

October 17, 2017

Mr. Patrick Wruck,
Commission Secretary,
BC Utilities Commission

RE: Comments on the Alternative Portfolio for Site C

Dear Mr. Wruck,

We are pleased to comment on the Alternative Portfolio on the following pages.

In addition, we propose a further “Alternative ‘Plus’ Portfolio” which addresses and resolves future electricity needs, specifically electric vehicles and an Electrification shift to reduce fossil fuels use. We believe that our ‘Plus’ portfolio can be achieved without Site C, and possibly at a lower cost than the BCUC Alternative Portfolio.

The ratepayer impact would be lower rates than rates under either Site C or under the alternative portfolio of BCUC. We hope that this ‘Plus’ portfolio represents a new era in BC’s electricity future, where BC Hydro becomes a “facilitator” rather than a “builder”.

Thank you for the opportunity to provide comments. If you wish further detail, please contact one of the signatories to this letter.

Sincerely,

Dr. Harry Swain, Dr. Eoin Finn, Dr. Vernon Ruskin,
Mr. Mauro Chiesa, Mr. Lorne Thomas, Mr. Roger Bryenton

BCUC SITE C INQUIRY – “ALTERNATIVE PORTFOLIO” COMMENTS

Dr. Vernon Ruskin, Dr. Eoin Finn, Mr. Roger Bryenton
October 17, 2017

COMMENTS

BCUC has requested comments on the “Alternative Portfolio” proposed by the BCUC as follows:

“The Panel invites comments from BC Hydro and other parties on these Alternative Portfolios of generating projects and demand-side management (DSM) initiatives; in particular:

- The underlying assumptions regarding the Alternative Portfolios (see the Key Assumptions table for descriptions of all key assumptions); and
- The calculations, inputs and assumptions used in the “Alternative Portfolio Spreadsheet.”

FINDINGS OF ALTERNATIVE PORTFOLIO

The results which BCUC has obtained from the Alternative Portfolio are found to be reasonable and inform decision makers as to the **necessity to terminate Site C**, and to utilize those (and other) electricity supply resources in the “Alternative Portfolio”, in lieu of Site C, if and when needed.

“ALTERNATIVE ‘PLUS’ PORTFOLIO” – A Plausible Scenario

IN ADDITION to the BCUC Alternative Portfolio, a further refinement to the “Alternative Portfolio” has been developed, which offers further proof of the lack of need for Site C. This is under assumptions of increased electricity demand for electric vehicles, using 1,932 GWh/year by 2036, and “Electrification” necessitated by addressing climate change objectives of reduced use of carbon fuels, at 13,000 GWh by 2036. We believe that this should be a “target” for the Province to set, and for electricity users to adopt and attain.

Some of the suggested measures require eventual, not immediate, legislative facilitation, such as accessing Columbia River Treaty electricity, a much preferable alternative to the needless flooding of BC’s last prime agricultural resource, the Peace River valley. Such legislation is deemed “rational” and wise, given the high environmental and First Nations’ impacts of the Site C project.

Summary of the “Alternative ‘Plus’ Portfolio”

The proposed portfolio consists of up to ten (10) elements, detailed following the Summary:

1. Increasing “Heritage” Resources from the arbitrary 48,491 GWh/yr to actual capacity of 54,264 GWh/yr, adding over 5,700 GWh/yr, 13% more than Site C.
2. Including for planning purposes, the presently unaccounted for “load shedding” of 400MW used operationally, 36% of site C and 80% of Revelstoke 6, saving \$500 Million.
3. “Cyclic Scheduling” of Lake Williston, over several years, adding 4,600 GWh/yr, 90% of Site C .
4. “Deep DSM”, up to 9600 GWh/yr (BC Hydro IRP), at under \$50/MWh, almost double Site C.
5. Eliminating “trade” sales of domestic power, averaging 3,731 GWh/yr; 73% of Site C.
6. Adding Columbia River Treaty power, of 4,100 GWh/year, 80% of Site C at \$33/MWh.
7. Market purchases by Powerex of 5,100 GWh/year at \$24/MWh or less.
8. IPP power can be reduced in cost, once capital has been recovered by the companies, allowing future contracts to be negotiated at a lower cost
9. Use of Burrard Thermal plant at peak times for a few hours per year if and when needed.
10. Future solar, wind and geothermal supplies as needed, at equal or less cost than Site C.

These ten options, some alone, some combined, eliminate ANY NEED for Site C until at least 2036.

Description of Portfolio Elements in “Alternative ‘Plus’ Portfolio”

1. “Heritage Resources” of 48,491 GWh/yr are prescribed by the Terms of Reference for the Site C Inquiry. This is incorrect and using this prescribed number results in **a clear bias favouring Site C**. Taking the peak output of the various dams across BC, for the period of 2013 to 2017, then correcting for the “average flow”, gives an output of 54,264 GWh/yr. This is close to the 53,000 GWh/yr including additional generators that Dr. Vernon Ruskin, has independently confirmed. Using the larger, and accurate value of 54, 264 shows that the **difference of 5,700 GWh/year is much greater than the output of Site C**. Whether using the lower value of 48, 491 GWh/yr was intended to increase “an apparent need for Site C” is not clear. If it was intentional, this is not acceptable; if not intentional this is a serious error.
2. In the Joint Review Panel submissions, BC Hydro described a 400MW “load shedding” capability being used operationally in agreement with major power users in BC. It was stated that BC Hydro did not include this 400MW for “planning purposes”. Such oversight appears to increase the need for additional capacity, and whether intentional or unintentional is again incorrect and not acceptable.
3. “Cyclic Scheduling” of the huge Lake Williston storage, over 3 to 5 (or more) years can optimize the output by up to 4,600 GWh/yr as Dr. Ruskin has described in his book about BC’s Electricity system and BC Hydro. See also submission F26-7 and F308 for further description.
4. “Deep DSM”, or DSM 5 as described in the 2013 Integrated Resource Plan by BC Hydro, Appendix 3, RODAT, can save up to 9,600 GWh/year at a cost \$50/MWh or less. This is almost double the amount of Site C power, at substantially lower cost. Recent DSM activities by BC Hydro saved power **at \$20/MWh** despite the projection of \$30/MWh. Some aggressive utilities are spending up to 4% of revenue on DSM (ACEEE). For BC Hydro 4% would be roughly double the present spending. Massachusetts in 2016 saved 3% of electricity in one year. That would amount to 1,500 GWh, or about 30% of Site C, in a single year! Two other states saved 2% of electricity output. Clearly there is great opportunity for BC Hydro to increase DSM savings.
5. “Trade Power”, which have been net exports averaging 3,731 GWh/yr from 2015 to 2017 (2016/17 Annual Service Plan) can be utilized instead of Site C. This is 73% of the Site C output, again at a much lower cost than Site C, estimated to be about \$33/MWh at Mid-C. Excluding these from the analysis further distorts the supply/demand balance in favour of Site C.
6. Columbia River Treaty power was excluded from the Site C Inquiry because of artificial “self-sufficiency” requirements, legislated by the former Site C-supportive Liberal government. This requirement was created explicitly in order to attempt to justify the need for Site C. Such an order can readily be reversed, as BC is not self-sufficient in oranges, bananas or pineapples either. This power is 4,100 GWh/year, almost equivalent to Site C, at a much lower price than Site C; about \$33/MWh (F26-5).
7. Market purchases of power by Powerex, from Mid-Columbia, up to 5,100 GWh/yr, equivalent to Site C are available at \$24/MWh or less (Dr. Vern Ruskin, F26-7 and F308).
8. IPP power can be re-negotiated once the capital has been repaid during the first contract. As has occurred to date, the re-negotiated prices are close to existing Transmission Tariff rates in the order of \$40/MWh, far less than Site C.
9. Burrard Thermal was also excluded from inclusion with Site C alternatives by government legislation. Again, a former Liberal government wanting to proceed with building Site C, “loaded the dice” by excluding another rational and obvious alternatives to Site C, again with substantially lower cost.
10. Future geothermal, wind and solar electricity can be supplied at costs equal to or lower than Site C. Testimony by Robert McCullough, and Alison Thompson (CanGEA) during technical sessions

described current projects for wind at \$58 to \$64 /MWh, geothermal at \$50/MWh and solar at \$73 /MWh, all Cdn.

SUPPLY/DEMAND ASSESSMENT

A supply/demand spreadsheet based upon BC Hydro's Revenue Requirements Tables 3-6 and 3-8 was created, utilizing data and algorithms from Dr. Eoin Finn's financial model. The following were included:

Elasticity - Specifically, we wanted to ensure that elasticity and DSM measures could be incorporated, which we had not seen in accurately incorporated in either the BC Hydro, nor the BCUC models of electricity requirements. Recent actual elasticities in BC of -.08, -.04, and -.21 for residential, commercial, and industrial sectors were used. Long-term elasticities of -.2 to -.4 have been postulated, but not used, but would further indicate the lack of need for Site C.

Electric Vehicles – the assumption was made of 17.5% of 2016 vehicles being electric in 2036.

Electrification – 13,000 GWh by 2036 was incorporated. The climate change imperative dictates that fossil fuel use MUST be reduced; other BC Hydro and BCUC models did not address such need.

RESULTS – Electricity energy demand by 2036 would be 85,347 GWh/yr. With aggressive DSM of 9,610 GWh and supplies of 78,950 GWh (including 4,400 from Columbia Treaty), a **surplus** (almost equal to Columbia Treaty) of 3,627 GWh would occur in 2036. Capacity demand would be 13,529 MW, supply would be 12,043 MW, DSM would contribute 1,996 MW for a **surplus** of 510MW by 2036.

CONCLUSION – BC has numerous options for new power supply if and when needed, at much lower cost than Site C. There is no justification for Site C. Meanwhile, solar, wind and geothermal costs continue to decline, and if and when needed, can be quickly installed to match any increased need for power.

BENEFICIAL FINANCIAL IMPACT

Given the BCUC financial impact of the "Alternative Portfolio" and the lack of time to explicitly model financing over a 70 year time horizon, the team proposes an intuitive-deductive methodology. In that all of the ten measures listed above cost less than Site C, and less or equal to the BCUC "Alternative Portfolio" components, it must therefore be concluded that **this proposed "Alternative 'Plus' Portfolio" will cost less and be more financially beneficial than either the proposed Site C project or the Alternative Portfolio.** Thus the impact on ratepayers will be lower than either Site C or the Alternative Portfolio.

Appendix 1 shows printouts of the spreadsheet results for reference.