November 10, 2017

VIA E-FILING

Patrick Wruck
Commission Secretary
BC Utilities Commission
6th Floor 900 Howe Street
Vancouver, BC V6Z 2N3

BCPIAC
Public Interest Advocacy Centre

Reply to: Kate Feeney
kfeeney@bcpiac.com
Ph: 604-687-3017

Our File: 7605

Dear Patrick Wruck:

Re: FortisBC Inc. 2016 Long Term Electric Resource Plan (LTERP) and Long Term Demand Side Management Plan (LT DSM Plan) ~ Project No.3698896

1. We make the submissions below on behalf of our clients, the British Columbia Old Age Pensioners' Organization, Disability Alliance BC, Council of Senior Citizens' Organizations of BC, and the Tenant Resource and Advisory Centre, known collectively in regulatory processes as "BCOAPO *et al*." The constituent groups of BCOAPO *et al.* represent the interests of low and fixed income energy consumers in BC and, more specifically in this process, the interests of FortisBC's (FBC) low and fixed income residential ratepayers.

2. In sum, BCOAPO recommends that the Commission accept the 2016 LTERP, including the LTDSM Plan, as being in the public interest pursuant to section 44.1(6) of the *Utilities Commission Act* (*UCA*). [1]

INTRODUCTION

3. On November 30, 2016, FortisBC Inc. ("FBC") submitted its 2016 Long Term Energy Resource Plan (LTERP) and Long Term DSM (LTDSM) Plan to the Commission for its review. Subsequently, on September 15, 2017, the Company filed material which

[1] Exhibit B-1, page 14

corrected errors that existed in the Conservation Potential Review supporting the two plans.[2]

4. This filing was made in accordance with Section 44.1(2) of the *UCA*, which requires that a public utility must file with the commission, in the form and at the times the commission requires, a long-term resource plan including all of the following:

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

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

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

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

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

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

    (g) any other information required by the commission.

5. FBC is requesting that the Commission accept the 2016 LTERP, including the LTDSM Plan, as being in the public interest pursuant to section 44.1(6) of the *UCA*.[3]

REQUIREMENTS FOR ACCEPTANCE

Legislative

6. Pursuant to Section 44.1(6) of the *UCA*, the Commission must determine whether carrying out the long-term resource plan is in the public interest. In doing so, the Commission must consider:[4]

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

[2] Exhibit B-1-1
[3] Exhibit B-1, page 14
[4] *UCA*, section 44.1(8)

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

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

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

7. British Columbia's energy objectives are set out in Section 2 of the *Clean Energy Act* (*CEA*) and summarized in Table 1-3 of FBC's 2016 LTERP. While some of the energy objectives and requirements set out in the *CEA* are specific to BC Hydro,[5] the various provisions represent considerations for FBC when developing its LTERP and for the Commission when reviewing the 2016 LTERP and determining whether it is in the public interest.

8. The *UCA* makes reference to "adequate" and "cost-effective" demand-side management (DSM) measures. These requirements are set out in the *Demand Side Management Regulation* (the "*DSM Regulation*"), wherein an "adequate" plan is defined as including:[6]

a) a demand-side measure intended specifically to assist residents of low-income households to reduce their energy consumption;

b) a demand-side measure intended specifically to improve the energy efficiency of rental accommodations;

c) an education program for students enrolled in schools in the public utility's service area; and

d) an education program for students enrolled in post-secondary institutions in the public utility's service area.

9. The *DSM Regulation* defines "cost effective" as based on the Total Resource Cost Test and, in the case of FBC, representing the Company's long-run marginal cost of acquiring electricity generated from clean or renewable resources in British Columbia. [7]

[5] For example, i) DSM reducing the demand for electricity by 66% by 2020, ii) self-sufficiency by 2016 and iii) meeting the prescribed 93% target for clean energy

[6] DSM Regulation, BC Reg 326/2008, Section 3. This regulation was subsequently amended after the 2016 LTERP was submitted per BC Reg 117/2017.

[7] DSM Regulation, Section 4

10. In its Final Argument, FBC notes that the most recent amendments to the *DSM Regulation* became effective in March 2017, well after the 2016 LTERP was submitted. It therefore submits that the Commission's review of the 2016 LTERP should be based on the pre-amendment version.[8] BCOAPO agrees with FBC's position.

BCUC Resource Planning Guidelines

11. The Commission has established the Resource Planning Guidelines, which outline a process to assist utilities in developing their resource plans.[9] Key elements of the process include:

    i. Establishing the objectives of the resource plan;

    ii. Developing a pre –DSM demand forecast;

    iii. Identifying supply and demand resources;

    iv. Developing multiple resource portfolios;

    v. Evaluation and selection of resource portfolios; and

    vi. Development of a four-year action plan and contingency plans.

FBC's Resource Planning Objectives

12. In the 2016 LTERP, FBC set out its planning objectives as: [10]

    - Ensure cost-effective, secure and reliable power for customers;
    - Provide cost-effective demand side management; and
    - Ensure consistency with provincial energy objectives.

13. In response to BCUC 2.1, FBC explained how these objectives align with the BCUC Resource Planning Guidelines and the objectives used in its previous (2012) Long Term Resource Plan. FBC has also confirmed that its definition of "cost-effective" uses the Total Resource Cost perspective, which is consistent with the *UCA* requirements. [11]

[8] Paragraphs 22-27
[9] Exhibit B-1, page 11
[10] Exhibit b-1, page 5
[11] BCOAPO 1.1

14. BCOAPO agrees that FBC's planning objectives are appropriate and reflect the broader applicable legislative requirements.

LONG TERM LOAD FORECAST

15. Tab 3 of the 2016 LTERP sets out FBC's (pre-DSM) long term load forecast through to 2035, in conformance with the BCUC's Resource Planning Guidelines and *UCA* section 44.1 (2) (a). The load forecast is composed of separate forecasts for each of the residential, commercial, industrial, wholesale, irrigation and lighting classes. The forecasts are primarily developed using econometric models and key load drivers for each sector. However, in some sectors a customer survey is used.[12]

Residential

16. The Residential forecast is based on forecast customer count (which is determined as a function of population growth) and the forecast use per customer (UPC). The forecast also accounts for future impacts (savings) due to general rate increases, the residential conservation rate, the introduction of the customer information portal, and AMI. The first three items all reduce the load forecast, whereas AMI increases the load forecast due to theft deterrence. The following table sets out the various components of the forecast[13].

Table 1: Residential Schedule

Loads (MWh)	A	B	C = A * B	D	E	F	G	F = C - D - E - F - G
Year	UPC Before-Savings	Average Customer Count	Before-savings Load	Residential Rate Driven Savings	RCR Savings	CIP Savings	AMI Savings	Residential After-savings Load
2016	11.80	114,623	1,352,649	1,163	4,118	-	(3,810)	1,351,178
2017	11.80	115,555	1,363,653	1,173	5,871	2,046	(8,836)	1,363,400
2018	11.80	116,503	1,374,838	1,182	5,871	4,125	(12,988)	1,376,648
2019	11.80	117,449	1,385,995	1,192	5,871	4,158	(16,465)	1,391,238
2020	11.80	118,399	1,397,213	1,202	5,872	4,192	(19,423)	1,405,370
2021	11.80	119,356	1,408,500	1,211	5,871	4,226	(21,113)	1,418,305
2022	11.80	120,317	1,419,842	1,221	5,871	4,260	(22,206)	1,430,696
2023	11.80	121,272	1,431,113	1,231	5,871	4,293	(23,309)	1,443,027
2024	11.80	122,207	1,442,149	1,240	5,871	4,326	(24,424)	1,455,135
2025	11.80	123,129	1,453,032	1,250	5,871	4,359	(25,550)	1,467,102
2026	11.80	124,041	1,463,793	1,259	5,871	4,391	(26,687)	1,478,959
2027	11.80	124,935	1,474,336	1,268	5,871	4,423	(27,835)	1,490,609
2028	11.80	125,808	1,484,644	1,277	5,871	4,454	(28,995)	1,502,037
2029	11.80	126,660	1,494,702	1,285	5,871	4,484	(30,167)	1,513,228
2030	11.80	127,488	1,504,464	1,294	5,871	4,513	(31,350)	1,524,136
2031	11.80	128,292	1,513,965	1,302	5,871	4,542	(32,545)	1,534,785
2032	11.80	129,077	1,523,214	1,310	5,871	4,570	(33,752)	1,545,216
2033	11.80	129,839	1,532,215	1,318	5,871	4,597	(34,972)	1,555,401
2034	11.80	130,579	1,540,947	1,325	5,871	4,623	(36,203)	1,565,331
2035	11.80	131,293	1,549,373	1,332	5,871	4,648	(37,447)	1,574,968

[12] Exhibit B-1, page 56
[13] BCOAPO 14.4

17. The UPC of 11.8 MWh per customer is based on the average of the (weather) normalized values for 2013-2015.[14] Assuming the averaged UPC captures the historical impact of general rate increases and the residential conservation rate, it is not clear why the impacts in 2016 are as high as assumed in the forecast.[15] However, any adjustment would have only a small impact on the overall forecast and not be material for planning purposes.

18. One change in the forecast methodology that appears to be material is the use of only five years of data to estimate the econometric equation used to forecast customer count.[16] In comparison, the Residential load forecast used in the 2012 LTRP used 20 years of data. However, FBC has explained that using a model based on 5 years of data produced more realistic result than one based on 10 or 20 years.[17]

19. Overall, BCOAPO considers FBC's Residential load forecast to be reasonable for purposes of the 2016 LTERP.

Commercial

20. The Commercial load forecast is based on a regression analysis that uses provincial GDP as the explanatory variable. It was noted during the interrogatory process that the equation used to forecast commercial load changed materially from that used in the 2012 LTRP.[18] However, FBC states that it has no concerns with its methodology, as the new equation shows a very strong statistical significance.[19]

21. Overall, BCOPAO considers FBC's Commercial load forecast to be reasonable for purposes of the 2016 LTERP.

Industrial

22. The Industrial load forecast is based for the first five years on survey data. In the longer term, the composite GDP growth rates of the industrial sectors are used to escalate the total industrial load.[20] The industrial load forecast in the 2016 LTERP is materially higher than in the 2012 LTRP due to the addition of six new industrial

[14] Exhibit B-1, Appendix E, page 8
[15] It appears that the RCR savings are incremental savings since 2012 – Exhibit B-1, Appendix E, page 2
[16] BCOAPO 66.3
[17] BCOPAO 66.1
[18] BCOPOA 15.1 and 67.1
[19] Exhibit B-1, Appendix E, page 9
[20] Exhibit B-1, page 13 and BCOAPO 17.5 & 17.6

customers and a higher forecast GDP growth. A comparison of the two forecasts is set out below.[21]

Table 1: Industrial Load (GWh)

	A	B	C	D	E = B - D for actual E = C - D for forecast
Year	2012 LTRP Industrial Forecast Load w/o CoK	Actual Industrial Load with CoK	2016 LTERP Industrial Forecast Load with CoK	CoK Actual and Forecast	2016 LTERP Industrial Actual and Forecast Load w/o CoK
2012	253.4	364.2		72.9	291.3
2013	261.1	383.5		81.0	302.5
2014	266.5	380.9		59.4	321.5
2015	268.6	381.3		52.9	328.4
2016	258.8	382.9	394.4	55.5	338.9
2017	250.7		410.7	55.7	354.9
2018	246.3		412.2	55.7	356.5
2019	243.0		416.1	56.1	360.0
2020	242.5		419.2	56.4	362.8
2021	243.9		425.5	57.2	368.3
2022	245.7		431.6	58.1	373.5
2023	247.5		438.4	59.0	379.4
2024	249.7		445.0	59.9	385.1
2025	251.9		451.8	60.8	391.0
2026	254.1		459.2	61.8	397.4
2027	256.4		465.9	62.7	403.2
2028	258.7		473.0	63.6	409.4
2029	261.0		480.1	64.6	415.5
2030	263.4		486.0	65.4	420.6
2031	265.8		492.7	66.3	426.4
2032	268.2		500.4	67.3	433.1
2033	270.6		508.2	68.4	439.9
2034	273.1		516.0	69.4	446.6
2035	275.6		523.8	70.5	453.4

23. FBC notes that its forecast long-term growth rate for industrial load (1.5%) is very similar to 1.3% growth rate BC Hydro forecast in its latest integrated resource plan.[22]

24. BCOAPO considers FBC's Industrial load forecast to be reasonable for the purposes of the 2016 LTERP.

Wholesale

25. The Wholesale forecast load is based for the first five years on surveys of the six wholesale customers. After that, the five-year growth rates for the individual customers are weighted by size and the results are used to forecast load for the balance of the period.[23] The overall results are similar to those from the 2012 LTRP as can be seen from the following table.[24]

[21] BCOAPO 17.1
[22] CECn8.2
[23] Exhibit B-1, Appendix E, page 11 and BCOAPO 16.2
[24] BCOAPO 16.1

Table 1: Wholesale Load (GWh)

	A	B	C = A - B	D	E
Year	2012 LTRP Wholesale Forecast Load	2012 LTRP CoK Forecast Load	2012 LTRP Wholesale Forecast Load w/o CoK	Actual Wholesale Load w/o CoK	2016 LTERP Wholesale Forecast Load w/o CoK
2012	925.8	332.6	593.1	565.8	
2013	935.4	333.5	601.9	578.1	
2014	942.7	334.3	608.4	571.9	
2015	948.0	334.9	613.1	561.7	
2016	950.6	335.4	615.2	547.6	588.1
2017	953.8	336.3	617.5		589.1
2018	959.0	337.6	621.4		592.4
2019	963.1	339.0	624.1		597.2
2020	966.2	340.4	625.8		602.3
2021	969.8	341.8	628.0		605.9
2022	973.3	343.3	630.1		609.5
2023	975.8	344.7	631.1		613.2
2024	979.3	346.2	633.1		616.8
2025	982.7	347.8	634.9		620.5
2026	986.1	349.4	636.7		624.3
2027	990.0	351.1	639.0		628.0
2028	993.8	352.7	641.1		631.8
2029	998.2	354.5	643.7		635.6
2030	1,002.5	356.3	646.3		639.4
2031	1,005.0	358.0	646.9		643.2
2032	1,008.6	359.8	648.7		647.0
2033	1,012.2	361.7	650.5		650.9
2034	1,015.7	363.6	652.2		654.8
2035	1,019.3	365.5	653.9		658.8

26. During the interrogatory process, FBC was asked about consistent over-forecasting by five out of the six wholesale customers. FBC admitted that it had not tested to determine if there was a statistical bias in the forecasts received or examined the reasons for the variance. However, it noted that based on standard statistical tests, the prediction accuracy was acceptable.[25]

27. Overall, BCOAPO considers FBC's Wholesale load forecast to be reasonable for the purposes of the 2016 LTERP.

Irrigation and Lighting

28. FBC forecasts that Irrigation and Lighting loads will remain constant at levels equivalent to the average load over the last 5 years.[26] In the case of Irrigation, FBC has analyzed the class's historic use data and determined that there is no

[25] BCOAPO 57.1
[26] Exhibit B-1, Appendix E, page 14-15

statistically significant trend.[27] In the case of Lighting, the historic load has also been relatively flat.[28]

29. BCOAPO considers the Irrigation and Lighting load forecasts to be reasonable for purposes of the 2016 LTERP.

Losses

30. Losses are assumed to be 8% of Gross Load prior to the impact of AMI.[29] Taking into account the impact of AMI, losses decrease to 7.6% of Gross Load in 2035.[30]

31. BCOAPO takes no issue with FBC's assumed loss factors over the forecast period.

Conclusion

32. Overall, FBC load forecast is reasonable for the purposes of Section 44.1(2) (a) of the *UCA* and the 2016 LTERP.

EXISTING RESOURCES AND LOAD RESOURCE BALANCE

33. While not explicitly noted in the *UCA* nor the BCUC's Resource Planning Guidelines, the starting point for determining the resources required to meet the load forecast is an understanding of a utility's existing resources that will be in place for the planning horizon.[31]

34. Section 5 of the 2016 LTERP provides a description of FBC's existing resources. These consist of the following:[32]

Table 5-1: FBC's 2016 Available[78] Energy and Capacity Resources

FBC Existing Resources (2016)	Available Energy (GWh)	Available Capacity (MW)
FBC-Owned Generation	1,595	208
BPPA	917	138
BRX	79	39
PPA Tranche 1 Energy	1,041	-
PPA Tranche 2 Energy	711	-
PPA Capacity	-	200
WAX CAPA (net of RCA)	-	218
IPP	3	5
Market and Other Contracts	241	0
Total	4,588	808

[27] BCOAPO 18.1
[28] Exhibit B-1, Appendix E, page 15
[29] Exhibit B-1, Appendix E, page 16.
[30] Based on Exhibit B-1, Appendix F, Tables 2.1 and 2.9
[31] Including DSM
[32] Exhibit B-1, page 74

35. For purposes of the 2016 LTERP, which covers a planning horizon to 2035, FBC has assumed that:

    - The CPA will be continued indefinitely in its current form;[33]
    - The PPA with BC Hydro will be renewed when it expires in 2033;[34] and
    - The Brilliant Expansion contract will be extended to 2027 and then discontinued.[35]

36. As FBC has completed an Upgrade and Life Extension Program on the majority of its own generation units, it is assumed that those units will be available throughout the planning horizon. Further, FBC plans, subject to Commission approval, to refurbish its remaining generation units in the 2017 to 2020 timeframe.[36]

37. Section 7 of the LTERP identifies the "gap" between existing resources and the load forecast. If PPA Tranche 2 energy is excluded, then an imbalance on the energy side emerges in 2019.[37] However, if PPA Tranche 2 energy is included, the gap does not emerge until 2026.[38] The reason the 2016 LTERP identifies the distinction is that the portfolio analysis undertaken in the 2016 LTERP indicates that there are more cost-effective resources than PPA Tranche 2 energy to meet the load forecast.[39]

38. In BCOAPO's view, this distinction is important as the objective of the "plan" is to not just have sufficient resources in place to meet load requirements, but to do so in a cost-effective manner. This means substituting new/alternative resources for existing available resources if the substitution leads to improved result when considered in terms of the planning objectives.

39. On the capacity side, gaps between demand and supply emerge starting in 2028 and grow to roughly 100 MW by the end of the planning horizon[40].

40. Overall, BCOAPO submits that FBC's 2016 LTERP presents a reasonable outlook for the load resource balance over the planning period.

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[33] Exhibit B-1, page 75
[34] Exhibit B-1, page 78
[35] Exhibit B-1, page 93
[36] Exhibt B-1, page 76
[37] Exhibit B-1, page 93
[38] BCUC 24.2
[39] BCUC 24.1
[40] Exhibit B-1, page 94

LONG TERM DSM PLAN

41. *UCA* Section 44.1(b) requires that FBC provide as part of its long term resource plan "a plan of how the public utility intends to reduce the demand referred to in paragraph (a) by taking cost-effective demand-side measures." As a first step in doing this, it is necessary for FBC to establish "the Company's long-run marginal cost of acquiring electricity generated from clean or renewable resources in British Columbia" as this (per the *DSM Regulation*) is the measure to be used for determining cost-effective demand side measures.

LRMC For Cost-Effective DSM Measures

42. FBC has established this LRMC by first identifying the various resource options available and their various attributes, including cost and whether they are considered clean or renewable. The results are summarized in Tables 8-3 and 8-4 of the 2016 LTERP. Clean or renewable options include:[41]

- BC Hydro PPA Tranche 1 and Tranche 2;
- Wood-Based Biomass;
- Biogas;
- Similkameen Hydro Project;
- Pumped Hydro Storage;
- Onshore Wind;
- Run-of-River Hydro; and
- Solar

43. FBC has represented its cost of acquiring electricity generated from clean or renewable resources in Portfolio B1, as described in Section 9.3.1 of the 2016 LTERP.[42] Portfolio B1 includes wind, biomass, biogas, and run-of-river resources, as well as market purchases out to 2025. The overall LRMC of the portfolio is $100.45/MWh, with contribution of each of the resources being as follows[43]:

[41] Exhibit B-1, page 108
[42] BCUC 34.1
[43] BCUC 76.2

Table 1: Portfolio B1 Components

	Weighting	$ per MWh	Weighted Average Cost ($ per MWh)
DSM	0.00%	$0.00	$0.00
PPA	29.98%	$58.72	$17.60
New Resources	57.51%	$126.17[8]	$72.56
Market	12.63%	$60.13	$7.59
Surplus Sales	0.44%	N/A[9]	$2.69
		LRMC	**$100.45**

44. BCOAPO notes that FBC has calculated the LRMC for this portfolio and the other portfolios based on an "average incremental cost approach." Under this approach, the present value of the incremental costs expected to be incurred over the planning horizon are divided by the present value of the additional load expected to be served within the same period.[44] As a result, it expresses the LRMC as the average cost of satisfying the incremental load requirements over the planning horizon. This definition is important to understand when using the value to assess various DSM scenarios.

45. An important issue is that Portfolio B1 includes market purchases for the years up to 2025.

46. First, while FBC believes that the majority of its market purchases come from clean sources, it acknowledges that it is difficult to know the ultimate source of every market purchase.[45] Based on historical data, FBC assumes that market purchases contain 0.19 CO2e ton/MWh.[46]

47. Second, the *DSM Regulation* specifies that the TRC test is to be based on FBC's long-run marginal cost of acquiring electricity generated from clean or renewable resources in British Columbia.[47] If market purchases were excluded from Portfolio B1, then the LRMC would rise to $106/MWh[48].

48. For these reasons, BCOAPO submits that the appropriate long run marginal cost for determining "cost-effective" DSM measures as $106/MWh, based on the exclusion of market purchases from the calculation.

Preferred DSM Scenario

49. In order to determine the appropriate amount of DSM to include in the 2016 LTERP, FBC designed four different DSM scenarios, each to offset a different proportion of

[44] Exhibit B-1, page 118
[45] BCUC 17.1.1
[46] BCUC 17.1
[47] Section 4 (1.1)(b)(i)
[48] BCUC 76.2.2

FBC's load growth. This approach aligns with the BC Energy Plan and the *CEA*, which express DSM targets as a load growth offset. The four offset scenarios were:[49]

i. Low DSM – Offsetting 50% of 2018-2035 load growth, similar to the target used in the 2012 LTRP.

ii. Base DSM – Offsetting 66% of load growth, reflecting the same level of target savings as in the Company's approved 2016 DSM Plan and its 2017 DSM Plan filing.

iii. High DSM – Represents the mid-point between the Base and Max scenario and offsets 77% of load growth over the period.

iv. Max DSM –Ramps up DSM to 100% offset, such that over the period, the overall DSM offset is 89%.

50. The measures included in each DSM scenario were drawn from Navigant Consulting's BC Conservation Potential Review (CPR). Since the reported CPR results addressed only technical economic potential, an assumption was made that 85% of the economic potential was achievable.[50] For each scenario, FBC used a portfolio of the most cost-effective DSM measures.[51] The results are summarized below:[52]

	DSM Scenario			
Category	**Low**	**Base**	**High**	**Max**
Resource Cost ($2016/MWh)				
Average cost, incl. program costs	$42	$52	$58	$64
Incremental cost, incl. program costs	$42	$86	$98	$108

51. In considering the results, it is important to note that the incremental cost represents the average cost of additional DSM measures in a DSM scenario relative to the preceding DSM scenario (e.g. the $98/MWh represents the average cost of the additional DSM measures in the High scenario versus the Base scenario.[53]) In contrast, the average cost represents the average cost of all DSM measures included in the scenario.

[49] Exhibit B-1, Volume 2, page 11
[50] BCUC 41.4
[51] BCUC 41.2
[52] BCUC 35.2 (corrected)
[53] BCOAPO 4.2

52. For purposes of considering the cost-effectiveness of each scenario,[54] FBC compared the incremental cost of each scenario to the $100/MWh LRMC for BC "clean" resources previously calculated.

53. FBC was asked why it used the incremental cost in such comparisons and responded: [55]

> *FBC believes presenting the incremental costs of each DSM portfolio clearly illustrates the increased cost, i.e. declining economics, of obtaining higher load growth offsets. Use of average TRC has the effect of blending lower and higher cost resources and thereby obscuring the marginal measures that likely should not be pursued.*

54. BCOAPO agrees that the incremental cost provides insight into the costs of the additional DSM measures being added to each subsequent scenario. However, comparing the incremental cost of the additional DSM measures in each scenario to the average avoided cost of Portfolio B1 is problematic, as the two "cost" definitions are fundamentally different. Indeed, a review of the "clean" resources included in Portfolio B1 indicates that the incremental cost of new resources is in excess of $125/MWh. This suggests that the incremental resources required in Portfolio B1 cost more than the incremental DSM resources required for the Max DSM scenario.

55. In BCOAPO's view, if FBC wishes to use the average LRMC for Portfolio B1 as the basis for comparison, then it should compare the average LRMC for Portfolio B1 to the average cost of each DSM scenario (including programing costs). On this basis, the Max DSM scenario would also be cost-effective.

56. Having said this, BCOAPO agrees with FBC that the Company is not required to include all cost–effective DSM in its LTDSM Plan or its LTERP.[56] In such circumstances, what is required is an explanation of why additional cost-effective DSM was not included.[57] FBC has included in both the 2016 LTERP[58] and its LTDSM Plan[59] explanations as to why the High DSM scenario is appropriate and preferred to the Max DSM scenario. The reasons[60] offered included consideration of:

- Rate/bill impacts

[54] BCUC 42.2
[55] BCUC 35.2.1
[56] Final Argument, paragraphs 127-132
[57] UCA, section 44.1 (2) (f)
[58] Section 8.1.3
[59] Section 3.2
[60] Additional explanations were also provided in BCUC 39.3 & 48.1 - 48.3 and BCSEA 11.1 & 11.3

- The voluntary nature of DSM participation
- The non-dispatchable nature of DSM savings
- The need to transition from the lower levels of current DSM activity (e.g., increase customer awareness, build market capacity).

57. In terms of the "adequacy" of the proposed LTDSM Plan (per UCA, section 44.1(8)(c)), the proposed plan includes measures that address the required areas, namely rental and low income customers, education (elementary and secondary) and post-secondary schools.[61]

58. Taking these factors into account, BCOAPO agrees with FBC that the High DSM scenario is an appropriate basis for its LT DSM Plan and the 2016 LTREP.

PREFERRED PORTFOLIO (A4)

59. After allowing for the High DSM scenario, there are slight gaps in the energy balance starting in 2024 (assuming no use of the high cost PPA Tranche 2 energy) and there are no gaps with respect to the capacity balance (assuming the PPA is renewed in 2033).[62]

60. FBC assessed different portfolios of supply options to meet its load-resource balance. The portfolios were designed to meet both energy and capacity gaps on a monthly and annual basis. They were also designed to produce the lowest cost means of satisfying the forecast cast load requirements given a set of constraints.[63] In the case of DSM, the total resource cost was used so as to take into account cost impacts to both the utility and the customer.[64] The following table outlines the various constraints considered in the portfolio analysis.[65]

[61] Exhibit B-1, Volume 2, pages 17, 19 and 23
[62] Exhibit B-1, pages 101-102
[63] Exhibit B-1, pages 115-117 and CEC 23.2
[64] BCUC 48.1
[65] Exhibit B-1, page 116

Table 9-1: Portfolio Analysis Base Characteristics and Sensitivity Cases

Portfolio Base Characteristics	Sensitivity Cases
DSM Level • Proposed High level	• No DSM • Max DSM • Low DSM
Reliance on Market Purchases • Self-sufficiency by 2025	• No self-sufficiency • Self-sufficiency by 2020 • High market and carbon prices
Percent Clean or Renewable • 93 percent clean or renewable	• 100 percent clean or renewable • High market and carbon prices
Load Requirements • Reference case load forecast	• High load scenario • Low load scenario
PPA Renewal • PPA renewed in 2033	• PPA not renewed

Self-Sufficiency

61. FBC has noted that there are risks associated with relying on market access and market purchases for supply over the long term. These risks are associated with: i) uncertainty as to long-term access to the necessary transmission to the US border and within the US itself;[66] and ii) future prices.[67]

62. Due to these risks, FBC does not believe that market supply can be relied on as a long-term planning resource and has proposed, for planning purposes, that a self-sufficiency date of 2025 be used.[68]

63. BCOAPO notes that FBC already has existing resources (i.e., PPA Tranche 2 energy) to meet the energy gap that arises in 2024. As such, additional new resources, as called for in the preferred portfolio,[69] are not truly needed (i.e., in the sense that there will be a shortfall otherwise) in 2025.

64. Indeed, if PPA Tranche 2 energy is included in FBC's resources, new resources are not truly needed for most, if not all, of the planning period.[70] As a result, the decision to build new resources during the period should be based on cost and market supply risk considerations.

65. In BCOAPO's view, one alternative to address the gap that will arise in 2025 (based strictly on Tranche 1 energy availability) would be to continue to use market supply and rely on PPA Tranche 2 energy simply as insurance. Admittedly, PPA Tranche 2

[66] Exhibit B-1, page 79
[67] Exhibit B-1, page 111
[68] Exhibit B-1, page 120
[69] See BCOAPO 38.2 & 38.3
[70] A review of BCOAPO 38.3 would suggest that the additional energy from new resources is less than the 711 GWh of Tranche 2 energy.

energy costs more (though the costs will likely decrease). However, it would only be required as insurance in case market supply was inaccessible or too costly.

66. BCOAPO submits that further analysis as to the risk and expected cost of having to rely on Tranche 2 energy as an alternative to market supply is needed to justify a self-sufficiency date of 2025. This is particularly important given the recent indications that BC Hydro's LRMC, which is basis for the PPA Tranche 2 rate, is likely to be lower than the current $129.70/MWh and more in the range of $85 - $100.[71]

67. Finally, BCOAPO notes that even if new resources are "targeted" for 2025 per FBC's preferred plan, commitments to design and construct such facilities would not be required prior to FBC's next long term resource plan.[72] As a result, the Action Plan proposed by the Company does not call for FBC to actively pursue new resources over the next four years.[73]

68. Given this window, BCOAPO submits that FBC should be directed to critically assess the cost and risks of continuing to rely on market purchases in conjunction with PPA Tranche 2 energy as an alternative to acquiring new resources as preparation for its next long term resource plan.

Selection of the Preferred Portfolio

69. One of Province's energy objectives under the *CEA* is that at least 93% of the electricity generated in BC be from clean or renewable resources. In consideration of this, FBC identified a number of portfolios that met the 93% criterion, including one that was 100% "clean."[74] These portfolios, along with one that did not require energy self-sufficiency, were selected for further analysis involving a range of considerations, including cost, reliability, geographic diversity, job creation and environmental impacts. The assessment is summarized in Table 9.2 of the 2016 LTERP. [75]

70. The No Self-Sufficiency portfolio (A1) is rejected, in part, because it is not considered to be consistent with the *CEA* objectives, which include self-sufficiency.[76] However, as discussed previously, the portfolio should be considered as meeting the self-sufficiency objective if the market purchases can be replaced by PPA Tranche 2 energy, if and as needed.

[71] Exhibit B-1,page 49
[72] CEC 24.2
[73] Exhibit B-1, Section 11
[74] Exhibit B-1, page 121
[75] Exhibit B-1, page 125 (revised)
[76] Exhibit B-1, page 127

71. Apart from this issue, BCOAPO has no concerns with FBC's assessment of the four selected portfolios. When it comes to the choice of Portfolio A4, there is substantial judgment involved. Each of the portfolios out ranks the others with respect to at least one attribute. Similarly, with the exception of A4, each of the portfolios ranks lowest on at least one attribute. Again, the "good news" is that the point in time at which a decision must be made regarding which portfolio (or path) to follow does not need to be made prior to the preparation of FBC's next long term resource plan.[77] For this reason, the same Action Plan[78] would apply regardless of which of the four portfolios was chosen.

72. Given this context, BCOAPO submits it is appropriate for the Commission to accept that FBC's 2016 LTERP, including the accompanying LT DSM Plan, is in the public interest.

TRANSMISSION AND DISTRIBUTION

73. Section 44.1 (2) (d) requires that, as part of its long term resource plan, FBC provide description of the facilities it intends to construct or extend in order to serve the forecasted demand.

74. In the 2016 LTERP, FBC identifies two transmission reinforcement projects that are within the 20 year planning horizon: i) the Grand Forks Terminal Transformer Addition; and ii) the Kelowna Bulk Transformer Capacity Addition.[79] In both cases, the projects are intended to be the subject of future CPCN applications.

75. During the interrogatory process, FBC also identified three distribution projects that it intends to undertake to address in the next four years in response to load growth: i) Sexsmith Second Distribution Transformer Addition; ii) DG Bell Distribution Transformer Addition; and iii) DG Bell Feeder 4 Addition.[80] In the case of these projects, the specific approvals that will be sought have not yet been determined as their timing and scope have not been confirmed.[81]

76. For each of the five projects, FBC has provided an explanation as to why they are needed over the planning horizon. Given that FBC is not seeking approval of the projects or the related expenditures at this time,[82] BCOAPO considers the level of detail provided to be adequate.

[77] CEC 24.2.1
[78] Exhibit B-1, Section 11
[79] Exhibit B-1, pages 87-88.
[80] BCUC 21.1.1
[81] BCUC 58.1
[82] BCUC 22.1 and 58.2

All of which is respectfully submitted.
BC Public Interest Advocacy Centre

Kate Feeney
Staff Lawyer

c. Registered Parties