Testimony to BC Utilities Commission on Site C

Harry Swain
14 October 2017

Panel members, it's a pleasure to meet you at last. Not since the last papal election have the opinions of a secret conclave been so eagerly anticipated. My name is Harry Swain, and I am the former chair of the long-defunct Joint Review Panel on Site C. I'm speaking today on behalf of no one except myself.

More than most, I understand the pressures of time and an odd set of terms of reference on your work. I thank you for hiring Deloitte, for the immense amount of work you and they did in a short time, for your own preliminary report, and for the many pointed questions you asked of BC Hydro.

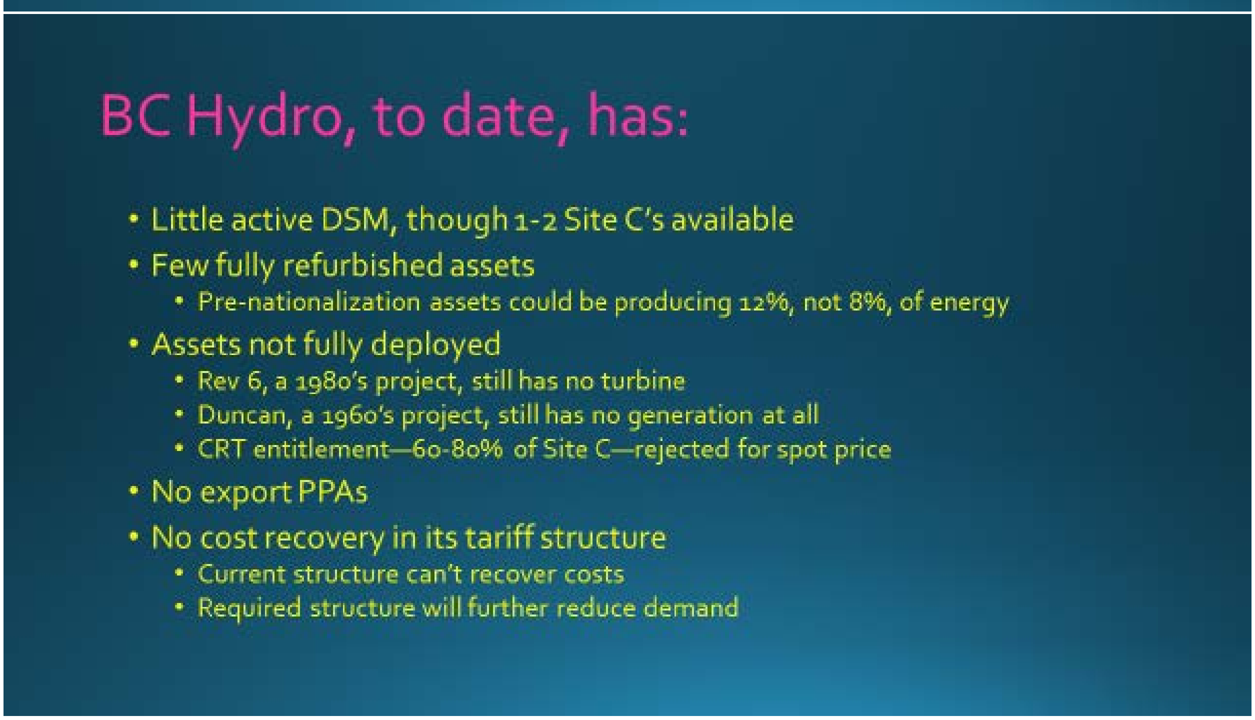
You have asked speakers not to repeat past written arguments, and for the most part I won't. However:

- One. Since I first analyzed BC Hydro's case in favour of Site C and found the project unsupported on the present schedule, the price has gone from $7.9 billion to $8.335 billion plus a Treasury Board contingency of $440 million to $8.945 billion plus $440 million, which quite dramatically tilts the case away from Site C. Further, as your own work points out, it is unlikely that F1-7 of Oct. 4 will be the last awkward letter Mr. O'Riley will have to write;

- Two. Likewise, on the demand side, LNG has largely gone away and is unlikely to materialize, given the current market glut and low prices. Even if it did, there is currently not a single LNG export plant in the world that uses grid electricity for power. Recent decisions by Pacific Northwest LNG and Aurora LNG to abandon their projects, and the indefinite postponement announcement by LNG Canada prove the point –-BC LNG is unlikely ever to be cost-competitive in a commodity market.

- And three, the stark lessons of Nalcor and Manitoba Hydro—don't build until you have power purchase agreements and regulatory approvals in hand—have demonstrated the wisdom of doing investment-grade analysis before gambling billions of public dollars on the basis of "If you build it they will come." Hydro Quebec learned this lesson well and no longer builds dams on speculation, a policy which contributed to their recent upgrade by the rating agencies.

[Slides 1 and 2—"A normal utility"]



This morning I'll focus on just one part of the problem—BC Hydro's consistently over-enthusiastic load forecasting. The whole project rests on blindly accepting these forecasts—as, ostensibly, your Terms of Reference oblige you to do. Those Terms look like they were written by BC Hydro, not an objective seeker after truth. But, as I argued in my initial submission, there are ample avenues for the Panel to interpret this particular term with a grain of salt. I will show that the present "low" forecast still seriously overestimates likely demand. If we proceed with Site C, we will be building an asset that will be stranded for decades to come, at great cost to ratepayers in money and jobs in the entire provincial economy.

BC Hydro's forecasting methodology is well known and has been approved by this Commission as recently as 2008. But year in and year out, their methods grossly mischaracterize industrial demand, and underestimate the conservation and substitution consequences of rising real prices for all classes of customer. They have done this by assuming—not observing—an almost complete overlap between demand-side management (DSM) and price elasticity, to the point where, after DSM, the effect of elasticity is supposed to be only -0.05.

This is wrong in three principal ways:

- The Large Industrial component, which in twelve years has gone from one-third to one-quarter of demand as per-connection demand has plummeted from 117 GWh/a to less than 70 GWh/a, while customers have increased from 136 to 191. This reflects dramatic and permanent change in the mining and forestry sectors. These are generally baseload customers, whereas the new champ, Residential, has more of a peaking character (and is thus much more amenable to time-of-use pricing).

- DSM includes active measures which require expenditures by BC Hydro to induce conservation. It directly impacts cash flow. It includes time-of-use pricing, Power Smart, load shedding agreements, changes to codes and standards, and the like. These focussed expenditures produce decrements in demand for both capacity and energy which compare favourably with the costs of new supply, and should be pursued to the point of equilibrium. DSM is a Good Thing, but most people don't need to be bribed to save money, at least in the long term. Elasticity should be applied to demand before supply alternatives, including DSM, are considered.

- More important and possibly more long-lasting than DSM is customer response to rising real prices. The JRP report observed that BC was coming off four decades of low and stable electricity prices, making it hard for BC Hydro to accurately estimate the effect of rising prices on demand. But we've had five years of increases and will have more ahead, as far as the eye can see. The literature abounds with empirical studies in other places, some quite like BC in important respects. As noted in my earlier submission, the long-run price elasticity of demand for electricity is typically between -0.2 and -0.7, with a central clustering around -0.4. Recent BC experience has been at the low end of the scale, with residential at -0.08, Commercial at -0.04 and Industrial at -0.21. These figures need to be viewed cautiously as real rate increases haven't started to bite very much yet, commodity prices strongly affect industrial demand, and the overlap with DSM was unresolved during the measurement period.

To summarize, core demand has not risen above 51.3 TWh/a since 2008 and ten years later is at 50.2 TWh/a. This is after a decade of population and GDP growth that has been stellar, in Canadian terms. A deep re-think of BC Hydro forecasting is overdue. Accepting the current BC Hydro forecast for a $9+ billion investment is deeply imprudent.

The better approach to calculating demand is to estimate the effect of the more general cause first, and then add on "in the money" DSM and other supply alternatives. The best approach would require using more than one method and thinking hard about their different results.

The problem with an elasticity approach is that calculating the effect of price elasticity requires an estimate of future prices. This in turn requires a long-run financial model of BC Hydro. I am sure such a model exists, as it is fundamental to BC Hydro's business and BC Hydro is a competent and professional organization; but I am equally sure that its publication would so alarm the electorate that the longevity in office of BC Hydro's owner would be threatened.

My colleagues Eoin Finn, Mauro Chiesa, Roger Bryenton and I have neither the resources nor the inside information to construct such a model. But we can make reasonable assumptions, and on that basis construct a plausible scenario. It is open to anyone who doesn't like the results to change the assumptions. Our working paper is being sent to you and BC Hydro, and is available on request. Here are the main assumptions:

- The present financial condition of BC Hydro, an artifact of previous public policy more than BC Hydro management, cannot continue, or worse, be allowed to deteriorate further. Its debt:equity ratio is perilously high, its deferral accounts are enormous, its equity oddly defined, and its free cash flow a long way from being free. If it were a regular publicly owned company its stock would be delisted—remember those quarterlies—and its credit rating below investment grade. Hence, at a bare minimum, we assume:

    - A debt:equity ratio of 3:2 is achieved over 20 years;

    - All current deferral accounts are paid off by 2024 (BC Hydro's current plan) and any new ones save for Site C itself have a maximum term of 5 years, with the aggregate not to exceed 6% of sales;

    - Pension account arrears disappear in a leisurely 20 years and are kept current thereafter; and

    - BC Hydro is freed of the nonsensical "prescribed accounting standards" and reverts to IFRS-based Canadian GAAP by 2020. (This requires the restoration of the independence and authority of BCUC by then as well.)

- Price elasticity of demand is set very conservatively at -0.15 for all classes of customer, taking effect in the fifth year after the causative real price increase is observed. Both the number and the lag time can be varied to test sensitivity.

- BC Hydro's assumptions about population growth and GDP are used.

- An arbitrary but generous allowance (580,000 by 2037) is made for electric vehicles, noting that their rate of market penetration may be slowed by rising electricity prices, but that gasoline prices are increasingly determined by policy rather than production cost.

- The long-term cost of debt increases to 4% at 1% per year until 2022 and is constant thereafter.

- Sales of surplus energy are at the mid-C price as given by Robert McCullough and at US$40/MWh thereafter.

- Surplus energy in 2024 is all of Site C and then some: not so much an assumption as a consequence of analysis.

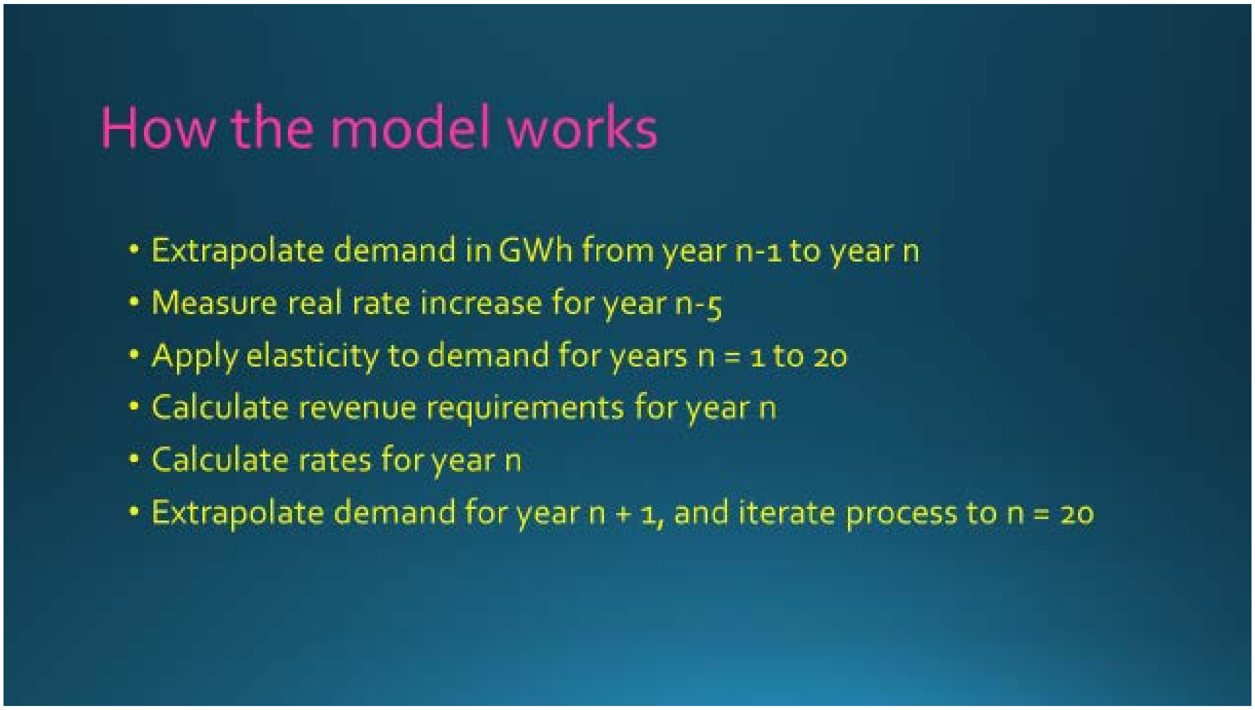
The basic equation in our simple model is that the revenue requirements of BC Hydro in any given year must cover all costs,[1] including those involved with getting back to a normal utility financial structure over a period of time.

[Slide 3]

We relaxed the annual balance feature so that a long period—20 years—is allowed for this restructuring: after all, it took a long time for the last provincial government to contrive the present misery, and realistically one would want to minimize rate shocks. But only after 2037 is there room for any return on equity: there are no dividends or "special payments" for the province. The basic assumption is that BC Hydro should mirror generally accepted practices, both financial and governance, among publicly-owned electrical utilities: Hydro Québec, for example.

Here's how the model works **[Slide 4]**:

[1] Including personnel costs, the only factor to have risen faster than BC Hydro's 2% load forecasts. If headcount had risen at only 2% since the flattening of the load curve in 2005, then by 2015 it would have had 5,123 employees. In fact it had 5,692, an 11-year increase of 35%. It is astonishing that with all these people, BC Hydro is unable to produce quarterly reports in a timely fashion. At the time of writing, we are well into 3Q2018 but no report for 1Q has yet been published, 114 days after the end of the quarter.

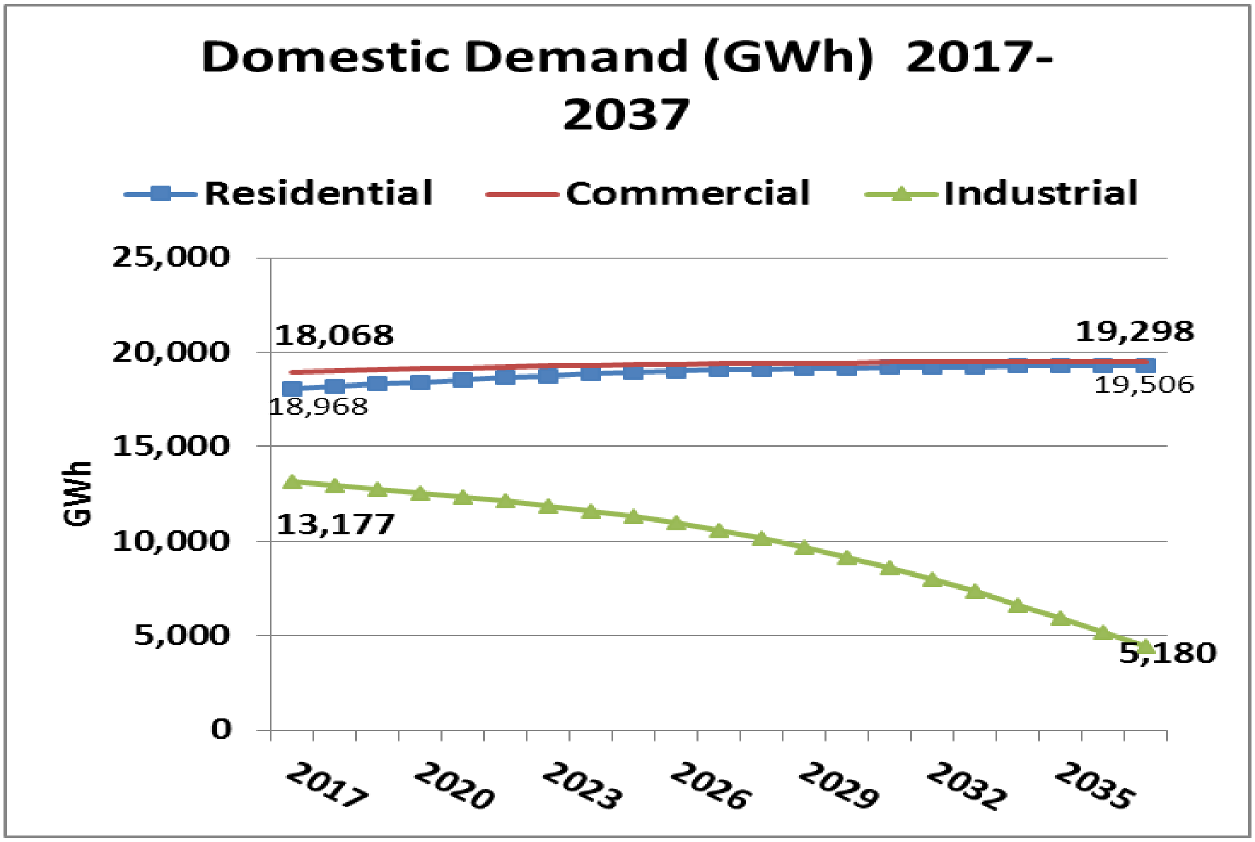


This elasticity-based model, which is strongly driven by the costs of capital in this capital-intensive industry, yields the following domestic demand curve:

[Slide 5]

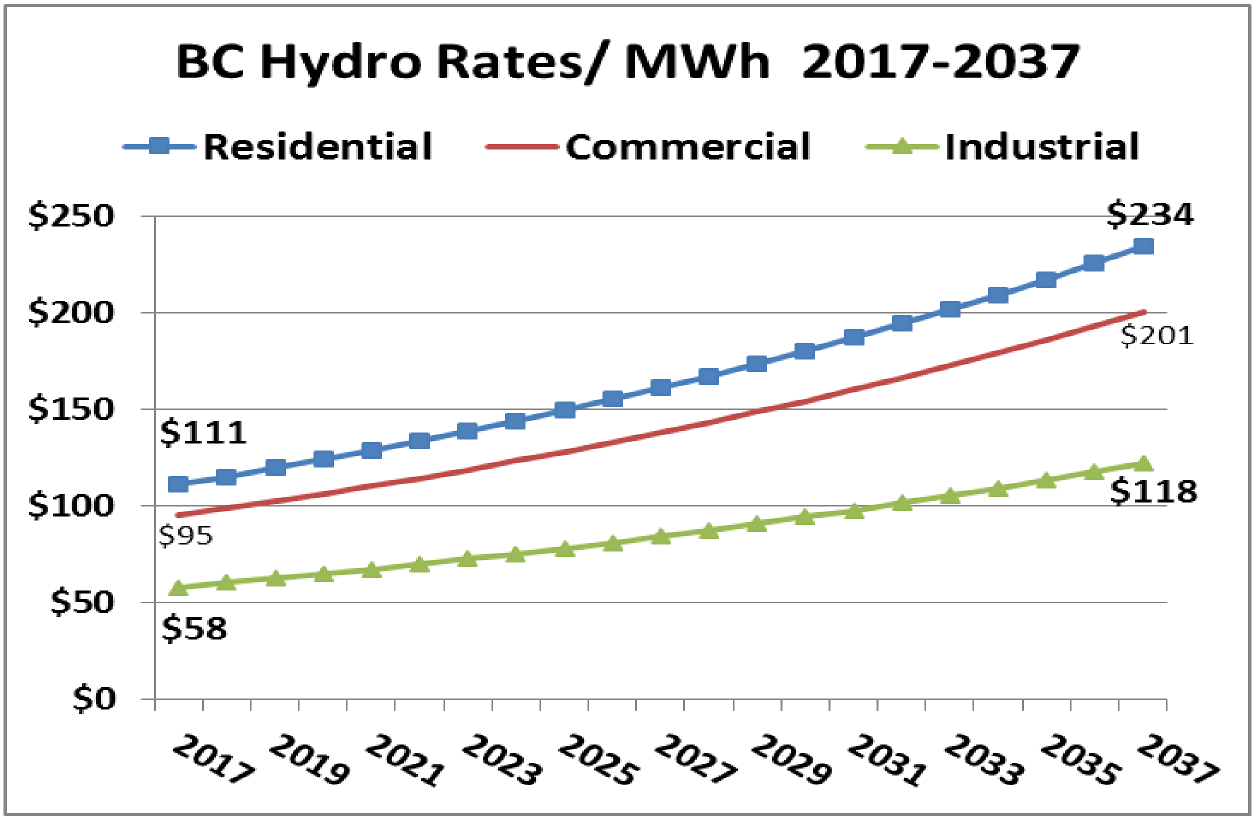
Note that residential and commercial demand rise only slightly over the whole 20-year period, meaning that per-connection demand continues the trend that has been apparent for some years now. Industrial demand continues the steep decline experienced since 2005. Total demand is only 44 TWh.

The wild card, if there is one, is Large Industrial. But here, the replacement for declining forest, pulp and paper, and mining activity is not apparent. We've over-cut our forests, and the Americans, despite the spike in demand caused by the recent hurricanes and fires, are determined to lessen our exports. Paper mills depending on newsprint face a world in which newspapers are, alas, increasingly relics of a pre-digital age. Miners, in addition to the vagaries of global commodity prices, face increasingly large problems of permits and social license. We've already spoken of LNG, and the electrification of the Montney play is an uphill struggle at best.



Those demand curves do not decrease the debt, or the cost to return BC Hydro to a healthy financial condition. Fixed costs are paid for from a diminishing amount of electricity sold. Rates go up: about 4% per year for 20 years, or more than a factor of two in real pre-inflation terms:

[Slide 6]:



Several observations:

- Under this scenario, with population growth, electric cars and DSM, and with a highly conservative price elasticity of -0.15, total domestic demand falls from 50.2 TWh in 2017 to 44.0 TWh in 2037.

- Industrial demand falls, all the faster with price increases; the traditional heavy resource industries are supplanted with less energy-intensive businesses, continuing a trend that has been going on for more than 20 years.

- Flat or declining demand confronted by rising costs to cover past and forecasted capex, replacing capital abstracted by the BC government, and the steadily increasing costs of personnel means that revenue requirements and therefore rates increase a lot faster than demand, and faster than inflation. These real rate increases drive customers to conserve or to substitute, but run directly against ss. 2(f) [competitive rates] and 2(h) [switching to lower GHGs] of the *Clean Energy Act 2010.*

- At 4%, rates double in 18 years. And these are real rates: add 2% or so for inflation to estimate the pocketbook effect. Nominal rates will double every 12 years.

- Our “plausible scenario” includes the current $9 billion and rising debt of Site C from 2025 onward. What would happen if there were no Site C—if it were cancelled at Christmas?

  - Only $3.1 billion (sunk costs + termination + remediation) would be added to BC Hydro long-term debt.

  - BC’s domestic needs would continue to be met, without BC Hydro’s exaggerated and unnecessary “replacement portfolio”

  - Lower debt would mean lower rates, therefore a greater propensity for consumers to substitute electricity for gas or oil and for industrial investors to create jobs.

  - No replacement source would be necessary for many years, but if and when the time eventually comes, there are much cheaper sources than Site C, even costed at its supposed marginal cost of $6 billion: current net exports, the Columbia River Entitlement, further DSM, some renewables—all “shapely,” to coin a phrase, and all able to be acquired as and when needed, without heavy early-year losses. I note that recent BC Hydro DSM results saved power at $20/MWh, a wonderful bargain. And IPPs coming off their first contracts, with initial capital retired, can negotiate much cheaper prices.

Our “plausible scenario” obviously differs from BC Hydro’s forecast. While its assumptions can be changed to match new evidence as it becomes available, it should really be done not as a substitute for traditional forecasting but as a complement to it. The differences should stimulate deeper reflection, more empirical research—and better forecasts.

And that’s the bottom line. **We don’t need Site C, and we don’t need a replacement portfolio.** If BC Hydro had used proper economic tools in their forecasting as well as trying to anticipate every twist of technology for decades ahead, their accuracy would have improved greatly, and this particular version of resource development would never have become, after the chimerical $100 billion LNG industry, the lodestone of a star-struck provincial government. We got sucked in by shiny baubles without a reality check.