



October 18, 2017

Patrick Wruck, Commission Secretary  
BC Utilities Commission  
Suite 410, 200 Howe St  
Vancouver BC V6Z 2N3

Dear Mr Wruck:

**RE: Comment on Alternative Portfolios of generating projects and DSM initiatives**

I am a retired preventive medicine physician. I will focus on three Key Assumptions. But first, an overall comment on the Portfolios offered. This is a time of unprecedented economic, ecological and political uncertainty. And further complicating the near future is rapidly-changing technology. The large investments that BC has made in hydroelectric power in the past may no longer be the appropriate model for meeting the energy needs of BC's citizens. Small may not only be beautiful, it may be wise and frugal.

Portfolio Assumption 10. Energy and Capacity Options

The energy option of wind may provide a firmer basis for quantitative projections but the acknowledged omission of other options [codes and standards; upgrade of existing BC Hydro assets; geothermal; and, particularly, the unpredictable but powerful, photovoltaic] results in a portfolio that may be more certain, but weaker in capacity and efficiency.

Reference 30, p. 8, of BCUC A-22<sup>1</sup> begins its Conclusion with this paragraph:

In this paper, we used a mix of experience curve projections and analysts' projections to estimate LCOEs for PV+ESS and CSP with thermal energy storage through 2030. We find that the relative competitiveness of each technology depends on how successfully they reach aggressive cost reduction targets. Given there is a great deal of uncertainty in the cost projections—for both technologies—we encourage the reader to focus on the range of results rather than a single point. There is also a great deal of uncertainty about what system configuration will make sense as solar penetration increases and the electricity system evolves over time.

Portfolio Assumption 11. Energy Efficiency DSM

The DSM performance of BC Hydro has been weak. The amount it has invested in DSM has been less than the average utility in the American Council for an Energy-Efficient Economy (ACEEE) and much less than that group's leading utilities. The DSM budget for 2017-2019 compared to the previous three years showed decreases of 25-33%. Of 14 ACEEE DSM strategies, BC Hydro has done one, partially done five and not done eight. This suggests the need for a fundamental change in the mission and management of BC

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<sup>1</sup> Exploring the Potential Competitiveness of UtilityScale Photovoltaics plus Batteries with Concentrating Solar Power, 2015–2030 David Feldman, Robert Margolis, and Paul Denholm National Renewable Energy Laboratory Joseph Stekli U.S. Department of Energy

Hydro beyond identifying DSM strategies. With this in mind, at the October 5 hearing, I suggested that BC Hydro's name be changed to "BC Energy Conservation Authority."

The second paragraph of Assumption 11 states that, "For the purpose of comparison to Site C costs, societal costs/benefits of energy efficiency DSM have not been included." One of the major benefits of effective DSM is, with other measures, it replaces Site C, is the saving of some of BC's best agricultural land. This would be a very substantial benefit.

#### Portfolio Assumption 16. Batteries

To take the median curve of battery cost (from reference 30 noted bottom pg 1) from the NREL report is to ignore the large amount of uncertainty that is even found in the final paragraph of that report's Conclusion (see quote under Assumption 10 comment). Future battery costs may be considerably less than assumed here, as also noted in this reference:

<http://www.ucsusa.org/clean-energy/how-energy-storage-works#.WeghVxNSyRt>

There are many different types of batteries that have large-scale energy storage potential, including sodium-sulfur, metal air, lithium ion, and lead-acid batteries. There are several battery installations at wind farms; including the Notrees Wind Storage Demonstration Project in Texas, which uses a 36 MW battery facility to help ensure stability of the power supply even when the wind isn't blowing [17].

Advancements in battery technologies have been made largely due to the expanding [electric vehicle](#) (EV) industry. As more developments are made with EVs, battery cost should continue to decline [18]. Electric vehicles could also have an impact on energy storage through vehicle-to-grid technologies, in which their batteries can be connected to the grid and discharge power for others to use.

It appears that even now, there are strategic combinations of actors and technologies that expand the potential for energy storage, as shown in this report by McKinsey:

<https://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/the-new-economics-of-energy-storage>

Our research shows considerable near-term potential for stationary energy storage. One reason for this is that costs are falling and could be \$200 per kilowatt-hour in 2020, half today's price, and \$160 per kilowatt-hour or less in 2025. Another is that identifying the most economical projects and highest-potential customers for storage has become a priority for a diverse set of companies including power providers, grid operators, battery manufacturers, energy-storage integrators, and businesses with established relationships with prospective customers such as solar developers and energy-service companies.

Again, I suggest that the BCUC recommend a name-change and a mission-change for BC Hydro...to 'BC Energy Conservation Authority.'

Thank you for considering the above,

Fred Bass, MD, DSc