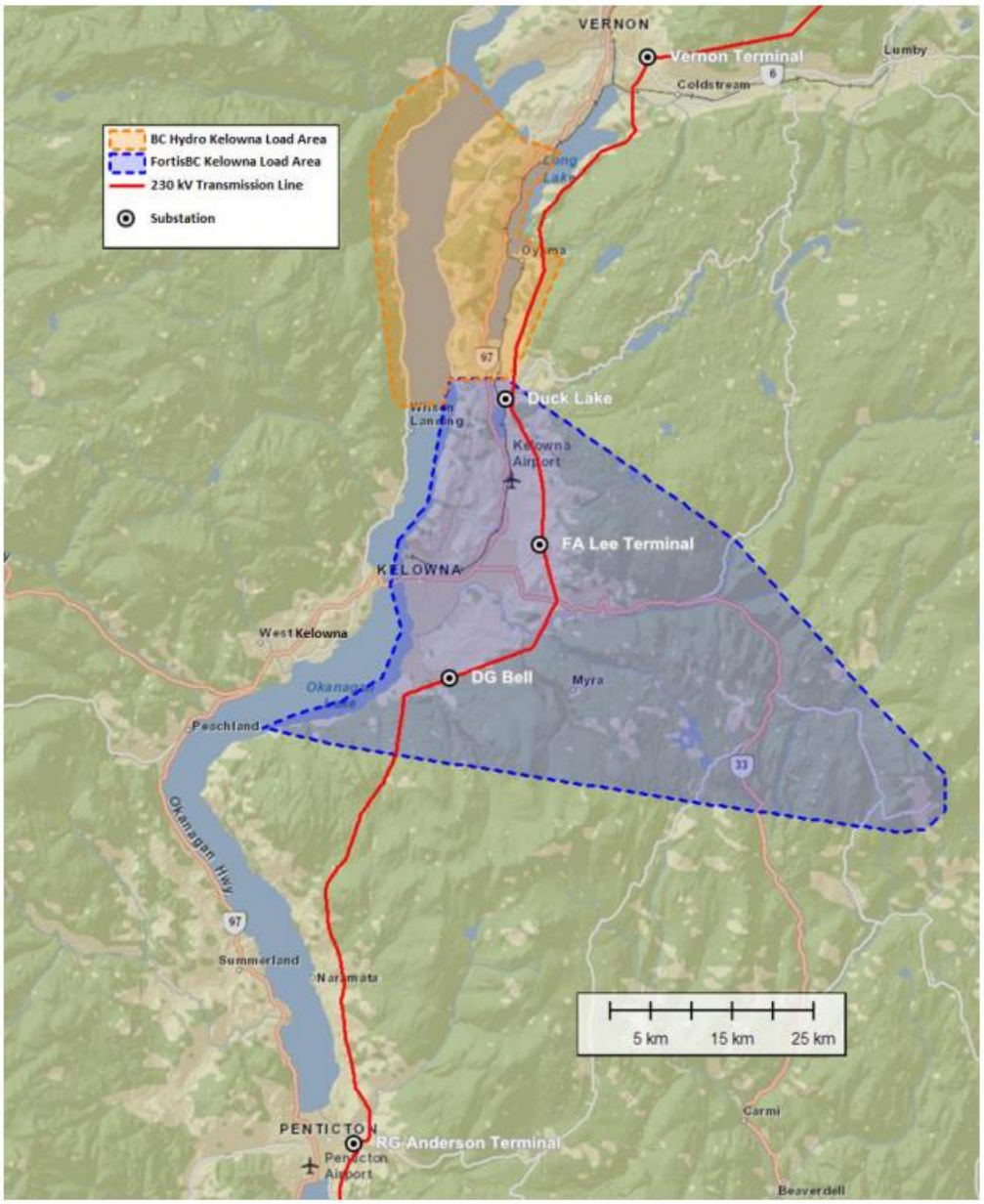
Kelowna's distribution system is supplied by the 230 kV and 138 kV transmission systems. FBC states that while capacity on the 230 kV system is sufficient, capacity on the 138 kV system, which directly feeds the area's distribution substations, is becoming increasingly constrained. FBC states that after considering potential alternatives, it determined that additional transformation capacity from 230 kV to 138 kV is required to continue meeting FBC's transmission planning criteria as area load continues to grow. FBC submits that this can best be accomplished by adding a new transformer in the Kelowna area.[15]

[13] Exhibit B-1, Section 3.1, p. 10.
[14] Exhibit B-1, Section 3.4, Footnote 16, p. 18.
[15] Exhibit B-1, Section 3.1, p. 10.

2.1.2 Kelowna Area System

The Project will serve FBC's customers in the Kelowna load area, which includes the City of Kelowna and its surrounding areas, such as Joe Rich, the Big White Ski Resort, and Lake Country.[16] FBC's Kelowna load area is shown in Figure 1, below.

Figure 1: Map of Kelowna Load Area[17]

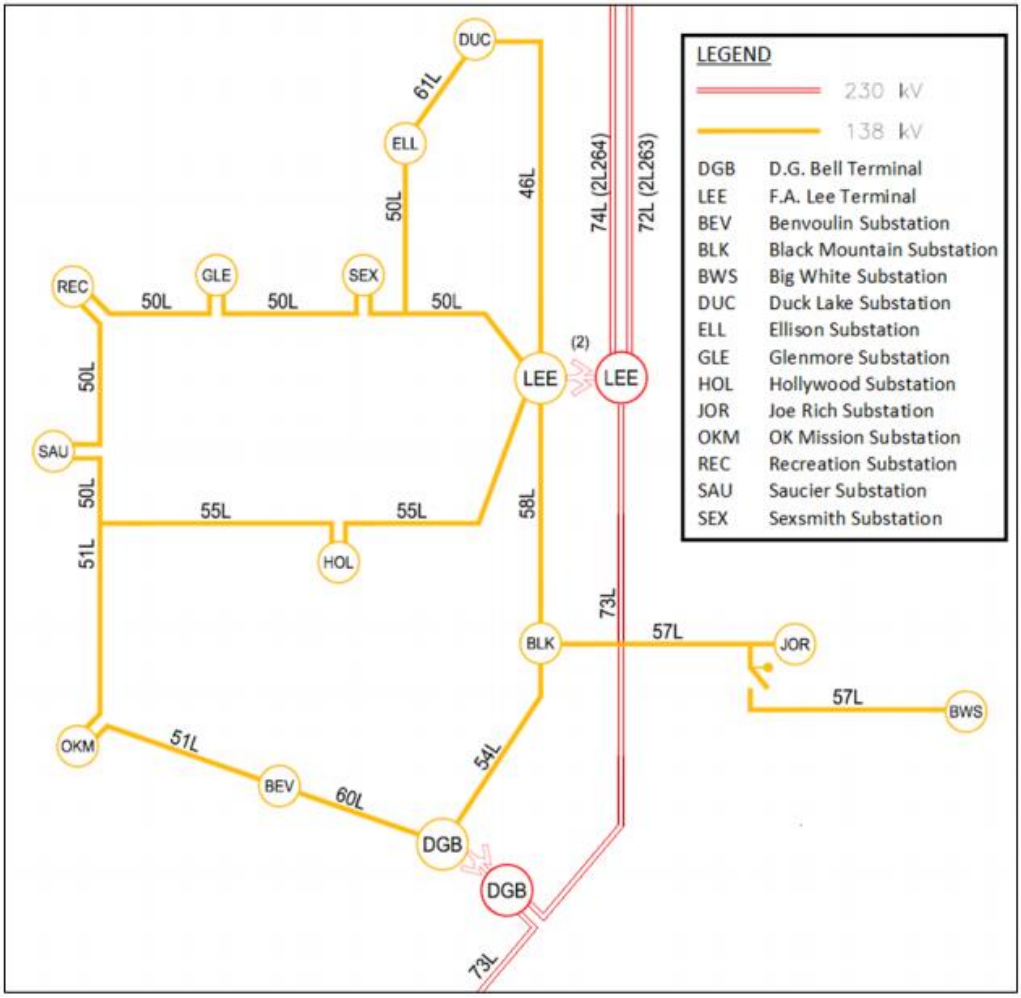


Currently, bulk power is delivered to the Kelowna area via FBC's 230 kV system: transmission lines 72L and 74L from British Columbia Hydro and Power Authority's (BC Hydro) Vernon Terminal Station and transmission line 73L from FBC's R.G. Anderson Terminal Station in Penticton. These transmission lines supply two 230/138 kV terminal stations, which in turn supply the area's 138 kV transmission system. The two 230/138 kV terminal stations are LEE, which contains two 168 MVA 230/138 kV transformers, and the DG Bell Terminal Station (DGB), which contains one 200 MVA 230/138 kV transformer.[18]

[16] Exhibit B-1, Section 3.2, p. 10.
[17] Exhibit B-1, Section 3.2, p. 11.
[18] Exhibit B-1, Section 3.2, p. 13.

The 138 kV lines from LEE and DGB supply 12 distribution substations in the Kelowna area, serving almost 85,000 direct and indirect[19] customers.[20] FBC provides a simplified single line diagram showing the Kelowna area transmission system as shown below in Figure 2.

Figure 2: Map of Kelowna Load Area[21]



2.1.3 Load Forecast

FBC identifies that the Kelowna area is the fastest growing region in FBC's service area. FBC states that according to Statistics Canada, Kelowna has been one of the fastest growing cities in Canada during the last decade and has grown at an average annual rate of 1.6 percent during the 20-year period from 1996 to 2016. [22] In the Application, FBC also provides other housing indicators, such as building permit applications, that FBC states demonstrate a consensus view of continued, consistent growth in the Kelowna area.[23]

[19] FBC provides electricity to British Columbia Hydro and Power Authority (BC Hydro) for service to its approximately 8,000 customers in the Duck Lake area. The Duck Lake Wheeling Agreement between FBC and BC Hydro was approved by Order G-19-10, dated February 11, 2010.
[20] Exhibit B-1, Section 3.2, pp. 13-14.
[21] Exhibit B-1, Section 3.2, p. 13.
[22] Exhibit B-1, Section 3.3, p. 14.
[23] Exhibit B-1, Section 3.3, pp. 14-15.

FBC forecasts regional load growth using trends in historical regional load data. FBC states that the population and housing indicators indicate that future growth in the Kelowna Area is likely to be consistent with past trends, and therefore historical load growth can be expected to produce a reasonable "status quo" load forecast.[24]

FBC explains that peak load forecasting for system planning purposes differs from forecasting energy and peak load for resource (energy) supply purposes. FBC states that the forecast for system planning purposes must account for possible weather extremes that directly impact winter and summer peak loads in order to ensure sufficient capacity under adverse conditions.[25] FBC accomplishes this through the use of a "1-in-20" year load forecast. This forecast is higher than the expected load forecast under normal conditions, meaning that there is only a 5 percent probability that loads will be higher than the "1-in-20" year forecast. FBC states that this forecast is used as the basis for determining compliance with FBC's transmission planning standards and is also consistent with industry practice.[26]

FBC provides comprehensive substation load data for the years 2015 to 2019[27] and summarizes the historical Kelowna area summer and winter peak loads for 2014 to 2019 in Table 1, below.

Table 1: FBC Kelowna Area Summer and Winter Peak Loads, 2014-2019[28]

	2014	2015	2016	2017	2018	2019
Summer (MW)	276.4	283.7	281.4	288.1	301.0	300.5
Winter (MW)	277.0	268.3	306.9	283.6	298.6	324.9

FBC provides the Kelowna area load forecast for 2020 to 2028 as shown in Table 2, below.

Table 2: FBC Kelowna Area Summer and Winter Peak Load Forecast, 2020-2028[29]

	2020	2021	2022	2023	2024	2025	2026	2027	2028
Summer (MW)	309.5	314.6	319.8	325.5	331.5	336.5	343.3	349.4	355.5
Winter (MW)	340.4	343.9	348.3	352.9	357.0	361.3	365.8	370.3	374.5

FBC describes the process for developing its "1-in-20" peak load forecast[30], and identifies that it has been using a "1-in-20" peak load forecast for planning purposes since at least 2011.[31] After forecasting peak load from historical data, FBC includes the impact of known or highly probable load developments, such as community developments that have an expected connection date and defined loads. In addition, FBC describes various potential incremental loads that may materialize in the near to medium term in the Kelowna area. However, FBC notes that none of these loads has been included in the load forecast since none have been confirmed.[32]

Impact of the COVID-19 Pandemic on the Load Forecast

FBC acknowledges that the load forecast as presented above in Table 2 was prepared in 2019, before the onset of the COVID-19 pandemic. At the time of filing of the Application, FBC stated that there was insufficient data to quantify the impact of COVID-19 during 2020, or to forecast future impacts on energy consumption or peak

[24] Exhibit B-1, Section 3.3, p. 15.
[25] Exhibit B-1, Section 3.3, p. 15.
[26] Exhibit B-1, Section 3.3, pp. 15–16.
[27] Exhibit B-2, BCUC IR 4.10, Attachment 4.10.
[28] Exhibit B-1, Section 3.3, Table 3-4, p. 16.
[29] Exhibit B-1, Section 3.3, Table 3-5, p. 16.
[30] Exhibit B-2-1-1, BCUC IR 4.4.
[31] Exhibit B-2, BCUC IR 4.2.
[32] Exhibit B-1, Section 3.3, p. 16.

loads. FBC identified that while COVID-19 may result in commercial loads declining due to business closures, there are also some factors that may mitigate the economic impacts of COVID-19 as they relate to energy and peak load forecasting. For example, FBC expected there to be some offsetting increase in residential loads, as a result of individuals working from home or spending more time at home due to job losses.[33]

During the review of the Application, FBC provided updates on the impact of the COVID-19 pandemic. In July 2020, FBC had not identified a significant impact on load that was attributable to the COVID-19 pandemic. FBC stated that energy consumption since mid-March of 2020 was less than 1 percent different from the most recent three-year average for the same period, after adjusting for weather and load growth. FBC stated that it did not believe these changes would result in a materially different peak forecast and therefore has not updated the peak forecast.[34] In August 2020, FBC provided year-to-date peak load data for summer 2020 of 313.1 MW, which exceeded the forecast value of 309.5 MW.[35]

2.1.4 FBC Planning Criteria

FBC's Kelowna area system is part of FBC's interconnected system in that it is supplied from more than one 230 kV source.[36] FBC's transmission planning criteria specifies that customer load should be able to be supplied under both normal (N-0)[37] operation and single contingency (N-1)[38] operation. FBC plans and constructs its interconnected transmission system to meet and maintain its N-1 system reliability planning criteria.[39]

FBC states that by Summer 2022, it will not be able to meet the N-1 system reliability planning criteria in order to reliably maintain service to the Kelowna area load during peak periods in the event of an outage or failure of one of the two existing 230/138 kV transformers at LEE.[40] FBC states that other than transformer capacity, which is being considered in this Application, there are currently no other power system elements in the Kelowna area that are at risk of not maintaining the N-1 system reliability planning criteria within the 2020 to 2030 time period.[41]

Transformer Limits

FBC identifies that for the 138 kV transmission system in the Kelowna area, seasonal peak loads will reach transformer emergency limits during the summer season before the seasonal peak loads will reach system emergency limits in the winter season. FBC states that this is because higher ambient temperatures reduce the summer emergency limits below the winter emergency limits.[42]

FBC summarizes the summer and winter normal and emergency rating for each of the transformers at LEE (Transformer 3 (T3) and Transformer 4 (T4)), as well as the transformer at DGB in Table 3, below. FBC notes that it is industry convention to refer to system load in MW and equipment ratings in MVA, however, FBC provides the transformer ratings in both MVA and MW for ease of reference.[43]

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[33] Exhibit B-1, Section 3.3, p. 17.
[34] Exhibit B-2, BCUC IR 5.1.
[35] Exhibit B-11, ICG IR 2, 3.1.
[36] Exhibit B-1, Section 3.4, p. 18.
[37] Normal operation, also referred to as N-0 reliability, means that with all major elements of the power system in service, the network can be operated to meet projected customer demand in order to avoid a load loss (customer outage). Exhibit B-1, Section 3.4, Footnote 15, p. 18.
[38] Single contingency, also referred to as N-1 reliability, means that an outage of a single element with all other elements of the power system in service results in no load loss. Exhibit B-1, Section 3.4, Footnote 16, p. 18.
[39] Exhibit B-1, Section 3.4, p. 18.
[40] Exhibit B-1, Section 3.1, p. 10.
[41] Exhibit B-2, BCUC IR 6.9.
[42] Exhibit B-1, Section 3.4, p. 19.
[43] FBC identifies that they are related according to the following formula: Real Power (MW) = Power Factor x Apparent Power (MVA). FBC applies a Power Factor of 0.95. Exhibit B-2, BCUC IR 7.3.

Table 3: Summer and Winter Transformer Ratings[44]

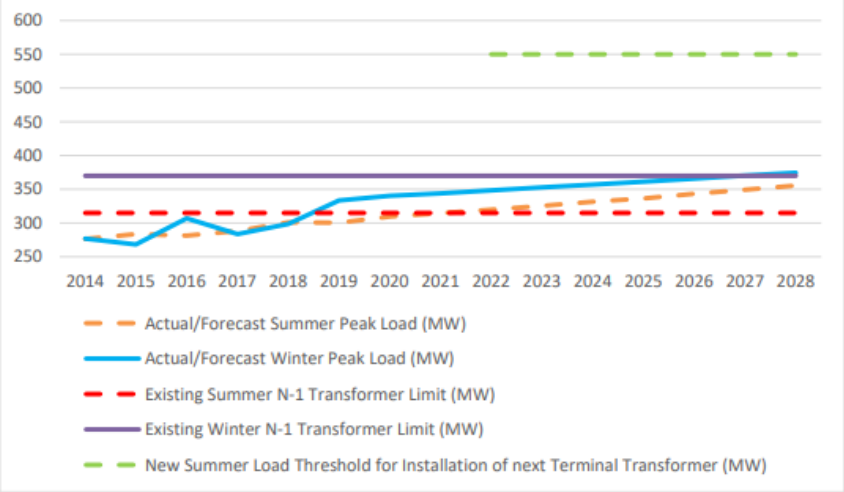
	Summer		Winter	
	Normal MVA (MW)	Emergency MVA (MW)	Normal MVA (MW)	Emergency MVA (MW)
LEE T3	168 (159)	210 (199)	199.5 (189)	226.8 (215)
LEE T4	168 (159)	210 (199)	205.8 (195)	226.8 (215)
DGB T2	200 (190)	250 (237)	237.5 (225)	270 (256)

FBC states that its operating procedures require a transformer's post contingency flow to be brought within the emergency rating within 15 minutes and to be reduced within the normal rating level within six hours.[45]

FBC notes that when the normal rating of a transformer is exceeded, loading would be in the emergency limit zone and would be considered to have exceeded the emergency limit. Therefore, any loading above the normal rating exceeds the emergency limit.[46]

FBC provides the existing summer and winter transformer limits relevant to the KBTA Project and the actual and forecast summer and winter peak loads in Figure 3, below. FBC identifies that the summer peak load is forecast to reach the transformer limit of 315 MW in 2021 and is forecast to exceed the limit in 2022. FBC states that the forecast winter peak load will exceed the winter transformer limit of 370 MVA in 2027.[47]

Figure 3: Kelowna Area Peak Loads and N-1 Transformer Limits (Alternative A)[48]



FBC states that the summer peak load level of 315 MW is considered to be the summer transformer limit because it is the maximum load that a reconfigured area system can manage while remaining within normal

[44] Table from FBC Final Argument, para. 24, p. 4; Exhibit B-2, BCUC IR 7.3.
[45] Exhibit B-2, BCUC IR 7.2.
[46] Exhibit B-7, BCUC IR 36.2.
[47] Exhibit B-1, Section 3.3, pp. 16–17.
[48] Exhibit B-1, Section 3.3, p. 17.

operating limits, as determined by power flow studies.[49] FBC provided power flow analysis to demonstrate that at a summer peak load level of 315 MW, an outage of LEE T3 or T4 would result in the power flow on the remaining transformer to be 191 MVA, or 91 percent of its 210 MVA emergency rating. FBC explains that it can then perform a system reconfiguration[50] that would result in the power flow on the remaining transformer to be 168 MVA, or 80 percent of the emergency rating and 100 percent of the normal rating of T3 and T4.[51]

Similarly, FBC states that the winter peak load level of 370 MW is considered to be the winter transformer limit because it is the maximum load that a reconfigured area system can manage while remaining within normal operating limits, as determined by power flow studies.[52]

FBC identifies that as Kelowna area load increases, an N-1 event in 2022 and beyond would result in loading above its normal rating on the remaining LEE transformer, even after the system reconfiguration described above. As noted, FBC's operating procedures allow operation above the normal rating for only six hours, and FBC states that plans to reduce the loading must be implemented within this time frame. FBC states that if loading above the normal rating is expected to persist for longer than six hours, the facility loading must be reduced below its normal rating as soon as practicable by shedding customer load during peak load periods. Initially, FBC identifies that the requirement for such load shedding would be confined to only part of the peak load period on summer peak days, however, as the Kelowna area load increases, the duration and frequency of required load shedding events would increase.[53] FBC estimates the duration of overloading to be 5 hours in 2022 and 7 hours in 2023, with the duration increasing as load increases in the future.[54]

FBC explains that although the Project is not scheduled to be in service until the end of 2022, in the event of an outage of one of the LEE transformers, overloading of the remaining LEE transformer would not be projected to persist for more than six hours over the peak period based on the Kelowna load forecast. As such, FBC considers there to be a low risk that customer load shedding would be required in 2022 in this N-1 event.[55]

FBC identifies that loading of substation transformers above the normal nameplate rating has a significant impact on their remaining expected lifespan, and that prolonged loading in the emergency range increases winding hot spot temperature and decreases the expected remaining life of the transformer. Further, FBC states that each hour that a transformer is loaded above nameplate rating brings a corresponding increase in winding hotspot temperature that has a substantial negative impact on remaining expected lifespan.[56]

2.1.5 Long Term Resource Plan

As previously stated, section 46 (3.1) of the UCA provides that in deciding whether to issue a CPCN, the BCUC must consider the most recent long-term resource plan filed by the public utility under section 44.1, if any.[57]

FBC's most recent long-term resource plan is the 2016 Long Term Electric Resource Plan (2016 LTERP), which was filed on November 30, 2016, pursuant to section 44.1 of the UCA. By Order G-117-18, dated June 28, 2018, the BCUC found the 2016 LTERP, for the period through 2024, to be in the public interest and accepted it.[58]

[49] Exhibit B-2, BCUC IR 7.2.
[50] A description of FBC's system reconfiguration can be found in Exhibit B-2, BCUC IR 7.5.
[51] Exhibit B-1, Section 3.4, p. 19.
[52] Exhibit B-2, BCUC IR 7.2.
[53] Exhibit B-1, Section 3.4, p. 19.
[54] Exhibit B-11, ICG IR 6.3.
[55] Exhibit B-2, BCUC IR 8.1.
[56] Exhibit B-1, Section 3.5, p. 20.
[57] *Utilities Commission Act* [RSBC 1996] Chapter 473.
[58] Decision and Order G-117-18, *FortisBC Inc. 2016 Long Term Electric Resource Plan and Long Term Demand Side Management Plan, dated June 28, 2018* (FBC 2016 LTERP), Directive 1.

The KBTA Project, then referred to as the Kelowna Bulk Transformer Capacity Addition project, was identified in Section 6.3 of the 2016 LTERP, as a required system reinforcement within the 2019 to 2020 timeframe. The 2016 LTERP notes that the timing of projects are assessed annually based on updated load forecasts and consequently the timing of some projects may either be advanced or delayed.[59]

Position of the Parties

FBC submits that the Project is needed to increase the transformation capacity between the 230 kV and 138 kV transmission systems that serve Kelowna's distribution system. Without the Project, FBC will no longer be able to satisfy the N-1 system reliability planning criteria, and will not be able to reliably serve customers in the Kelowna area at peak periods from 2023 in the event of an outage of one of the existing transformers at the LEE substation. [60]

FBC forecasts that, based on customer growth in the Kelowna area, load will exceed system peak capacity by summer of 2022. FBC submits that during the period from 1996 to 2016 the average annual growth rate in the Kelowna area was 1.6 percent, and growth is expected to continue at 1.5 percent per year for the period 2016-2036.[61] FBC uses a "1-in-20" year method to forecast peak load, accounting for possible high or low temperature weather extremes that directly impact winter and summer peak loads. FBC submits it has received service interconnection inquiries related to new businesses in the area, but has not included these loads in the forecast as they are not sufficiently probable. [62]

FBC submits that the COVID-19 pandemic has not had a significant effect on load in the Kelowna area, and that from mid-March to August 2020 there was "less than a one percent difference in energy consumption from the average of the most recent three years, after adjusting for weather and load growth."[63] FBC adds that none of the minimal changes in load would materially impact the peak load forecast, and that even a reduction of 10 percent in commercial load, with no corresponding increase in residential load or new customers connections and a three-year recovery period, would result in a delay of the need for the Project of no more than one year.[64]

FBC reports a new record peak load of 313.1 MW was experienced in Kelowna in summer 2020, exceeding the "1-in-20" year forecast. FBC submits this demonstrates that peak load in Kelowna has continued to grow, and has almost reached the 315 MW level at which FBC will no longer be able to satisfy the N-1 system reliability planning criteria, thus demonstrating the imminent need for the Project. [65]

ICG submits that FBC generally applies a power factor of 0.95 when converting from MVA to MW, for example when calculating the normal and emergency system load rating, and that the actual power factor for LEE in 2019 was 0.97. ICG submits there appears to be an opportunity to postpone the Project by at least a year through a power factor correction, but that this alternative was not explored.[66]

FBC replies that, assuming ICG is proposing that a power factor improvement be undertaken, this is not a feasible alternative to the Project. As the power factor at the LEE station is already close to unity, any opportunities to reduce equipment loading though power factor correction are minimal, and FBC submits any

[59] FBC 2016 LTERP, Exhibit B-1, Section 6.3, p. 87.
[60] FBC Final Argument, pp. 4–5.
[61] FBC Final Argument, p. 8.
[62] FBC Final Argument, pp. 8–10.
[63] FBC Final Argument, para. 40, p. 11.
[64] FBC Final Argument, pp. 11–12.
[65] FBC Final Argument, p. 5.
[66] ICG Final Argument, p. 4.

hypothetical postponement would be temporary. FBC adds that there is no further opportunity to defer the Project.[67]

ICG accepts that the appropriate planning criteria for a transmission system is that all forecast customer loads are served during N-1 conditions. Nevertheless, ICG submits that the need for the Project rests entirely on the application of the N-1 system reliability planning criteria to the 138 kV distribution system, and that the only elements of FBC's Kelowna system which are at risk of not meeting the N-1 system reliability planning criteria for the 2020-2030 planning period are one of the two LEE transformers for 5 hours in 2022 and 7 hours in 2023. ICG submits that given this and the use of the "1-in-20" load forecast, the Project is "extremely unlikely to reduce the frequency or duration of outages in the Kelowna service area."[68]

FBC replies that ICG's argument is inconsistent with the N-1 system reliability planning criteria for FBC's transmission system, which ICG agrees is the appropriate standard. FBC submits that if load is forecast to exceed the emergency rating of a transformer for more than 15 minutes or exceed the normal rating for more than six hours, then FBC will fail to meet its N-1 system reliability planning criteria. FBC adds that speculation about the likelihood or duration of an outage is inappropriate; instead, where load is forecast to exceed capacity limits, the violation must be addressed to ensure continued reliable service to customers. [69]

ICG submits that the BCUC should compel FBC to consider every opportunity to postpone capital expenditures, and that there is no evidence FBC has considered, or even identified, any such opportunities. [70]

FBC submits in reply that, where possible and appropriate, it has previously identified and considered opportunities for deferral, and in fact has previously deferred the Project, which was identified in FBC's 2012 Long Term Capital Plan, based on revised load forecasting and growth rates. However, FBC submits that "there comes a point where the benefits of further delay are outweighed by the disadvantages and risks, and it is no longer reasonable or appropriate to delay."[71] FBC submits that any further delay of the Project would yield little to no benefit while creating considerable risk, as further delay "will result in actual or forecast peak load exceeding the transformer limits, in violation of the N-1 transmission planning criteria."[72]

The CEC submits that continuing to meet the N-1 system reliability planning criteria is appropriately treated as an important objective for FBC, and that it is appropriate FBC maintains its commitment to these planning criteria. The CEC submits that "a low likelihood of failure does not diminish the justification in that the N-1 planning criteria is the issue"[73], and that FBC has made a "reasonable case of future risk to its N-1 planning criteria"[74] for the Project proceeding in the near future. [75]

The CEC is satisfied with FBC's population and growth projections for the Kelowna area, and accepts that the "1-in-20" standard of peak load forecasting is appropriate. In the absence of strong evidence that the COVID-19 pandemic will have any significant impact on load, the CEC submits it is reasonable to accept FBC's forecast. [76]

[67] FBC Reply Argument, p. 5.
[68] ICG Final Argument, pp. 3, 5.
[69] FBC Reply Argument, p. 6.
[70] ICG Final Argument, p. 5.
[71] FBC Reply Argument, para. 16., p. 6.
[72] FBC Reply Argument, p. 6.
[73] CEC Final Argument, para. 31., p. 5.
[74] CEC Final Argument, para. 32., p. 5.
[75] CEC Final Argument, pp. 3–5.
[76] CEC Final Argument, pp. 3–5.

BCOAPO submits it has no issues with FBC's use of the "1-in-20" method of forecasting peak load for the purposes of the current application. BCOAPO also submits that it has no issues with the peak load forecast FBC has used on the application.[77]

BCOAPO submits that, overall, it accepts the summer of 2023 as "the critical need date for maintaining reliability of supply to the Kelowna area."[78]

Panel Determination

The Panel finds that FBC has established the need for the Project to maintain and improve reliability in the Kelowna area, and further finds that the increase in transformation capacity provided by the Project will be needed beginning in 2023.

The Panel agrees with FBC and all interveners that the N-1 system reliability planning criteria are appropriate for ensuring transmission systems provide reliable power to distribution systems, and ultimately improve the reliability of service to customers. FBC has appropriately considered how much power may be transformed in the Kelowna area in the event of an outage of one of the two LEE transformers, and both the normal and emergency operating limits of the remaining transformer.

The Panel accepts that the period in which forecast peak load exceeds the transformation capacity is 5 hours in 2022 and 7 hours in 2023, which suggests a low likelihood that an outage of one transformer would occur during those times. However, the Panel disagrees with ICG that this likelihood is a relevant factor when considering the need for the Project. The question is whether or not the N-1 system reliability planning criteria are met, and they are not met if the peak load is forecast to be greater than the transformation capacity of the system. In this case, the evidence demonstrates that the N-1 system reliability planning criteria are not met in the Kelowna system from 2023 onwards.

The Panel accepts FBC's forecast for load in the Kelowna area. FBC has demonstrated that the population in Kelowna continues to grow and that future population growth projections are reasonable. The Panel is satisfied that the demand projections do not include future service interconnections which are insufficiently probable or possible future changes to the rate of electrification. We are also satisfied that there is no evidence the current pandemic has made a significant difference to demand in the Kelowna area.

We also accept FBC's "1-in-20" year method for forecasting peak load, which has been used by FBC since at least 2011, examined by the BCUC on multiple occasions and is not opposed by interveners. Recent evidence that the summer peak demand in Kelowna established a new record in 2020 (which exceeded FBC's "1-in-20" year forecast for 2020) and is now close to the transformation limit of the LEE substation, demonstrates to the Panel that the need for the Project exists and is imminent, possibly even before the date of 2023 submitted by FBC.

The Panel agrees with ICG that FBC should take every opportunity to postpone capital expenditures, but we disagree that FBC has not done so in this case. The Project has been considered and postposed before, and the evidence supports an imminent need for the Project if FBC is to continue to meet the N-1 system reliability planning criteria. Further, the Project was included in the 2016 LTERP, accepted by the BCUC as being in the public interest, as a required system reinforcement in 2019-2020, and has been delayed until 2022 based on the most currently available load forecasts.

2.2 Alternatives and Justification

At the early screening stage, FBC evaluated several project alternatives that were deemed not to be feasible and were rejected from further study. These alternatives are discussed in Section 2.2.1.

[77] BCOAPO Final Argument, pp. 5–6.
[78] BCOAPO Final Argument, p. 8.

FBC identified three feasible project alternatives, which are discussed in Section 2.2.2.

2.2.1 Infeasible Project Alternatives

Several project alternatives were studied and rejected at an early stage of project planning:

- Status Quo;
- Demand response;
- Local generation;
- Addition of a transformer at a local distribution substation;
- Mobile transformer;
- Local solar generation;
- Time of use pricing;
- Reconductoring of transmission lines to increase capacity;
- Replacing existing transformers with larger capacity transformers;
- One-year project deferral; and
- Connecting to the BC Hydro system via BC Hydro's West Kelowna Project.

All of these potential project alternatives were assessed by FBC and rejected from further study due to unsuitability.

2.2.1.1 Status Quo

FBC states that continuing with the status quo is not an option because it does not increase the 138 kV supply capacity, which is necessary for FBC to meet its N-1 transmission planning criteria in the event of a LEE transformer outage. A shortage of transmission capacity could cause potentially lengthy customer outages during peak and near-peak summer conditions.[79] For these reasons, FBC submits that the status quo is not a viable project alternative.

2.2.1.2 Demand Response

Demand Response (DR) can be an effective means of reducing or shifting peak load, and FBC submits that it is investigating the potential use of DR for mitigating system peaks. A DR pilot is currently underway in the Kelowna area, however the DR pilot is a proof-of-concept initiative, and the magnitude of the proposed target of 1.75 MW capacity is insufficient to defer the KBTA Project.[80] Despite "considerable efforts"[81], the 2019 to 2020 winter DR activities yielded an average capacity reduction of 0.5 MW per event, with the highest single demand reduction at 0.7 MW. FBC submits that it would not be feasible to scale up the DR activities to match the growth curve necessary (6 MW per year summer and 4.5 MW per year winter) in time to defer this Project.[82]

[79] Exhibit B-1, Section 4.2, p. 22.
[80] Exhibit B-1, Section 4.2, p. 22.
[81] Exhibit B-4, CEC IR 9.4.
[82] Exhibit B-4, CEC IR 9.4.

2.2.1.3 Local Generation

The installation of firm generation resources, such as a gas turbine, near Kelowna and connected to the 138 kV transmission system could increase the Kelowna area transmission capacity and meet the N-1 transmission planning criteria. FBC submits that this option was considered and rejected due to its high capital cost.[83] The amount of generation required to be equivalent to a transformer addition is approximately 237 MW, equal to the emergency rating of the proposed transformer. At an estimated cost of $1.5 to $2.0 million per MW of gas-fired generation, the cost of this option would be $355 million to $474 million.[84]

2.2.1.4 Addition of a Transformer at a Distribution Substation

The 138 kV transmission capacity could be increased in the Kelowna area by the addition of a 230/138 kV terminal transformer at an existing distribution substation. There are two distribution substations within reasonable proximity to 230 kV transmission lines, which could be candidates for this alternative: Duck Lake station (DUC) or Black Mountain station (BLK). However, neither substation has a large enough footprint to accommodate the new equipment that would be required, and FBC would need to acquire adjacent land, which would impact project costs. In addition, the vacant land adjacent to both the DUC and BLK sites are located within the Agricultural Land Reserve, and approval of the Agricultural Land Commission would be required to rezone any acquired property. Both factors would likely delay the Project beyond the required timeframe. For these reasons, FBC dismissed this option.[85]

2.2.1.5 Mobile Transformer

Parties questioned the possibility of a mobile transformer alternative to the Project through IRs. FBC submits that mobile transformers of the necessary size are not manufactured and are therefore not available. This is because the physical size of such of a unit far exceeds the practical limits of a mobile transformer, which is intended for routine road transport. A fully equipped and serviceable transformer such as LEE T3 or T4 weighs in excess of 200 metric tonnes and is over 8 metres tall. Even if a mobile transformer that could meet the requirements for the LEE installation were available, replacement of one of these transformers with a spare or mobile transformer would not be possible in a timeline that meets N-1 system reliability planning criteria, resulting in customer load shed.[86]

2.2.1.6 Local Solar Generation

Solar generation as an alternative to the Project was explored through IRs. The Kelowna area summer peak load is forecast to increase by approximately 6 MW per year. Beginning in 2027, the solar generation would also be required to provide an incremental load reduction of approximately 4.5 MW per year at winter peak for each year of Project deferral. In the Kelowna area over the past five years, an average of 0.26 MW of peak solar capacity has been installed per year, which FBC states does not approach the pace of the forecast load growth. Further, measures such as storage would likely be required to ensure that solar generation provides firm load reductions. Finally, it is unlikely that solar resources would be feasible for significant winter peak load reductions since winter peak in the Kelowna area typically occurs after sunset. Accordingly, FBC submits that solar resources are not a feasible alternative to the proposed Project.[87]

[83] Exhibit B-1, Section 4.2, p. 22;
[84] Exhibit B-1, Section 4.2, p. 23;
[85] Exhibit B-1, Section 4.2, p. 23;
[86] Exhibit B-2, BCUC IR 7.13.
[87] Exhibit B-5, ICG IR 1.8.

2.2.1.7 Time of Use Pricing

FBC states that time of use (TOU) pricing is generally considered to have the impact of reducing peak demand. FBC currently has TOU pricing available to all customer classes, with residential TOU rates closed to new customers by BCUC Order G-3-12.[88] FBC adds that given it already has TOU rates in place, it does not believe that adding to, or amending its TOU rates is a feasible alternative for the Project.[89]

2.2.1.8 Reconductoring Transmission Lines to Increase Capacity

Through IRs, a project alternative was explored to utilize the full capacity of the existing DGB transformer by reconductoring transmission lines 60L and 51L as laid out in the description and scope of Alternative C. If this scope were completed, the DGB T2 transformer could carry up to 180 MVA of load in the year 2025 following the reconfiguration. FBC states that further reconfiguration is not possible as system voltages would be at low limits and the loading on the remaining LEE transformer would be at 99.5 percent of the emergency limit. FBC states that reconductoring lines 60L and 51L could provide approximately 22 MW of incremental capacity.

These line upgrades would defer the need for a terminal transformer addition by three years, as the transformer would need to be in service prior to summer 2026 rather than prior to summer 2023. FBC submits that this alternative was considered at a high level in the early stages of the Project, but was ultimately rejected because the relatively high capital cost of the line reconductoring only resulted in a limited benefit, deferring the need for an additional transformer for only three years.[90]

2.2.1.9 Replacing Existing Transformers with Larger Capacity Transformers

FBC did not actively consider the alternative of replacing both existing transformers with newer, larger units as this would not be a cost-effective nor a long-term solution to the capacity limitations in the Kelowna area. Currently, both the LEE T3 and T4 transformers have nameplate ratings of 168 MVA. FBC submits that, as a hypothetical example, even if both transformers were replaced with 200 MVA units (the largest standard size used by FBC), the firm station capacity would only increase by approximately 32 MVA. This is because if one of the two new transformers was out of service for any reason, the capacity of the remaining transformer would only be 32 MVA greater than it is today. However, to achieve this relatively nominal capacity increase would require replacement of both transformers along with substantial additional station upgrades (as the larger transformers would require, for example, larger transformer foundations and oil containment, replacement of switches, breakers, buswork, etc.).[91]

FBC submits that while no formal estimates were prepared, based on the cost of the transformers alone, FBC estimates the cost of upgrading the two transformers to be in excess of $7 million. The addition of a third transformer would still be required by 2028 to address load growth, thereby increasing the total cost of the required upgrades by more than $7 million over the Project alternatives. FBC explains that this option was rejected as it is neither a cost-effective nor a long-term solution.[92]

2.2.1.10 One-Year Project Deferral

The possibility of a one-year deferral of the Project was explored through IRs. The current Project schedule would see the new transformer in service after summer load peak in 2022. The Kelowna summer peak load for 2020 year-to-date is 313.1 MW, which exceeded the forecast peak load of 309.5 MW. FBC states this

[88] Exhibit B-4, CEC IR 9.2.
[89] Exhibit B-4, CEC IR 9.6.
[90] Exhibit B-9, BCOAPO IR 30 series.
[91] Exhibit B-2, BCUC IR 10.3.2.
[92] Exhibit B-2, BCUC IR 10.3.2.

demonstrates that there is continued load growth in the Kelowna area, as peak load has almost reached the 315 MW load level. FBC submits that further deferral is not possible, as the new transformer is required to be in service before summer 2023.[93]

2.2.1.11 BC Hydro West Kelowna Project

During the IR process and in argument, ICG submitted that FBC should consider the BC Hydro West Kelowna project alternative of connecting to FBC's Saucier substation as a viable alternative to the FBC KBTA Project.[94]

FBC states that the existing BC Hydro 138kV line to the Nicola substation does not have the capacity to be a backup supply to FBC's Saucier substation.[95] Further, FBC explains that it has previously confirmed that a transmission line connecting the FBC and BC Hydro systems would increase the peak load on FBC's Kelowna area transmission network, intensifying the need for the KBTA Project, as opposed to providing a solution for the Project.[96] The BC Hydro to FBC connection would therefore not be a feasible alternative to the KBTA Project.

FBC further states it does not believe there are "'any other potential interconnection points for power purchases from BC Hydro or any upgrades to BC Hydro transmission and distribution system' that would be a viable alternative to the KBTA Project… Nor could a potential BC Hydro interconnection be completed within the required timelines for the KBTA Project."[97]

2.2.2 Feasible Project Alternatives

Three project alternatives, all of which add a terminal transformer at an existing Kelowna terminal substation, were evaluated as a preferred means to increase 138 kV supply capacity in the area.

Alternative A consists of the purchase and installation of a third terminal transformer at LEE substation and reconfiguration of the existing 138 kV split bus into an industry standard ring bus configuration. Alternative A is the chosen alternative and is described fully in the Project Description in Section 3.0 of this Decision.[98]

Alternative B consists of the purchase and installation of a third terminal transformer at LEE and extension of the existing non-standard 138 kV split bus configuration.[99]

Alternative C consists of the purchase and installation of a second terminal transformer at DGB and extension of the existing 138 kV industry standard ring bus configuration.[100]

In each alternative, the transformer to be installed is a 230/138 kV transformer with a rating of 120/160/200 MVA, which is the modern standard size for transformers in applications of this type. This matches the rating of the transformers at DGB and other FBC terminal stations.[101]

2.2.2.1 Alternative A

Alternative A (the Project) consists of the installation of a third 230/138kV transformer at LEE substation and the reconfiguration of the existing 138kV bus. The existing 138kV split bus will be reconfigured into a ring bus, in

[93] Exhibit B-11, ICG IR 2.3.1.
[94] Exhibit B-5, ICG IR 1.3 series; Exhibit B-11, ICG IR 2.12 series; ICG Final Argument, pp. 7–8.
[95] Exhibit B-11, ICG IR 12.1.
[96] FBC Reply Argument, para. 28., pp. 9–10; Exhibit B-2, BCUC IR 9.2.
[97] FBC Reply Argument, para. 28., pp. 9–10; Exhibit B-2, BCUC IR 9.2.
[98] Exhibit B-1, Section 4.3, p. 23.
[99] Exhibit B-1, Section 4.3, p. 23.
[100] Exhibit B-1, Section 4.3, p. 24.
[101] Exhibit B-1, Section 4.3, p. 24.

accordance with FBC's standard bus configuration for switching substations. The LEE substation, which has two 230/138 kV transformers, is presently configured with a 138 kV split bus because it was constructed prior to FBC's adoption of ring bus as a standard configuration.[102]

The capital cost of this alternative is $23.288 million. The annual gross operation and maintenance (O&M) reduction associated with this option is approximately $0.028 million.[103]

2.2.2.2 Alternative B

Alternative B is similar to the Project in that an additional transformer would be added to LEE substation. However, unlike the Project, the existing split bus configuration would be kept and extended. The station footprint and fence line would be extended slightly under this alternative.[104]

The capital cost of Alternative B is $17.008 million. The annual gross O&M reduction associated with this option is approximately $0.023 million.[105]

2.2.2.3 Alternative C

Alternative C involves installing a new 230/138 kV transformer at DGB and the reconductoring of transmission lines 60L and 51L to O.K. Mission Terminal Station. Since there is insufficient space adjacent to the existing 230 kV equipment at DGB, this would require construction of a new 230 kV yard on an undeveloped portion of the land owned by FBC.[106]

The existing 230/138 kV transformer would be relocated, and a four-breaker ring bus would be constructed. Even after the addition of a second transformer at DGB and the reconductoring of transmission lines 60L and 51L, FBC notes that the Kelowna area load is forecast to exceed the 138 kV capacity by no later than 2036. The addition of a fifth terminal transformer in the Kelowna area would be required at that time. Since this additional transformer falls within the 40-year period of financial analysis, FBC included the additional transformer cost in its evaluation of this alternative.[107]

The capital cost of Alternative C is $32.332 million.[108] Excluded from the $32.332 million is the capital cost of the next capacity addition in 2036. FBC assumes the cost of that addition to be the same as Alternative A, subject to inflation. These 2036 costs have been included in the 40-year financial analysis of this project for comparability to Alternatives A and B. The annual gross O&M increase associated with this option is approximately $0.020 million.[109]

2.2.2.4 Choice of Preferred Alternative

FBC states that all three of the feasible alternatives would provide N-1 reliability upon completion of the Project.[110] Alternatives A and B provide advantages over Alternative C in that they provide more capacity and do not require transmission line reconductoring. Alternative C requires the addition of a terminal transformer when

[102] Exhibit B-1, Section 4.4, p. 27.
[103] Exhibit B-1, Section 4.4, p. 29.
[104] Exhibit B-1, Section 4.4, p. 29.
[105] Exhibit B-1, Section 4.4, p. 30.
[106] Exhibit B-1, Section 4.4, p. 30.
[107] Exhibit B-1, Section 4.4, pp. 31–32.
[108] Exhibit B-2, BCUC IR 1.15.2.
[109] Exhibit B-1, Section 4.4, p. 32.
[110] Exhibit B-1, Section 4.6, p. 34.

summer peak load reaches 400 MW,[111] expected to be reached in 2036[112]. FBC states there are no additional advantages or benefits to reconductoring the 138 kV lines under Alternative C.[113] Alternative C is not recommended from a technical perspective and it is the highest cost alternative.

FBC states that both Alternative A and Alternative B provide enough capacity to sustain area load growth to 550 MW, which FBC expects to reach in the year 2060.[114]

Alternatives A and B differ in their configuration of the 138 kV bus. As described above, Alternative A proposes a ring bus and Alternative B proposes to maintain the current split bus. In a ring bus topology, each transformer or transmission line has its own discrete node in the bus between two breakers. The ring bus configuration increases system reliability since faulty sections of lines can be isolated without affecting the no-fault zones. FBC submits that a ring bus configuration is today's minimum industry standard for this type of terminal substation and is FBC's modern standard for a terminal substation.[115]

FBC states that a ring bus offers the following advantages over a split bus configuration:

1. Reduction in annual outage minutes due to discrete nodes for operational zones;
2. Ease of maintenance and operation because any single breaker can be taken out of service without required bus reconfiguration;
3. Reduced safety risk to workers due to clear isolation zones;
4. Less complicated protection and switching schemes; and
5. Less prone to human operational error due to standardized configuration.[116]

Further, Alternative A has potential for future expansion with the capacity to add two additional nodes.[117] FBC states that while there are currently no firm plans to connect a new 138 kV transmission line at LEE, FBC has received several large load requests. The ability to add another 138 kV line without expanding the footprint of the bus provides flexibility to meet demand using the LEE terminal.[118]

FBC provided a technical evaluation of the three feasible project alternatives in the Application, rating Alternative A as the highest rated project alternative.[119] For these reasons, FBC submits that the technical merits of Alternative A justify its selection as the preferred alternative, although it is a higher cost than Alternative B.[120]

Position of the Parties

FBC submits it identified a number of alternatives to the Project, some of which were rejected at a preliminary stage as they "failed to meet the objective of increasing the 138 kV transmission capacity, or were otherwise clearly inferior to other alternatives."[121] FBC analyzed three alternatives in detail, each of which involves installing an additional transformer at an existing terminal station. FBC submits the two key differences between the three options are whether to locate the additional transformer at LEE or DGB terminal station, and whether to install a ring bus or split bus configuration. FBC submits that the Project, Alternative A, is the preferred

[111] Exhibit B-1, Section 4.6, p. 34.
[112] Exhibit B-2, BCUC IR 1.15.2.
[113] Exhibit B-2, BCUC IR 1.11.5.
[114] Exhibit B-2, BCUC IR 1.11.2.
[115] Exhibit B-1, Section 4.3, p. 26.
[116] Exhibit B-1, Section 4.3, pp. 26–27.
[117] Exhibit B-1, Section 4.6, pp. 34–35.
[118] Exhibit B-2, BCUC IR 1.14.1.
[119] Exhibit B-1, Table 4-1, Section 4.5, p. 33.
[120] Exhibit B-1, Section 4.6, p. 36.
[121] FBC Final Argument, para. 44, p. 13.

option, and involves adding an additional transformer at the LEE terminal station using the ring bus configuration.[122]

FBC submits the LEE terminal station is preferred to DGB because this solution adds 235 MW of incremental capacity, which would not be exceeded until 2060, whereas adding a new transformer at DGB would add only 85 MW, and this limit would be exceeded by 2036. FBC also prefers Alternative A because adding a transformer at DGB would require certain transmission line reconductoring work to be completed, which work is not required if a transformer is added at LEE.[123]

FBC prefers the ring bus configuration to the split bus configuration. FBC submits that the ring bus, which creates a redundant path for power to flow, is "today's minimum industry standard for a 230/138 kV terminal station"[124], providing "increasing reliability and reducing customer outages, being easier to maintain and operate, increasing safety and being expandable." [125] FBC submits research demonstrates a ring bus configuration results in more than a 50 percent reduction in outage minutes per year compared to a split bus configuration, and would require $15,700 per year less in O&M to operate in Kelowna. Further, FBC argues that the ring bus configuration enhances safety compared to the split bus alternative as it provides "a clear zone of isolation when working on equipment that is free from complex transfer buses and switches"[126], and provides the capability of expansion without expanding the bus. [127]

FBC conducted an in-depth evaluation of the three identified alternatives, considering five factors: the N-1 system reliability planning criteria; safety and operability; potential for future expansion; system reliability; and project risk. FBC submits its evaluation showed the Project to be superior to the other two alternatives. FBC also submits it conducted a financial analysis, showing that the Project had a larger reduction in annual O&M costs than the other two alternatives, although the Project has a higher cost than Alternative B as the latter does not include an upgrade to a ring bus configuration. [128]

FBC submits the Project, Alternative A, is the preferred approach as it is the best technical solution of all three alternatives considered and that the advantages with respect to reliability, operability, safety and expandability justify the additional expense compared to Alternative B. [129]

ICG submits that the BCUC should not accept FBC's recommended alternative because FBC limited its consideration of alternatives to those with additional transformers, and thus the value of their analysis was limited. ICG submits there are "many alternatives"[130] to meeting the N-1 system reliability planning criteria which do not involve increasing the number of transformers. Further, ICG submits that the BCUC's CPCN Guidelines require utilities to identify alternatives at an early screening stage and to provide reasons why certain alternatives are not considered, but FBC "does not provide a list of identified alternatives, with the exception of gas-fired generation and the [demand response] pilot project, and does not provide adequate reasons why alternatives were not considered further."[131] In ICG's view, FBC did not fulfill the "requirements"[132] of the BCUC's CPCN Guidelines and did not carry out a "full two-step screening process."[133] ICG recommends that in these circumstances, the BCUC should deny the Application and direct FBC "to consider alternatives aligned with

[122] FBC Final Argument, pp. 12–13.
[123] FBC Final Argument, pp. 13–14.
[124] FBC Final Argument, para. 54, p. 15.
[125] FBC Final Argument, para. 54, p. 15.
[126] FBC Final Argument, para. 60, p. 17.
[127] FBC Final Argument, pp. 14–18.
[128] FBC Final Argument, pp. 18–20.
[129] FBC Final Argument, pp. 20–21.
[130] ICG Final Argument, para. 12, p. 5.
[131] ICG Final Argument, para. 12, p. 6.
[132] ICG Final Argument, para. 12, p. 6.
[133] ICG Final Argument, para. 14, p. 6.

the objectives of the [*Clean Energy Act*] and other than an additional transformer,"[134] such as "clean, distributed generation such as local solar generation." [135]

FBC replies that its process undertaken in the Application and in the proceeding was consistent with the guidance provided in the BCUC's CPCN Guidelines. FBC submits the Application sets out "alternatives that were identified by FBC at an early stage for initial consideration and that were then rejected"[136] and the reasons why these alternatives were "not feasible alternatives and were rejected from further consideration."[137] FBC did not limit its initial consideration to alternatives involving installing an additional transformer, and did not reject alternatives because they did not involve installing an additional transformer. FBC submits that an in-depth analysis of alternatives discounted as infeasible would be an unnecessary use of resources, not necessary under the CPCN Guidelines, and would not somehow convert an infeasible alternative into a feasible option for the Project. [138]

FBC adds that solar generation does not represent a viable alternative to the Project. In addition to the winter peak demand in Kelowna area typically occurring after sunset, the impact of solar installations is largely included in substation peak load data as solar generation offsets load. In the past five years an average of 0.26 MW of peak solar capacity has been installed per year, whereas increases of approximately 6 MW per year and approximately 4.5 MW per year at winter peak would be required to allow for the deferral or avoidance of the Project. [139]

FBC submits that the BCUC should reject ICG's suggestion that FBC be directed to consider further alternatives to the Project as such investigations would not yield a different result from that set out in the Application and would delay the Project and likely result in a violation of FBC's planning criteria. [140]

ICG submits that "it must be presumed that reinforcing BC Hydro's West Kelowna system [as an alternative to the Project] would be technically and operationally feasible"[141], and that the BCUC "should not now rely on FBC's understanding of the BC Hydro project costs and timelines, without first hearing from BC Hydro. FBC was the applicant and should have sought and then filed BC Hydro's views on the record of this proceeding." [142]

FBC submits in reply that the existing 138 kV BC Hydro line supplying West Kelowna load "does not have the capacity to act as a backup to FBC in the case of a major outage on the FBC system, such as an outage or failure of a LEE transformer"[143], and that a transmission line connecting the FBC and BC Hydro systems "would *increase* the peak load on FBC's Kelowna area transmission network, intensifying the need for the KBTA Project, as opposed to providing a solution for the Project"[144] (emphasis in original). FBC submits it does not believe there are "any other potential interconnection points for power purchases from BC Hydro or any upgrades to BC Hydro transmission and distribution system"[145] that would be a viable alternative to the KBTA Project, and that in any event the extensive transmission line infrastructure required for an interconnection with BC Hydro would

[134] ICG Final Argument, para. 16, p. 7.
[135] ICG Final Argument, pp. 5–7.
[136] FBC Reply Argument, para. 21, p. 7.
[137] FBC Reply Argument, para. 21, p. 8.
[138] FBC Reply Argument, pp. 7–8.
[139] FBC Reply Argument, p. 10.
[140] FBC Reply Argument, p. 11.
[141] ICG Final Argument, para. 20, p. 7.
[142] ICG Final Argument, p. 8.
[143] FBC Reply Argument, para. 28, p. 9.
[144] FBC Reply Argument, para. 28, p. 9.
[145] FBC Reply Argument, para. 28, p. 9.

"plainly be more disruptive, expensive and time-consuming to construct"[146] than the Project, and could not be completed within the required timelines for the Project. [147]

ICG supports the Project, Alternative A, from the "limited and inadequate"[148] list of feasible alternatives presented in the Application.[149]

The CEC accepts the alternatives provided as being reasonable, and agrees that installing an additional transformer at LEE appears to represent a "superior and longer-term solution."[150] The CEC also accepts FBC's technical analysis as being appropriate, and agrees the ring bus configuration is superior to the split bus configuration, justifying the cost differential. In CEC's view the Project is a "cost-effective investment"[151], and its benefits "could be expected to exceed the costs."[152]

BCOAPO agrees with FBC that the Project, Alternative A, is the preferred choice. While it leads to slightly higher rate impacts, BCOAPO submits it provides greater reliability and worker safety, and represents both the industry standard and FBC's approach in more recent installations.[153]

Panel Determination

The Panel finds that the Project is the most appropriate alternative to meet the reliability needs in the Kelowna area.

The Panel is satisfied that FBC has identified a wide range of alternatives to meet the reliability needs of the Kelowna area. FBC identifies four alternatives in the Application which it rejected: the status quo; demand response; local generation; and the addition of a transformer at a distribution substation. In IRs, FBC addressed a further seven alternatives: a mobile transformer; local generation; time-of-use pricing; reconductoring transmission lines; replacing existing transformers with transformers of larger capacity; a one-year deferral; and a link to BC Hydro's system in West Kelowna. The Panel is also satisfied that FBC properly rejected those alternatives which were infeasible or clearly inferior, and only conducted an in-depth analysis of the three alternatives that FBC demonstrated could meet the stated reliability objectives by 2023 and were not demonstrably inferior or more expensive than other alternatives.

The Panel rejects ICG's submission that "FBC's opinion that the only feasible alternative was additional transformation limited the value of the alternative analysis and for that reason should not be accepted by the Commission."[154] FBC based its selection of alternatives for in-depth analysis on criteria such as feasibility and cost, and appropriately rejected alternatives which did not meet the criteria. To do otherwise would have increased the cost and elapsed time to complete the analysis to little or no benefit. ICG has not convinced the Panel that FBC has omitted to consider any feasible alternative to meet the reliability needs of the Kelowna area by 2023, as required to continue to meet the N-1 system reliability planning criteria.

The Panel also rejects ICG's recommendation that the BCUC "deny the Application and direct FBC to consider alternatives aligned with the [*Clean Energy Act*] and other than an additional transformer."[155] The Panel agrees with FBC that further analysis is unlikely to identify any alternatives that would be an improvement over the

[146] FBC Reply Argument, para. 28, p. 9.
[147] FBC Reply Argument, pp. 9–10.
[148] ICG Final Argument, para. 24, p. 9.
[149] ICG Final Argument, p. 9.
[150] CEC Final Argument, p. 3.
[151] CEC Final Argument, p. 3.
[152] CEC Final Argument, pp. 6, 8–10.
[153] BCOAPO Final Argument, p. 14.
[154] ICG Final Argument, p. 5
[155] ICG Final Argument, para. 16, p. 7.

three alternatives chosen by FBC for in-depth analysis, and by delaying the Project would likely cause FBC to be in violation of its N-1 system reliability planning criteria in 2023.

In particular, the Panel rejects ICG's recommendation that the BCUC direct FBC to further evaluate the option of BC Hydro reinforcing the West Kelowna system as an alternative to the Project. The Panel is satisfied with FBC's evidence that the transmission interconnection between BC Hydro's West Kelowna system and FBC's system would increase rather than decrease the peak load on the FBC system because FBC would be wheeling power to BC Hydro's customers in West Kelowna, rather than receiving power from BC Hydro. Further, since FBC is yet to receive an interconnection request from BC Hydro and would only then complete a system impact study, the interconnection between the FBC's system and BC Hydro's West Kelowna system could not be completed prior to 2023 when the additional peak load power in FBC's service area of Kelowna is required.

The Panel is also satisfied with FBC's evidence that there are no other potential interconnection points for power purchases from BC Hydro or any upgrades to BC Hydro's transmission and distribution system that would be a viable alternative to the Project within the timeframes required.

The Panel is satisfied that FBC properly evaluated the three credible alternatives, and that Alternative A, the Project, is the most appropriate alternative to meet the reliability needs in the Kelowna area. The Panel agrees that the LEE terminal station is a preferable location for installing an additional transformer compared to DGB because of the 235 MW additional capacity it brings versus the 85 MW additional capacity which could be achieved at DGB, among other benefits. We also agree that the choice of the ring bus configuration is preferable to the split bus configuration, and the extra cost is worth the benefits of improved reliability, ease of operation, expandability and worker safety.

3.0 Consultation

Section 3 of the BCUC's CPCN Guidelines outlines the information expected from an applicant regarding consultation with First Nations and the public, which includes: a description of consultation activities; issues and concerns raised; the applicant's assessment of the sufficiency of the consultation process; and a statement of planned future consultation.[156]

FBC identified the following key stakeholders for the KBTA Project:

- City of Kelowna elected officials and staff;
- Residents and businesses at the Tower Ranch subdivision and Tower Ranch Golf & Country Club, and other residents adjacent to or in close proximity to LEE; and
- Indigenous Communities as identified through the Provincial Consultative Areas Database.[157]

FBC states that, as the Project progresses, it will continue to work with customers, stakeholders, and Indigenous communities to address any outstanding items.[158]

The following subsections provide an overview of FBC's consultation activities with the key stakeholders.

[156] CPCN Guidelines, Section 3, pp. 5–7.
[157] Exhibit B-1, Section 7.2, p. 57.
[158] Exhibit B-1, Section 7.5, p. 62.

3.1 Consultation with Local Government

FBC submits that it provided a brief overview of the Project by email to City of Kelowna staff on March 16, 2020 and sent a follow up letter on March 31, 2020, which included visual renderings, the noise study summary and an offer to provide additional information as needed. FBC states that a response from the City Manager was received on March 31, 2020 advising that the Council had been briefed and that they would be in contact if further information was requested.[159] FBC states that no further information has since been requested.[160]

3.2 Consultation with Local Residents

FBC submits that with the assistance of the TRCA, FBC had an opportunity to reach a very high percentage of local residents. FBC's consultation activities include development of a project website, notification letters and a virtual townhall.[161]

FBC developed a dedicated webpage containing information on the Project, which included an opportunity to provide feedback via an online survey.[162] Five online surveys were received with primary concerns identified as visual impacts/station aesthetics, traffic disruptions, and removal of the storage tent.[163]

Notification letters were emailed to the TRCA President for distribution to area residents on March 30, 2020. Notification letters were also mailed to the owners of three properties adjacent to the station as well as the two Tower Ranch businesses. The letters provided information about the Project, the regulatory process, how to contact FBC with any questions or concerns, visual renderings of the proposed Project, and a summary of the noise study.[164]

FBC also hosted a virtual town hall/information session on April 22, 2020, which was attended by approximately 12 residents.[165] Based on previous experience, FBC considers the attendance at the virtual town hall to be average.[166]

FBC states that the primary concerns raised by residents during the virtual town hall were as follows:

- Aesthetic improvement options FBC is considering including concrete wall height and colour, as well as vegetative screening;
- Clarification on results of noise study summary and whether noise levels will increase substantially;
- Lighting concerns about the number of lights and times of use;
- The extent to which work would be done within current station footprint or beyond;
- Impacts during construction such as road closures and/or planned outages; and
- Levels of electromagnetic fields (EMF) post construction.[167]

FBC provided the following information to address each concern raised:

[159] Exhibit B-1, Section 7.3, p. 57.
[160] Exhibit B-1, Section 7.3, p. 57; Exhibit B-2, BCUC IR 31.1.
[161] Exhibit B-1, Section 7.4, p. 58.
[162] Exhibit B-1, Section 7.4, p. 58.
[163] Exhibit B-1, Appendix D-2.
[164] Exhibit B-1, Section 7.4, p. 59.
[165] Exhibit B-1, Section 7.4, pp. 59–60.
[166] Exhibit B-2, BCUC IR 32.3.
[167] Exhibit B-1, Section 7.4, p. 60.

- Aesthetic improvement: FBC is open to feedback on options for concrete wall height and colour that would be acceptable to area residents and complimentary to the neighbourhood aesthetics, as well as consideration of input on vegetative screening;
- Noise: not expected to substantially increase given the change in operation of the station with the load spread across a higher number of transformers;
- Lighting: will be improved for safety purposes and will only be in use when night work is required in the station. FBC confirmed that lighting will not be on 24 hours per day;
- Station work will not require any expansion outside of existing station property. Confirmed a small fence modification will be required on the southwest corner, away from the residential area;
- Construction impacts are expected to be minimal and will be communicated in a construction notification letter, which will be sent to area residents during Project planning and leading up to construction; and
- FBC has committed to assess any change in EMF levels that may result from the Project.[168]

FBC has agreed to work collaboratively with the TRCA Board of Directors by creating a focus group to continue discussions as the Project progresses. FBC states that it will work in partnership with the TRCA Board of Directors to incorporate customer input into design plans for appropriate aesthetic improvements to the extent possible.[169]

Two letters of comment were received during the proceeding. Neither party opposed the expansion of the transformer capacity, but both parties submitted that additional landscaping is required to improve the appearance of the terminal station. [170]

3.3 Consultation with Indigenous Communities

FBC states that it is committed to developing and maintaining relationships with Indigenous communities within whose territories it works and operates. FBC states that, in keeping with FBC's Statement of Indigenous principles, the Project team has and intends to:

- uphold a high standard of consultation and engagement; and
- identify potential opportunities for Indigenous procurement, which ensures local Indigenous communities and individuals receive opportunities through the development of the Project.[171]

FBC developed a list of potentially affected Indigenous communities using the Province of British Columbia's Consultative Areas Database to create a comprehensive list of those Indigenous communities whose area of interest is located in the area of LEE. The list includes:

- Okanagan Indian Band;
- Penticton Indian Band;
- Okanagan Nation Alliance;
- Lower Similkameen Indian Band;
- Westbank First Nation; and

[168] Exhibit B-1, Section 7.4, p. 60.
[169] Exhibit B-1, Section 7.4, p. 61.
[170] Exhibits E-1; Exhibit E-2.
[171] Exhibit B-1, Section 7.5, p. 61.

- Upper Nicola Indian Band.[172]

FBC notified the Indigenous communities identified above by letter, dated December 19, 2019, to provide information about the Project, and provided contact information and an opportunity to request a follow up meeting. FBC states it did not receive any requests for meetings as a result of the notification letter and received only one response deferring further engagement to Okanagan Indian Band and Westbank First Nation. FBC states that it followed up on April 2, 2020 by sending an update email with a link to the Project webpage, a summary of the noise study and visual renderings of the Project. FBC also offered to host a virtual Town Hall with the Indigenous communities. FBC states that two responses were received, one deferring further engagement to Westbank First Nation; and one requesting additional information on the Project location, which FBC explains was provided.[173]

On June 27, 2020, FBC sent a follow up letter to the Indigenous communities advising of the filing of the Application with the BCUC and extended another offer to discuss the Project.[174] A virtual meeting was subsequently held between Westbank First Nation and FBC on September 8, 2020. At the virtual meeting, FBC explains that it presented the Project overview describing the station history, the need for the Project, scope, timelines and regulatory review process. [175]

FBC notes that LEE was originally constructed in the late 1950s and that during that period, consultation with First Nations and archaeological assessment work would not have been carried out in the same way it is today. Accordingly, FBC submits that Westbank First Nation expressed concerns regarding the lack of consultation and archaeological assessment work when the station was originally constructed and feel there is a need for accommodation for the past alienation of the land. FBC submits that Westbank First Nation did acknowledge that times were different then and agreed that the upgrade FBC is proposing is important. FBC states that Westbank First Nation advised that it will not oppose the Project.[176]

FBC states that it has committed to future meetings with Westbank First Nation to discuss accommodation, such as opportunities for contracting, employment and/or procurement opportunities for aspects of construction, and the inclusion of a cultural component at the Project site to reflect the history of the area.[177]

Position of the Parties

FBC submits it has engaged directly with the local community, Indigenous communities and local government, and will continue to inform and engage with Indigenous communities as the Project progresses. [178]

With respect to concerns raised by the local community, FBC submits the removal of an existing white storage facility will significantly reduce the visible impact of the appearance of the station, and FBC also intends to provide visual screening at road level. FBC is "willing to consider other options brought forward by the TRCA community, where practical, provided they do not impact the safety, reliability or security of FBC's facilities, or require ongoing maintenance by FBC." [179]

[172] Exhibit B-1, Section 7.5, p. 61.
[173] Exhibit B-1, Section 7.5, p. 62.
[174] Exhibit B-2, BCUC IR 33.2.
[175] Exhibit B-7-2, Response to Exhibit A-7, BCUC Request for further information.
[176] Exhibit B-7-2, Response to Exhibit A-7, BCUC Request for further information.
[177] Exhibit B-7-2, Response to Exhibit A-7, BCUC Request for further information.
[178] FBC Final Argument, p. 23
[179] FBC Final Argument, pp. 23–24

FBC adds that the additional transformer at LEE will reduce noise levels due to reduced loading on the existing transformers, and submits it will measure noise levels once the third transformer is in service and will consider then whether additional noise mitigation measures are required. [180]

ICG recommends the BCUC direct FBC to include the results of noise measurement and any mitigation measures in its final report.[181]

The CEC finds FBC's consultation to be satisfactory, noting its responsiveness to the concerns raised by owners of adjacent properties and its openness to future discussions with Indigenous communities.[182]

BCOAPO notes the outstanding consultation issues primarily relate to station aesthetic improvements and construction impacts and generally considers FBC's consultation process and planned activities with respect to the Project to be appropriate. [183]

TRCA did not submit argument in the proceeding.

Panel Determination

The Panel finds that FBC's consultation with local government, residents and Indigenous communities to date has been adequate. FBC has made appropriate efforts to date to contact parties who might be affected by the Project and has responded to their concerns. FBC expects the removal of an existing storage facility as part of the Project combined with visual screening at road level will improve the aesthetic appearance of the terminal station, and the Panel agrees.

That said, the Panel is concerned about the noise levels at the station once the third transformer is in service. FBC expects the noise level to be reduced due to the reduction in loading of the two existing transformers, but submits in any event that it will measure the noise levels at that point. To ensure the results of this testing is examined, **the Panel directs FBC to submit the results of its noise measurement study and any mitigation measures in its final report**.

4.0 Project Description

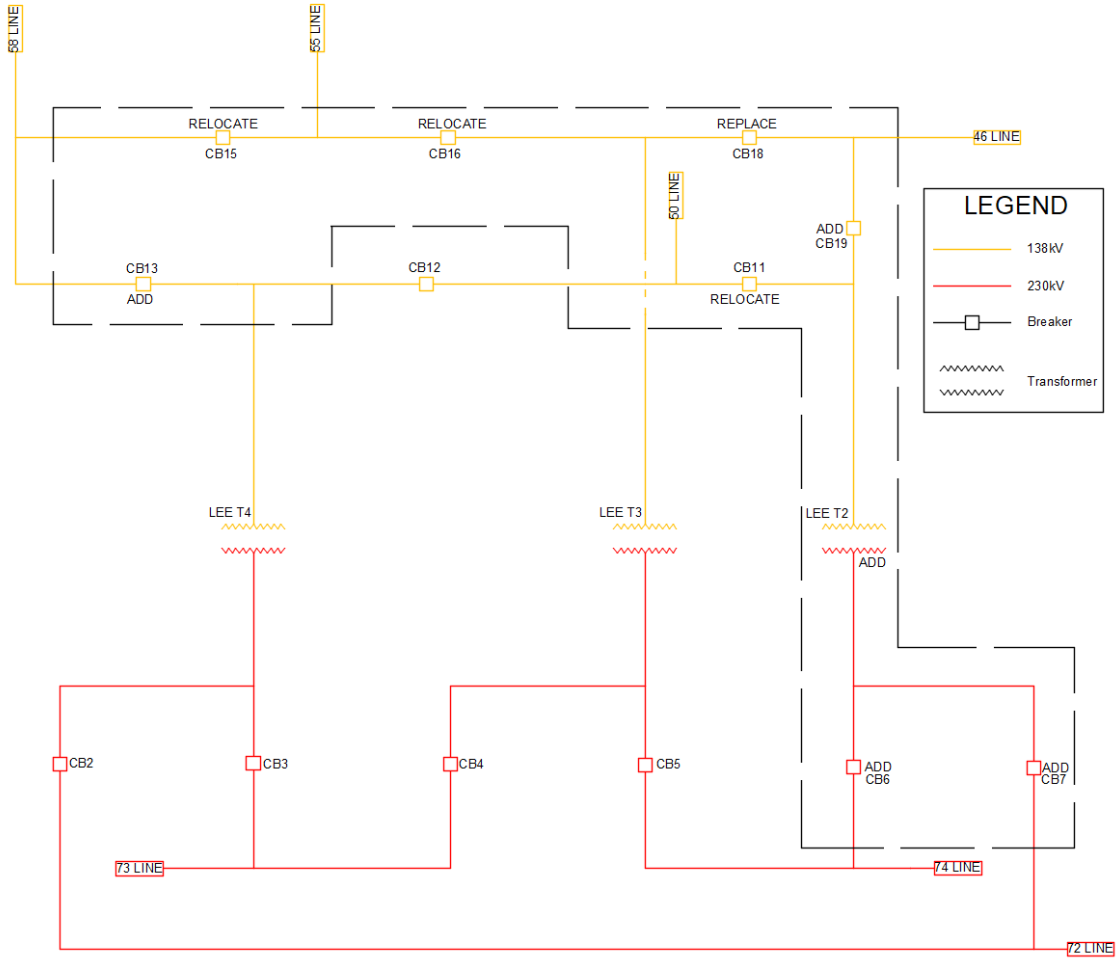
The Project consists of the installation of a third 230/138 kV transformer at LEE substation and the reconfiguration of the existing 138 kV split bus. The existing 138 kV split bus will be reconfigured into a ring bus, according to FBC's standard bus configuration for switching substations. The LEE substation, which has two 230/138 kV transformers, is presently configured with a 230 kV ring bus and a 138 kV split bus because it was constructed prior to FBC's adoption of ring bus as a standard configuration.[184]

The station footprint and fence line will be slightly expanded to accommodate the reconfigured bus while remaining on FBC land. Though not part of this Project, FBC states the seven-breaker ring bus could be converted in future to a nine-breaker ring without expanding the bus, creating two additional nodes for connection of new transmission line(s) and/or a 138 kV/13 kV distribution transformer.[185]

A one-line diagram of the Project is shown in Figure 5 below.

[180] FBC Final Argument, p. 24
[181] ICG Final Argument, p. 9
[182] CEC Final Argument, p. 13
[183] BCOAPO Final Argument, pp. 15–16
[184] Exhibit B-1, Section 4.3, p. 27.
[185] Exhibit B-1, Section 4.4, p. 28.

Figure 5 – One-line diagram of the Project at LEE substation[186]



The Project includes transmission and distribution line work. Some existing 138 kV transmission line approaches within the station will need to be re-located within existing land and rights-of-way to improve clearances and to provide space for the required station upgrades. None of the existing 230 kV line approaches or alignments in the station will need to be modified.[187]

The existing 13 kV distribution bus and equipment will be demolished and removed from the station since the distribution supply is being eliminated.[188] Following the transfer of the 13 kV distribution load from LEE to Sexsmith Feeder 6 in 2020, the 13 kV feeders LEE 1 and 2 will no longer be utilized. Distribution lines will be re-aligned as they will be underbuilt on transmission lines 55L and 50L, just inside the station's south and west property lines. The distribution lines will bypass LEE and will run between Sexsmith substation and Black Mountain with a normally open point just west of LEE.[189]

Engineering work will be completed either by FBC or FBC-approved contractors.[190] The specification for the new transformer will include proactive noise mitigation measures to minimize noise impact on nearby customers.[191] FBC expects that the addition of a third transformer will lower loading on the existing transformers and thereby

[186] Exhibit B-2, BCUC IR 1.18.1.
[187] Exhibit B-1, Section 5.1, pp. 38–39.
[188] Exhibit B-1, Section 4.4, p. 28.
[189] Exhibit B-1, Section 5.1, p. 39.
[190] Exhibit B-1, Section 5.2, p. 40.
[191] Exhibit B-1, Section 5.2, p. 41.

reduce noise levels. Accordingly, FBC will conduct field diagnostic noise measurements as recommended by Patching Associates prior to considering the implementation of any additional noise mitigation measures.[192]

A Project schedule, assuming CPCN approval by December 2020, indicates construction work will commence in January 2021, with project completion anticipated in December 2022.[193]

FBC provided a risk analysis and concludes that the overall risk to the Project schedule, quality and cost, considering the planned mitigation activities, is low. FBC has planned mitigation steps for all risks identified in its risk register. Any cost impacts that may arise from these risk factors are expected to be manageable within the Project contingency.[194] FBC submits that material delivery times of major equipment such as circuit breakers and the power transformer are the largest risk foreseen at this time. To mitigate this risk, FBC has created an internal task force to identify critical long-lead items, communicate with vendors and monitor the supply chain. In addition, FBC will consider earlier order times and will include scheduled flexibility in the Project schedule.[195]

FBC states it has implemented measures to minimize the risk of COVID-19, including its Exposure Control Plan (Plan), which specifically addresses COVID-19 risks to its employees and contractors. This Plan, which was filed in confidence with the BCUC on May 29, 2020, has been reviewed by WorkSafe BC and conforms to all current requirements.[196] FBC states that should the COVID-19 pandemic remain a concern during the construction phase, at minimum the approach would be to continue with the measures adopted in 2020, evaluate the risks in accordance with standard health and safety practices, and institute mitigation measures as required.[197]

Position of the Parties

FBC submits the description of the Project is provided in the Application, and highlights a few points based on questions raised during the proceeding.[198]

FBC confirms it will use external resources to complete the Project as it does not staff its engineering or construction workforces to meet peak requirements. Using external resources allows FBC's staff to focus on other activities which are more difficult to contract out and allows FBC to take advantage of the construction experience of its external contractor.[199]

FBC submits it expects the Project to be in service by late December 2022, assuming approval is received by the end of December 2020. FBC does not anticipate that the COVID-19 pandemic will affect the schedule as the work is deemed essential and FBC has measures in place to mitigate the COVID-19 risks for workers and contractors on its construction sites and in its offices.[200]

FBC expects the largest schedule risk to be with respect to the delivery time of major equipment. FBC submits it has mitigated this risk by identifying long-lead items, communicating with vendors and monitoring the supply chain. Further, FBC has other risk mitigations available such as scheduling float, construction methodology resequencing, overtime and shift rotations. FBC submits it also incorporates late delivery penalties as part of its purchase orders for major equipment such as large power transformers.[201]

[192] Exhibit B-2, BCUC IR 1.22.2.
[193] Exhibit B-1, Section 5.4, p. 43.
[194] Exhibit B-1, Section 5.7, pp. 48–51.
[195] Exhibit B-2, BCUC IR 1.23.4.
[196] Exhibit B-2, BCUC IR 1.23.1.
[197] Exhibit B-1, Section 5.4, p. 45.
[198] FBC Final Argument, p. 21.
[199] FBC Final Argument, p. 21.
[200] FBC Final Argument, p. 22.
[201] FBC Final Argument, p. 22.

The CEC has no issues with FBC's proposed Project plan.[202]

No other interveners made submissions on FBC's proposed Project plan.

Panel Discussion

The Panel is satisfied with FBC's plan to complete the Project. FBC has prepared its plan to an appropriate level of detail, consistent with information categories set out in the BCUC's CPCN Guidelines. Also, FBC has adequately considered the risks and planned appropriate mitigation steps, in addition to having a project cost contingency.

5.0 Project Cost and Rate Impact

5.1 Capital Cost

The forecasted total cost of the Project is $23.288 million, which includes $1.230 million of AFUDC and $0.828 million of net removal cost.[203] The capital cost meets the AACE International Class 3 level of project definition and design and has an expected accuracy of between -20 and +30 percent.[204] A summary of the estimated project capital costs are provided in Table 4.

[202] CEC Final Argument, p. 12
[203] Exhibit B-1, Section 6.2, pp. 52–53.
[204] Exhibit B-1, Section 6.2, p. 52.

Table 4 – Summary of Estimated Project Capital Costs ($ millions)[205]

Item	$ 2019	$ As-Spent
Pre-Approval Costs	0.425	0.442
Construction Costs	17.375	18.241
Net Removal Costs	0.792	0.828
Contingency	2.417	2.546
AFUDC		1.230
Total Project Costs	**21.009**	**23.288**

As noted previously, the Project is composed of station work as well as transmission and distribution line work.[206] In developing its capital cost estimate, the key assumptions employed by FBC include:

- Work will be done predominantly by external labour;
- 138 kV Capacitor banks can be shut down one at a time for extended periods;
- Outage windows required for 138 kV transmission lines can be accommodated; and
- Outage windows required for modifications to 230 kV ring bus can be accommodated.[207]

Capital cost estimates for station work and transmission and distribution line work were submitted confidentially through Appendix B-2 and Appendix B-3, respectively.[208]

5.2 Operation and Maintenance Expenses

The Project is expected to reduce gross O&M expenditures by approximately $28,000 annually beginning in 2024. This is as a result of reduced maintenance associated with the elimination of the 13 kV distribution equipment within the substation and a net reduction of one 138 kV breaker.[209]

The majority of FBC's O&M expenses are determined using a formula, as approved in the FortisBC Multi-Year Rate Plan Application for 2020 to 2024 proceeding (Multi-Year Rate Plan).[210] During the IR process, FBC clarified since the majority of its O&M expenses are determined by a formula, FBC will reduce the O&M formula amount by $28,000 to account for O&M savings achieved as a result of the KBTA Project in 2024.[211]

5.3 Rate Impact

FBC states that the majority of the assets are expected to enter rate base in 2023 and to evaluate the rate impact of the Project and the alternatives, a 40-year cost of service model was used.[212] For the Project (referred to as Alternative A) and each alternative, FBC provided both the rate impact in 2024, the year when all assets are expected to be in service, and the levelized 40-year rate impact for an average residential customer using 11,000 kWh of energy.[213] The results are summarized in Table 5.

[205] Exhibit B-1, Section 6.2, p. 52.
[206] Exhibit B-1, Section 6.2, p. 53.
[207] Exhibit B-1, Section 6.2, p. 53.
[208] Exhibit B-1, Section 6.2, p. 53.
[209] Exhibit B-1, Section 6.3, p. 54.
[210] Decision and Order G-166-20, *FortisBC Energy Inc. and FortisBC Inc. Multi-Year Rate Plan Application for 2020 to 2024*, dated June 22, 2020, Section 4.1, p. 102.
[211] Exhibit B-4, CEC IR 19.1.
[212] Exhibit B-1, Section 6.4, p. 55.
[213] Exhibit B-1, Section 6.4, p. 55.

Table 5 – Cost of Service and Levelized Rate Increase[214]

Item	Alternative A	Alternative B	Alternative C
2024 Cost of Service Rate Increase	0.54%	0.40%	0.74%
2024 Bill Impact *Avg. Residential Customer Using 11,000KWH*	$ 6.87	$ 5.05	$ 9.35
40 Year Levelized Rate Increase	0.39%	0.29%	0.75%
40 Year Levelized Bill Impact *Avg. Residential Customer Using 11,000KWH*	$ 4.96	$ 3.69	$ 9.49

Table 5 estimates the rate impact of the Project in 2024 to be 0.54 percent, which equates to an annual bill increase of $6.87 for an average residential customer using 11,000 kWh of energy.[215] The levelized 40-year rate impact of the Project is estimated to be 0.39 percent and the annual bill impact for an average residential customer at the 40-year levelized rate is estimated to be $4.96.[216]

During the IR Process, the 40-year present value (PV) of the incremental revenue requirement for each Project alternative was analyzed using the extremes of the Project's Class 3 estimate accuracy range (-20/+30 percent). The analysis identified the potential variability in rate impact if the estimated capital costs or incremental operating costs were to vary within the -20 to +30 percent acceptable range. Tables 6 and 7 reflect the change in PV and levelized rate impact, respectively, for the Project (Alternative A), Alternative B and Alternative C, based on a cost decline of 20 percent and a cost increase of 30 percent.

Table 6 – Change in Value of 40-Year Incremental Revenue Requirement [217]

		PV Value If:		Difference to Base PV if:	
		Cost Decline	Cost Increase	Cost Decline	Cost Increase
	Base PV	20%	30%	20%	30%
Alternative A	$ 23.0	$ 18.6	$ 29.7	$ (4.4)	$ 6.7
Alternative B	$ 17.1	$ 13.9	$ 22.0	$ (3.2)	$ 4.9
Alternative C	$ 44.0	$ 35.5	$ 56.9	$ (8.5)	$ 12.9

Table 7 – Levelized Rate Impact [218]

		% Rate Impact if:		Change in Annual Bill if:	
		Project Cost	Project Cost	Project Cost	Project Cost
	Base PV	Decline 20%	Increase 30%	Decline 20%	Increase 30%
Alternative A	$ 23.0	0.32%	0.51%	$4.00	$6.40
Alternative B	$ 17.1	0.24%	0.38%	$2.98	$4.74
Alternative C	$ 44.0	0.60%	0.97%	$7.64	$12.25

Tables 6 and 7 above show that if the costs for Alternative A increased by 30 percent, the PV of incremental revenue would rise to $29.7 million. This would result in an estimated levelized 40-year rate impact of 0.51 percent and the annual bill impact for an average residential customer at the estimated 40-year levelized rate would be $6.40.

[214] Exhibit B-2, BCUC IR 28.1.
[215] Exhibit B-1, Section 6.4, p. 55.
[216] Exhibit B-1, Section 6.4, p. 55.
[217] Exhibit B-2, BCUC IR 28.3.
[218] Exhibit B-2, BCUC IR 28.2.

Position of the Parties

ICG recommends that interveners be given the opportunity to comment on any project spending variances higher than the control budget, the Project's AACE Class 3 estimate. ICG submits that any such variances "should be considered imprudently incurred in the absence of compelling evidence, accepted by the Commission, that such costs were prudently incurred."[219]

FBC replies that ICG seeks to inappropriately "flip"[220] the prudency review process such that costs exceeding the AACE Class 3 estimate would be automatically presumed to be imprudent, contrary to the established regulatory practice in BC. FBC submits that the BCUC may decide to disallow certain costs that it finds to have been imprudently incurred, after an appropriate process. However, expenditures in excess of the AACE Class 3 estimate may still be prudently incurred and necessary to ensure the success of the Project. FBC adds that it would be "unnecessary and burdensome to grant interveners a general opportunity to comment on variances from the AACE estimate following the conclusion of this proceeding," [221] and that FBC will file whatever reports and updates are directed by the BCUC.[222]

The CEC submits that the cost estimate has been satisfactorily completed.[223]

Overall, BCOAPO submits it has no issues with the estimated cost of the Project. However, BCOAPO submits that upon completion of the Project, FBC's base O&M used to set rates in its Multi-Year Rate Plan should be further reduced by $15,700, which FBC has indicated will be saved as a result of the installation of the ring bus configuration at the LEE terminal station.[224]

FBC agrees with BCOAPO that the choice of a ring bus configuration at the LEE terminal station will reduce its O&M costs by an additional $15,700 per year, and agrees to make that additional adjustment to its base O&M.[225]

Panel Discussion

The Panel is satisfied with FBC's cost estimate for the Project. The cost estimate was prepared in accordance with the CPCN Guidelines and to an AACE Class 3 level of accuracy.

The Panel rejects ICG's recommendation that interveners be given the opportunity to comment on any project spending variances higher than the Project's AACE Class 3 estimate, and that such variances should be considered imprudently incurred in the absence of compelling evidence to the contrary. As FBC submits, the regulatory practice in BC is that utility costs are presumed to be prudently incurred, and ICG presents no compelling reason to reverse the practice in this instance. Once the Project's assets are added to rate base, which FBC anticipates will be in 2023 for the majority of the assets[226], interveners in this proceeding will have the opportunity to review the Project's costs at FBC's subsequent annual review, if they choose to participate in that proceeding.

The Panel appreciates BCOAPO's observation regarding the additional $15,700 per year savings to FBC's base O&M as a result of the choice of a ring bus configuration at the LEE terminal station, and FBC's agreement to make this adjustment.

[219] ICG Final Argument, p. 9.
[220] FBC Reply Argument, para. 36, p. 12.
[221] FBC Reply Argument, para. 37, p. 12.
[222] FBC Reply Argument, pp. 11–12.
[223] CEC Final Argument, p. 13.
[224] BCOAPO Final Argument, p. 15.
[225] FBC Reply, p. 2.
[226] FBC Final Argument, p. 23.

6.0 BC Government Energy Objectives

Section 46 (3.1) of the UCA states that in deciding whether to issue a CPCN, the BCUC must consider:

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

(b) the most recent long-term resource plan filed by the public utility under section 44.1, if any; and

(c) the extent to which the application for the certificate is consistent with the applicable requirements under sections 6 and 19 of the *Clean Energy Act* (CEA).

BC's energy objectives and CEA considerations are discussed in this section. FBC's long-term resource plan considerations are discussed in section 7.

6.1 British Columbia's Energy Objectives

BC's Energy Objectives are set out in section 2 of the CEA. FBC submits that the KBTA Project is required in order to increase the 138 kV transmission capacity in the Kelowna area, and is therefore directly aligned with objectives (c), (h), (k), and (m), as summarized in Table 8 below. FBC states that while not directly affecting the remaining objectives, the KBTA Project does not hamper the advancement of these energy objectives by other projects, initiatives, or proponents.[227]

Table 8: BC Energy Objectives[228]

Item	Objective	FBC Comments
(c)	to generate at least 93% of the electricity in British Columbia from clean or renewable resources and to build the infrastructure necessary to transmit that electricity	Project infrastructure is for the purpose of transmitting electricity within the province
(h)	to encourage the switching from one kind of energy source or use to another that decreases greenhouse gas emissions in British Columbia	Project increases Kelowna area capacity necessary to accommodate incremental load from switching from higher GHG sources of energy to electricity
(k)	to encourage economic development and the creation and retention of jobs	Project will benefit the local economy during the construction phase and ensure adequate transmission capacity to support future economic growth.
(m)	to maximize the value, including the incremental value of the resources being clean or renewable resources, of British Columbia's generation and transmission assets for the benefit of British Columbia	Project increases available transmission capacity for the benefit of FBC's customers

6.2 Clean Energy Act

Sections 6 and 19 of the CEA concern electricity self-sufficiency and clean or renewable resources, respectively.

[227] Exhibit B-1, p. 63

[228] Table prepared by BCUC. Exhibit B-1, Section 8.2, pp. 63–65.

FBC states that sections 6 and 19 of the CEA apply mainly to BC Hydro, with section 6(4) and section 19 of the CEA having relevance to FBC.[229]

Section 6(4) of the CEA provides:

> (4) a public utility, in planning in accordance with section 44.1 of the *Utilities Commission Act* for
>
> (a) the construction or extension of generation facilities, and
>
> (b) energy purchases,
>
> must consider British Columbia's energy objective to achieve electricity self-sufficiency.[230]

Section 19 of the CEA states:

> 19 (1) To facilitate the achievement of British Columbia's energy objective set out in section 2(c), a person to whom this subsection applies
>
> (a) must pursue actions to meet the prescribed targets in relation to clean or renewable resources, and
>
> (b) must use the prescribed guidelines in planning for
>
> (i) the construction or extension of generation facilities, and
>
> (ii) energy purchases.
>
> (2) Subsection (1) applies to
>
> (a) the authority, and
>
> (b) a prescribed public utility, if any, and a public utility in a class of prescribed public utilities, if any. [231]

FBC states that the KBTA Project does not involve either the construction or extension of generation facilities, nor is FBC a prescribed public utility for the purpose of section 19 of the CEA. Accordingly, FBC submits that sections 6 and 19 of the CEA are not applicable to the KBTA Project.[232]

Position of the Parties

ICG submits that an increase to transformer capacity does not achieve any of the CEA objectives identified by FBC, and the Project if approved would not "advance the benefits of the transition to clean, distributed energy resources."[233] ICG adds that the Project would not encourage customers to be more engaged in how they use energy, encourage switching from one energy source to another that decreases greenhouse gas emissions, encourage economic development and the creation of new jobs, or maximize the value of clean or renewable energy sources. Rather, ICG submits that the Project is contrary to CEA objectives because it will discourage switching from one energy source to another and the economic development, creation, and retention of jobs. ICG submits the Application should be denied because it does not advance the CEA objectives and is "almost certainly is a step backwards".[234]

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[229] Exhibit B-1, Section 8.4, pp. 65–66.
[230] *Clean Energy Act* [SBC 2010] Chapter 22.
[231] *Clean Energy Act* [SBC 2010] Chapter 22.
[232] Exhibit B-1, Section 8.4, p. 66.
[233] ICG Final Argument, para. 29, p. 10.
[234] ICG Final Argument, p. 10.

FBC submits in reply that ICG's interpretation is "entirely inconsistent with the objectives of the CEA."[235] Subsections 2(c) and (m) of the CEA expressly reference "clean or renewable resources"[236], which are defined to include hydro-electric power, and subsection 2(h) of the CEA refers to switching to energy sources that "decrease greenhouse gas emissions."[237] FBC submits that its electricity, which is almost entirely hydro electricity, is a clean and renewable resource that decreases greenhouse gas emissions. FBC submits there is no basis on which ICG may argue that the Project does not serve the objectives of the CEA or is a "step backward"[238] from those objectives. [239]

Panel Determination

The Panel finds that the Project is consistent with the objectives of the CEA, and further finds there is no reason for rejecting the Application on the basis of the objectives of the CEA.

The CEA defines "hydro" as a clean or renewable generation source. FBC submits its electricity is clean and renewable, coming "almost entirely"[240] from hydro-electric sources, and ICG offers no evidence to the contrary.

The Project is required for delivering FBC's clean and renewable electricity to its customers in a reliable manner, supporting their use of this clean and renewable resource and switching from other sources of energy. Therefore, the Project is consistent with the objectives of the CEA.

7.0 CPCN Determination

FBC submits that the approvals sought in the Application should be granted and that it should be granted a CPCN with respect to the Project.[241]

Position of the Interveners

ICG recommends that the BCUC not approve the Project. Alternatively, if the BCUC disagrees, ICG recommends the BCUC direct FBC to further consider alternatives that do not increase transformer capacity, to seek BC Hydro analysis and opinion regarding reinforcing the BC Hydro West Kelowna system as an alternative to the Project, and to consider all opportunities to postpone the Project for at least year.[242]

The CEC recommends the BCUC approve the Application as filed by FBC.[243]

BCOAPO submits the evidence indicates the Project is in the public interest and recommends the BCUC approve the Project as filed.[244]

Panel Determination

The Panel finds the public convenience and necessity require the construction and operation of a new transformer in Kelowna.

[235] FBC Reply Argument, para. 38, p. 12.
[236] FBC Reply Argument, para. 41, p. 13.
[237] FBC Reply Argument, para. 41, p. 13.
[238] FBC Reply Argument, para. 43, p. 13.
[239] FBC Reply Argument, pp. 12–13.
[240] FBC Reply Argument, para. 41, p. 13.
[241] FBC Final Argument, p. 25.
[242] ICG Final Argument, p. 11.
[243] CEC Final Argument, p. 1.
[244] BCOAPO Final Argument, p. 16.

In section 2.0 of this Decision, the Panel set out its finding that there is a need for the Project to maintain and improve reliability in the Kelowna area beginning in 2023, and that the Project is the most appropriate alternative to meet this need. In section 6.0, the Panel set out its finding that the Project is consistent with BC's energy objectives as set out in section 2 of the CEA.

Accordingly, the Panel grants a CPCN to FBC for the Project, specifically for:

(a) The installation of a new 120/160/200 MVA 230/138 kV bulk transformer at the F.A. Lee Terminal Station;

(b) The required substation modifications, including the reconfiguration of the 238 kV bus to a ring bus configuration, inside the F.A. Lee Terminal Station;

(c) Re-alignment of some existing transmission structures outside of the F.A. Lee Terminal Station; and

(d) Removal of the existing distribution egress within the station and re-alignment of distribution lines outside the F. A. Lee Terminal Station.

8.0 Reporting

The Panel directs FBC to provide the following reports:

1. Material Change Report
    - A material change is a change in FBC's plan for the Project that would reasonably be expected to have a significant impact on the schedule, cost or scope, such that:
        - The Project schedule and/or the in-service date is delayed by 3 months or longer;
        - The total Project cost exceeds 10 percent of the estimated Project cost provided in Table 6-1 of the Application; and
        - There is a change to the Project scope provided in section 5 of the Application.
    - In the event of a material change, FBC must file a material change report with the BCUC explaining the reasons for the material change, FBC's consideration of the Project risk and the options available, and actions FBC is taking to address the material change FBC must file the material change report as soon as practicable and in any event within 30 days of the date on which the material change occurs.
2. Final Report:
    - A Final Report is to be filed within three months of substantial completion of the Project. The report is to include:
        - the final cost of the transformer;
        - a complete breakdown of the final costs of installation;
        - a comparison of these costs to the estimates provided in this Application;
        - an explanation of all material cost variances for any of the cost items provided in Table 6-1 of the Application that exceed 10 percent;
        - details of any further consultation conducted, any issues raised, and measures undertaken by FBC to resolve the identified issues; and
        - the results of its noise measurement study and any mitigation measures.

DATED at the City of Vancouver, in the Province of British Columbia, this 30th day of November 2020.

*Original signed by:*_____
R. I. Mason
Panel Chair / Commissioner

*Original signed by:*_____
W. M. Everett, QC
Commissioner

*Original signed by*_____
T. A. Loski
Commissioner

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ORDER NUMBER
C-4-20

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

FortisBC Inc.
Application for a Certificate of Public Convenience and Necessity for the
Kelowna Bulk Transformer Addition Project

BEFORE:
R. I. Mason, Panel Chair
W. M. Everett, QC, Commissioner
T. A. Loski, Commissioner

on November 30, 2020

ORDER

WHEREAS:

A. On April 24, 2020, pursuant to sections 45 and 46 of the *Utilities Commission Act* (UCA), FortisBC Inc. (FBC) filed an application with the British Columbia Utilities Commission (BCUC) for a Certificate of Public Convenience and Necessity (CPCN) for the Kelowna Bulk Transformer Addition Project (Project) (Application);

B. The Project comprises the following:

- The installation of a new 120/160/200 MVA 230/138 kV bulk transformer at the F.A. Lee Terminal Station (Lee Terminal Station);
- The required substation modifications, including the reconfiguration of the 238 kV bus to a ring bus configuration, inside the Lee Terminal Station;
- Re-alignment of some existing transmission structures outside of the Lee Terminal Station; and
- Removal of the existing distribution egress within the station and re-alignment of distribution lines outside the Lee Terminal Station;

C. By Order G-107-20, dated May 5, 2020, the BCUC established a regulatory timetable for the review of the Application, which consisted of intervener registration, two rounds of information requests and final and reply arguments;

D. FBC and Intervener final arguments were received on September 3, 2020 and September 17, 2020, respectively. FBC submitted its reply argument on September 29, 2020; and

E. The BCUC has considered the Application, evidence and submissions from all parties and finds that public convenience and necessity require that the Project proceed and the following determinations to be warranted.

NOW THEREFORE the BCUC orders as follows:

1. Pursuant to sections 45 and 46 of the UCA, a CPCN is granted to FBC for the Project, authorizing the following:

   (a) The installation of a new 120/160/200 MVA 230/138 kV bulk transformer at the F.A. Lee Terminal Station;

   (b) The required substation modifications, including the reconfiguration of the 238 kV bus to a ring bus configuration, inside the F.A. Lee Terminal Station;

   (c) Re-alignment of some existing transmission structures outside of the F.A. Lee Terminal Station; and

   (d) Removal of the existing distribution egress within the station and re-alignment of distribution lines outside the F. A. Lee Terminal Station.

2. FBC is directed to provide the following reports:

   1. Material Change Reports:

      - A material change is a change in FBC's plan for the Project that would reasonably be expected to have a significant impact on the schedule, cost or scope, such that:
        - The Project schedule and/or the in-service date is delayed by 3 months or longer;
        - The total Project costs exceeds 10 percent of the estimated Project cost provided in Table 6-1 of the Application; and
        - There is a change to the Project scope provided in section 5 of the Application.
      - In the event of a material change, FBC must file a material change report with the BCUC explaining the reasons for the material change, FBC's consideration of the Project risk and the options available, and actions FBC is taking to address the material change FBC must file the material change report as soon as practicable and in any event within 30 days of the date on which the material change occurs.

   2. Final Report:

      - A Final Report is to be filed within three months of substantial completion of the Project. The report is to include:
        - the final cost of the transformer;
        - a complete breakdown of the final costs of installation;
        - a comparison of these costs to the estimates provided in this Application;
        - an explanation of all material cost variances for any of the cost items provided in Table 6-1 of the Application that exceed 10 percent;
        - details of any further consultation conducted, any issues raised, and measures undertaken by FBC to resolve the identified issues; and

- the results of its noise measurement study and any mitigation measures.

DATED at the City of Vancouver, in the Province of British Columbia, this 30th day of November 2020.

BY ORDER

Original signed by:

R. I. Mason
Commissioner

FortisBC Inc.
Application for a Certificate of Public Convenience and Necessity for the Kelowna Bulk Transformer Addition Project

Glossary of Terms

Acronym	**Description**
AFDUC	Allowance for funds used during construction
BC Hydro	British Columbia Hydro and Power Authority
BCOAPO	British Columbia Old Age Pensioners' Organization *et. al*
BLK	Black Lake station
CEC	Commercial Energy Consumers Association of British Columbia
CPCN	Certificate of Public Convenience and Necessity
DGB	DG Bell Terminal Station
DR	Demand Response
DUC	Duck Lake station
EMF	Electromagnetic fields
FBC	FortisBC Inc.
ICG	Industrial Customers Group
IR	Information Request
KBTA Project or the Project	Kelowna Bulk Transformer Addition Project
kWh	Kilowatt hours
kV	Kilovolt
LTERP	Long Term Electric Resource Plan
LEE	F.A. Lee Terminal Station
Multi-Year Rate Plan	FortisBC Multi-Year Rate Plan Application for 2020 to 2024
MVA	Mega Volt Amp
MW	Megawatts

N-0	Normal Operation
N-1	Single-contingency Operation
O&M	Operation and maintenance
Plan	Exposure Control Plan
PV	Present value
T3	Transformer 3 at LEE
T4	Transformer 4 at LEE
TOU	Time of use
TRCA	Tower Ranch Community Association
UCA	*Utilities Commission Act*

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

FortisBC Inc.
Application for a Certificate of Public Convenience and Necessity
for the Kelowna Bulk Transformer Addition Project

EXHIBIT LIST

Exhibit No.	Description
COMMISSION DOCUMENTS	
A-1	Letter dated April 27, 2020 – Appointing the Panel for the review of FortisBC Inc.'s Application for a Certificate of Public Convenience and Necessity for the Kelowna Bulk Transformer Addition Project
A-2	Letter dated May 5, 2020 – BCUC Order G-107-20 establishing a regulatory timetable and public notice
A-3	Letter dated June 18, 2020 – BCUC Information Request No. 1 to FBC
A-4	**CONFIDENTIAL** – Letter dated June 18, 2020 – BCUC Confidential Information Request No. 1 to FBC
A-5	Letter dated July 30, 2020 – BCUC Information Request No. 2 to FBC
A-6	**CONFIDENTIAL** – Letter dated July 30, 2020 – BCUC Confidential Information Request No. 2 to FBC
A-7	Letter dated August 27, 2020 – BCUC Requesting FBC for further information

APPLICANT DOCUMENTS

B-1	**FORTISBC INC (FBC)** – Letter dated April 24, 2020 - Application for a Certificate of Public Convenience and Necessity (CPCN) for the Kelowna Bulk Transformer Addition Project
B-1-1	**CONFIDENTIAL** – Letter dated April 24, 2020, - FBC Submitting Confidential Appendices A, B, C
B-2	Letter dated July 9, 2020, - FBC Submitting response to BCUC Information Request No. 1
B-2-1	**CONFIDENTIAL** - Letter dated July 9, 2020, - FBC Submitting confidential attachment 6.7 to BCUC Information Request No. 1
B-2-1-1	Letter dated August 20, 2020, - FBC Submitting Replacement response to BCUC Information Request No. 1 Question 4.4
B-2-2	**CONFIDENTIAL** - Letter dated July 9, 2020, - FBC Submitting confidential response to BCUC Information Request No. 1
B-3	Letter dated July 9, 2020, - FBC Submitting response to BCOAPO Information Request No. 1
B-4	Letter dated July 9, 2020, - FBC Submitting response to CEC Information Request No. 1
B-4-1	**CONFIDENTIAL** - Letter dated July 9, 2020, - FBC Submitting confidential response to CEC Information Request No. 1 Question 17.2
B-4-2	**CONFIDENTIAL** - Letter dated July 9, 2020, - FBC Submitting confidential response to CEC Information Request No. 1
B-5	Letter dated July 9, 2020, - FBC Submitting response to ICG Information Request No. 1
B-5-1	**CONFIDENTIAL -** Letter dated July 9, 2020, - FBC Submitting confidential attachment to ICG Information Request No. 1
B-6	Letter dated July 9, 2020, - FBC Submitting response to TRCA Information Request No. 1
B-7	Letter dated August 20, 2020, - FBC Submitting response to BCUC Information Request No. 2
B-7-1	Letter dated September 3, 2020, - FBC Submitting further response to BCUC Information Request No. 2, Question 44
B-7-2	Letter dated September 18, 2020, - FBC Submitting updated response to BCUC Information Request No. 2, Question 44
B-8	**CONFIDENTIAL -** Letter dated August 20, 2020, - FBC Submitting confidential responses to BCUC Confidential Information Request No. 2
B-8-1	Letter dated August 20, 2020, - FBC Submitting non-confidential response to BCUC Confidential Information Request No. 2, Questions 10.1 through 10.4

B-9	Letter dated August 20, 2020, - FBC Submitting response to BCOAPO Information Request No. 2
B-10	Letter dated August 20, 2020, - FBC Submitting response to CEC Information Request No. 2
B-11	Letter dated August 20, 2020, - FBC Submitting response to ICG Information Request No. 2
B-11-1	**CONFIDENTIAL** - Letter dated August 20, 2020, - FBC Submitting confidential responses to ICG Confidential Information Request No. 2

INTERVENER DOCUMENTS

C1-1	**BRITISH COLUMBIA OLD AGE PENSIONERS' ORGANIZATION ET AL. (BCOAPO) –** Letter dated June 11, 2020 Request to Intervene by Leigha Worth and Irina Mis
C1-2	Letter dated June 25, 2020 – BCOAPO Information Request No. 1 to FBC
C1-3	Letter dated July 30, 2020 – BCOAPO Submitting Information Request No. 2 to FBC
C2-1	**COMMERCIAL ENERGY CONSUMERS ASSOCIATION OF BRITISH COLUMBIA (CEC)** – Letter dated June 11, 2020 Request to Intervene by Christopher Weafer
C2-2	Letter dated June 22, 2020 - CEC Submitting Confidentiality Undertaking for David Craig
C2-3	Letter dated June 22, 2020 - CEC Submitting Confidentiality Undertaking for Janet L. Rhodes
C2-4	Letter dated June 25, 2020 – CEC Information Request No. 1 to FBC
C2-5	**CONFIDENTIAL** – Letter dated June 25, 2020 – CEC Confidential Information Request No. 1 to FBC
C2-6	Letter dated July 30, 2020 – CEC Submitting Information Request No. 2 to FBC
C3-1	**INDUSTRIAL CUSTOMERS GROUP (ICG)** – Letter dated June 12, 2020 Request to Intervener by Robert Hobbs
C3-2	Letter dated June 17, 2020 - ICG Submitting Confidentiality Undertaking for Robert Hobbs
C3-3	Letter dated June 17, 2020 - ICG Submitting Confidentiality Undertaking for Elroy Switlishoff
C3-4	Letter dated June 25, 2020 – ICG Information Request No. 1 to FBC
C3-5	Letter dated July 30, 2020 – ICG Submitting Information Request No. 2 to FBC
C3-6	**CONFIDENTIAL** - ICG Submitting Confidential Information Request No. 2 to FBC

C4-1 **TOWER RANCH COMMUNITY ASSOCIATION (TRCA)** – Letter dated June 12, 2020 Request to Intervene by Larry Bray

C4-2 Letter dated June 23, 2020 – TRCA Information Request No. 1 to FBC

INTERESTED PARTY DOCUMENTS

D-1

LETTERS OF COMMENT

E-1 Owen, E. – Letter of Comment dated June 12, 2020

E-2 Hayduk, M. – Letter of Comment dated June 15, 2020