Please see attached letter regarding an expansion of comments I made at the October 5th Community Input Session in Vancouver. The expansion was requested by Chairman Morton.
Re: E. Finn address of Oct. 5th – supplementary evidence

Sirs/Madam:

At the community input session in Vancouver on October 5th, Chairman Morton asked me to submit some additional information to support statements I made in my address. My statements were focused mainly in four areas:

1. The DSM provision of the Clean Energy Act and its effects on BC Hydro’s demand forecast;
2. BC Hydro’s poor financial state;
3. Rate effects of the Keeyask/Bipole and Muskrat Falls projects; and
4. The likelihood that a BC LNG industry will develop.

I submit the following supplemental material in support of my comments.

1. DSM and BC’s Clean Energy Act

In the Act, Section 2(b) (BC’s Energy Objectives) explicitly states that the Authority (BC Hydro) is “to take demand-side measures and to conserve energy, including the objective of the authority reducing its expected increase in demand for electricity by the year 2020 by at least 66%”. I do not see compliance with that directive reflected in BC Hydro’s demand forecasts. I suggest that, were it to be so, the forecasted demand would be met by a far more aggressive DSM than the paltry 1% (602GWh) achieved so far and satisfying it would not require the construction of Site C. Other utilities are exceeding 4% saving.

2. BC Hydro’s poor financial state

As many commenters have stated, BC Hydro’s finances are in something of a mess. A key measure of its financial health - its debt-to-equity ratio - is 4.55:1. As shown in the graph following, that is much greater than that of its Utility industry peers.¹

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¹ [http://www.bclaws.ca/civix/document/id/complete/statreg/10022_01#section2](http://www.bclaws.ca/civix/document/id/complete/statreg/10022_01#section2)
The primary reason for this is because of Hydro’s aggressive use of an accounting device called deferral accounts. Using this device, the annual shortfall in operating revenue has been continually added to BC Hydro’s rapidly growing ~$30B debt/deferrals burden. The BC government has, by imposing a unique accounting standard on BC Hydro, allowed this financial manipulation to occur by circumventing the attentions of an independent regulator.

3. Rate effects of the Muskrat Falls and Keeyask/Bipole projects

Long-term dam projects run serious risks of budget overruns, power gluts, borrowing rate hikes and depressed export prices – all of which combine to make Site C a high-risk project. BC Hydro has chosen to ignore the recent dam-building experience of two peer-group Canadian utilities, suggesting instead that these are “outliers”. Published thumbnails of these projects highlight the difficulties they have encountered:

Muskrat Falls (Newfoundland & Labrador)
- Budget overrun ($6.7Billion -> $12.7B); Approved with no regulatory review - lessons for BC;
- Latest expected power cost (2019): $233 per MWh – triple what BC Hydro is postulating for Site C’s UEC;
- Nalcor Customer bills are set to double from $150/mo. -> $300/mo.

Keeyask/Bipole III (Manitoba) – built mainly for export to U.S.
- Manitoba Hydro’s recent 2017-2018 rate application\(^2\) is a sobering read;
- Budget overrun $6.5B -> $8.7B; In-service date 2 years delayed;
- Increased Debt burden- by 2020, 70% of Manitoba Hydro’s domestic revenues will go for servicing an expected $25 Billion debt. This will risk a downgrade of Manitoba’s credit rating for its entire provincial debt;
- The effect on Customer rates: 7.9% increases for each of next 5 years, with a warning of up to 18% hikes if interest rates go up 100 basis points or wholesale rates in U.S. hub continue falling. With QE (Quantitative Easing) ending in the U.S. and predictions of electricity supply gluts causing electricity futures to fall further, both of those outcomes are more than possible.

Both of these projects are very comparable in scale and complexity to Site C. Both illustrate the various risks of long-term dam construction projects that are beginning to afflict the Site C project. They are not “outliers” - worldwide experience with building dams was recently echoed by the Munk school at the University of Toronto\(^3\): *In the energy sector, a 2013 study by Flyvbjerg and Atif Ansar found that, of 245 large hydro dam projects in 65 countries, the cost escalated on average by 90 percent between the final approved

\(^2\)https://www.hydro.mb.ca/regulatory_affairs/pdf/electric/general_rate_application_2017/02.0_tab_2_key_messages_and_reasons_for_a_rate_increase.pdf

budget and the completed project. There was no improvement in budget accuracy over the 70 years of data that the study covered.10”.

4. Likelihood of a BC LNG Industry

BC Hydro’s forecast suggests that a 3-project BC LNG export industry would consume almost 60% (2800 GWh) of Site C’s output. However, it has not factored into that estimate the probability that the industry – or specifically these three projects requesting grid power- will actually materialize. That is a serious error, because:

- There is currently a large and growing glut of LNG supply in the target Asia-Pacific market. Japan (over 1/3rd of the 265 million tones of worldwide annual LNG demand) has commenced reactivating over 40 of the 54 nuclear reactors mothballed since the Fukushima disaster of 2011. In the wake of that disaster, Japan’s power-generation needs for LNG fuel sparked an LNG seller’s market in Asia. LNG prices spiraled to a peak of $18.50/million BTUs (mmBTU). This in turn triggered a worldwide spate of “Final Investment Decisions" (FIDs) in new LNG plants to liquefy the methane supplies made abundant by new directional drilling/fracturing (fracking) techniques. The resulting oversupply caused Asian LNG prices to plummet back to the ~$6/mmBTU price that has prevailed since late 2014. Prices of the ubiquitous commodity may fall further as the supply glut threatens to grow (100% by 2025 to 600 million tones per annum) much faster than worldwide demand growth (2-4% p.a.);

- Unlike the 16 active LNG export projects in the U.S. (easily converted from earlier roles as LNG import terminals, 2 of them already in service), the 20+ proposed BC LNG plants are almost all “greenfield” sites requiring long pipelines from N.E. BC gas fields to expensive, skilled labour-short, First Nations-owned locations on the BC coast. At LNG prices below US$10, BC plants, whose capex costs are around $1,000/tonne of LNG, are uneconomic and uncompetitive with a slew of proposed U.S. (16), Russian (3), Iranian/Qatari (3), African (6) and Australian (6) LNG export plants, most of them located in far less costly areas of the world. Details of the 45 proposed LNG export plants, in various stages of completion, that will double the world LNG supply over the next decade are shown following. The green shading on the right shows a balancing of world supply-demand not occurring until the mid-2030s at best (if annual demand doubles to 4.5%).

- China – long expected to need LNG to assist its switch from using coal as a power-generation source, is instead being served by the construction of two “Power of Siberia” pipelines4 which will bring 50 million tonnes of Russian gas – not expensively liquefied, shipped and regasified LNG – to its factories, homes and (maybe) power utilities every year for 30 years when completed in 2019-20. China is also developing its own extensive shale-gas reserves – the 13th largest in the world (Canada’s are 21st).

4 http://www.gazprom.com/about/production/projects/pipelines/built/ykv/
B.C.’s shale —gas resources are expensive to drill, extract and get to market. In a boom-and-bust commodity market, cost-competitiveness is key, as is the talent pool of skills available to make the industry a success. BC has neither advantage, and its
fracked gas is competing against facilities closer to S. Asia that can give away gas “associated” with more valuable wells producing oil and condensates.

- Of the three LNG projects cited by BC Hydro as:
  - Fortis/Tilbury Phase 2 expansion suffered a severe blow when its tentative deal to export 800,000 tonnes of LNG a year to Hawaii’s electric utility fell through, in part because Hawaii’s Governor David Ige declared\(^5\) that “a dollar spent on LNG is a dollar wasted toward achieving Hawaii’s goal of having its energy needs 100% fossil-fuel free by 2045”;
  - Shell’s LNG Canada has indefinitely postponed its FID decision for its Kitimat, BC plant, citing the same “market conditions” reason that have caused oil & gas majors Petronas’ Lelu Island Northwest LNG and Nexen’s Dodge Cove Aurora plant proposals to be scrapped altogether;
  - Woodfibre’s proposed 2.1MTPA plant in Howe Sound has no contracted customers, an inadequate supply pipeline opposed by First Nations and local inhabitants. Woodfibre has no experience in building or operating an LNG plant. If built, it would be the first grid-powered export plant in the world (Norway’s Snohvit LNG plant on Melkoya Island claims to be grid-powered, but is actually powered by gas turbines on the mainland 4km away in Hammerfest). And Woodfibre is dependant on receiving 1,500 GWh of power from BC Hydro at or below the industrial rate of $54/MWh – an industry subsidy of $34 million annually – for scarcely 100 jobs.

- All three of these proposals face uphill struggles to overcome uniquely Canadian hurdles, including regaining social license, dealing with regulatory and First Nations rights and title issues re fracking, pipelines and liquefaction plant siting. In short, despite its acknowledged shale-gas resources, it is highly unlikely that BC will develop an LNG industry before the mid-2030’s – long after Site C would be in service.

In summary, the low-cost, low-risk solution to any risk of future capacity shortfalls is obvious – get serious about DSM, remove the restrictions on using already-built gas-powered peaking plants, use BC’s entitlement from the Columbia River Treaty and get on with freeing our power grid to utilize the bountiful supply of renewable power in the province to help make the transition to the new green economy which will more usefully employ many more of our workers’ talents than needlessly digging large, costly unstable holes in the ground.

Yours very truly

Eoin Finn, B.Sc., Ph.D., MBA, Vancouver, BC