

BC Utilities Commission  
900 Howe St.  
Vancouver, BC  
V6Z 2S9

Sirs/Mesdames,

RE: Submission to the BC Utilities Commission Site C Inquiry

In the BC Utilities Commission (BCUC) terms of reference for the Site C Inquiry (Inquiry) consideration is made to the topic of expected peak capacity demand and energy demand with respect to the Site C Dam. Specifically, in the terms of reference for this Inquiry the BCUC was required to:

*use the forecast of peak capacity demand and energy demand submitted in July 2016 as part of the authority's Revenue Requirements Application, and must require the authority to report on*

- i) developments since that forecast was prepared that will impact demand in the short, medium and longer terms, and*
- ii) other factors that could reasonably be expected to influence demand from the expected case towards the high or low load case.*

The research and analysis that formed the basis of the July 28, 2016 *Fiscal 2017 to Fiscal 2019 Revenue Requirements Application* was completed prior to the Paris Agreement<sup>1</sup> coming into force and a search of the document demonstrates that Canada's commitments under the Paris Agreement were not considered in the forecasts presented. It is my opinion that any review of future energy demand in BC that ignores our commitments under the Paris Agreement would be incomplete. As such, I present the following information for your consideration.

Under the Paris Agreement Canada agreed to drop our greenhouse gas emissions to 30% below 2005 levels by 2030<sup>2</sup>. BC currently meets most of our electrical energy needs using large-reservoir hydro but most of our energy needs are being met using fossil fuels. As a nation Canada has pledged to reduce our dependence on fossil fuels. This can only be accomplished by substantially increasing our supply of electricity. To do so we will need to develop alternative low-carbon energy supplies. Given our future energy needs we cannot ignore readily available, low-carbon energy sources like the Site C project.

Depending on your reference, BC's total energy consumption, inclusive of the energy required to create secondary electricity, was approximately:

- 1,142 PJ in 2000<sup>3</sup>
- 1,264 PJ in 2009<sup>4</sup>
- and/or 1,070 PJ in 2010<sup>5</sup>

I'm providing multiple numbers because, frankly, I don't know which one to trust. For the purposes of this discussion I am going to rely on the median, the Globe Foundation number, of around 1,142 PJ of energy a year. This translates to approximately 317,500 GWh of energy. According to BC Hydro, in 2012<sup>6</sup> BC Hydro's total energy requirements were 57,083 GWh. This means that BC Hydro supplied less than 18% of the total energy used in BC and that renewable electricity component represents approximately 17% of our yearly energy needs. That leaves over 82% of our provincial energy usage being derived from sources other than BC Hydro. Of that 82% about 33% (approximately 380 PJ) was supplied via fossil fuels (excluding natural gas); about 26% (approximately 300 PJ) was supplied via natural gas; about 20% (approximately 225 PJ) was supplied via burning of waste biomass in industrial facilities; and the remaining was supplied via coal and coke (mostly for use in cement plants)<sup>7</sup>.

Looking at the numbers above, it becomes clear that cutting our emissions to achieve our pledge under the Paris Agreement will mean reducing the percentage of fossil fuels from our energy mix and replacing that energy with low-greenhouse gas electricity, like the kind that will be produced by the Site C Dam. Consider that the Site C Dam, once completed, is expected to generate 5,100 GWh<sup>8</sup> of electricity. To replace the energy currently provided by gasoline and diesel fuels only, we would need to find the energy equivalent to almost 15 Site C dams. Admittedly using the efficiency gains associated with the use of electric vehicles in transportation could bring that number down to 6-9 Site C Dam equivalents (depending on your choice of conversion factors).

Remember that only considers liquid fuels. For a 100% fossil fuel-free B.C., we would also need to replace the natural gas used mostly for industrial purposes and for home and water heating. That would represent another 16 Site C dam equivalents. Consider the City of Vancouver's Zero Emissions Building Plan which calls for the elimination of natural gas in housing uses. The move from natural gas to electricity for housing uses would significantly drive up electricity demand.

Any knowledgeable observer looking at these numbers would recognize that British Columbia is nowhere near ready to help Canada meet our Paris Agreement commitments. Given our current electrical supply we are approximately 20-25 Site C Dam equivalents away from a goal of a fossil fuel BC and still many Site C Dam equivalents away from achieving our Paris Agreement commitments. What is abundantly clear, however, is that we will need a lot of fossil fuel-free electricity in the very near future if we are to do our part to arrest global climate change. As the numbers clearly show, the Site C Dam project barely gets us started on the road to our fossil fuel-free future but at least it will help move us in the right direction.

Having established that we need a lot of power, the question that must be asked is how do we go about generating that power? Happily, BC Hydro evaluated various energy generation and storage technologies<sup>9</sup> including establishing approximate costs for the various options. BC Hydro's, 2014-2015 power generation options update<sup>10</sup> helps clarify the costs of alternatives and makes it clear that, on a cost basis, the Site C Dam represents a cost-efficient means to achieve our future energy needs.

Some have argued that energy imports will allow BC to achieve our electricity needs in the absence of Site C. Well, in 2007 as part of its Energy Plan<sup>11</sup> (2007 EP) and in the subsequent Climate Action Plan<sup>12</sup> (CAP) our Provincial Government committed us to a path of electricity

self-sufficiency. As described in these plans, electricity self-sufficiency was deemed a major priority. The reason for this was self-evident to the authors of those plans: in a world where fighting climate change becomes a defining political objective, ensuring that we have a steady domestic supply of low-carbon electricity is exactly the reason why we have a government-owned utility. The two plans foresaw a future where we needed to use more electricity for transportation and residential uses and wanted to ensure that we had the domestic capacity to meet those needs. Recognizing that the government of the day couldn't pay for it all the CAP foresaw that we would need to bring in external partners to meet our future electricity needs. It also acknowledged that paying a bit more to provide flexibility of supply and energy security represents sound governmental policy and not a mistake.

Many disagree with that analysis, as “internationally respected economist Robert MuCullough”<sup>13</sup> puts it:

*In 2013, B.C. Hydro estimated that Site C would cost 2.5 times then current annual market prices. As natural gas and renewable prices have continued to decline, Site C now costs 3.3 times current annual market rates.*

*Put another way, British Columbia rate payers could save \$4.1 billion simply by buying the same amount of power from the United States — even after writing off the \$1.75 billion already spent.*

Now let's look at that approach in light of current political/economic conditions. On January 1, 2017, the Province of Alberta initiated its Climate Leadership Plan<sup>14</sup>. As part of that plan Alberta committed to ending coal pollution<sup>15</sup>. This requires that Alberta phase out its coal power plants. On January 1, 2017 coal represented 41% of Alberta's installed electricity generation capacity<sup>16</sup>. I'm guessing that if Alberta is in the process of shuttering 41% of its generation capacity, it will not have a lot of inexpensive electricity to export.

As for Washington State, they are in the process of implementing a carbon pricing mechanism while looking to increase their zero emission vehicle fleet to 30%<sup>17</sup> and simultaneously eliminating the use of electrical power supplied by coal<sup>18</sup>. While Washington has been a net exporter of electricity<sup>19</sup>, the vast majority of that has been to California which imported 805 trillion BTUs of electricity in 2015<sup>20</sup> (latest data available). This would be the same California that is closing its last nuclear plant<sup>21</sup> while projecting increases in electricity prices<sup>22</sup>. California is also starting to price carbon<sup>23</sup> and currently generates 6386 GWh<sup>24</sup> of electricity from nuclear (closing) and natural gas-fired plants (whose carbon is being priced). What this means is that electricity prices are not going down in California anytime soon.

So to our east they are foreseeing a crunch on electricity while to our south Washington should just barely be able to supply its own market. To the south of Washington California is going to be desperately searching for massive amounts electricity. These are not the conditions where we, as British Columbians, want to go hat-in-hand looking for cheap electricity to import. Once BC starts acting on our climate change commitments we are going to need a lot of electricity. Moreover, that electricity is not going to be cheap<sup>25</sup> and irrespective of what the activists keep claiming conservation and efficiency improvements will not address this energy shortfall<sup>26</sup>. As

for the Columbia River entitlement, that may help a bit, but as I have demonstrated even including that power we will come nowhere close to meeting our increased demands<sup>27</sup>.

To conclude I can't seem to say this enough. The Site C dam is not a perfect project. It has real flaws but I can't help but hearken back to what Dr. Andrew Weaver, climate scientist, said about the project<sup>28</sup>:

*There are environmental consequences, yes, but there are environmental consequences for everything we do and we have to stop using the atmosphere as an unregulated dumping ground.*

To my understanding, BC's 2007 Energy Plan was predicated on a scenario where fighting climate change meant that Alberta and Washington had no electricity to export. Now with Alberta closing its coal plants we are half-way there. Any post-Paris Agreement Energy Plan must assume that BC will not be importing electricity. To assume otherwise will leave us incredibly vulnerable to external forces. We already pay above market rates for our gasoline. Do we want to depend on the US for our electricity as well?

My answer to this question is no. I think that the 2007 Energy Plan and the Climate Action Plan represented solid evidence-based policy. The two plans acknowledged the risks and admitted that addressing those risks would be a bit more expensive than simply pretending that those risks don't exist. It is good government policy to ensure that, when the time comes, BC has the energy it will need to meet its commitments to its populace. I do not think we can rely on the kindness of our neighbours because in the coming years it is likely the neighbours won't have any excess energy to share.

Thank-you for your time on this matter.

Blair King, Ph.D., R.P.Bio., P.Chem.

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