

SITE C: With all due respect

Mandate:

- Confirm whether or not BC Hydro is on target to complete Site C on budget and by 2024, and;
- Provide advice on implications for ratepayers associated with:
 - proceeding with the project;
 - suspending the project, while maintaining the option to resume construction until 2024; and

terminating the project, remediating the site and proceeding with other resource portfolios that provide the same level of benefits at the same or lower cost as Site C.

Since the basic time/cost analysis has been done, that exercise may be marked, as completed. Also, understood, is that Environmental and Indigenous issues are beyond the scope of your review.

Therefore, after your analysis of the Deloitte report, you are left with three considerations, for Site C:

1. Proceed.
2. Suspend.
3. Terminate.

Option 2. SUSPEND:

Starting from the least biased position, in the middle, and working outwards.

Delay = Deny, so let's toss this one out, from the get go. Delay, adds costs, without any meaningful economic or social justifications.

Recommendation: Simplify, and fugetaboutit. Probably, **NOT** worthy of your consideration.

Option 3. TERMINATE:

This consideration implies that you have decided upon an alternative energy source(s) that:

1. Can meet BC's future energy requirements.
2. Is readily available, at lesser or near equal cost, when compared to Site C.
3. Has a long term reliability. (Think 50 – 100 years.)
4. Has an available delivery corridor, and in place transmission system.
5. Is a lower carbon emission choice, when all phases of the construction footprint are considered.
6. Can be permitted/completed within a time frame that captures the current low cost of capital.
7. Recovers lost capital. Can absorbed the \$5.7 Billion cancellation costs, approximately one half of the probable Site C construction cost, while still remaining the least cost/best option.

NOTE: Don't forget to include Site C reclamation costs, in your analysis.

1. Future requirements: To paraphrase the Conference Board of Canada, “in order to meet its climate targets and successfully shift toward a lower-carbon economy [will] require heavy investment into increasing the adoption of electric vehicles and expanding current infrastructure. Meanwhile, power suppliers will need to double or even triple their current capacity....”

<http://business.financialpost.com/commodities/energy/ottawas-carbon-tax-plan-to-shrink-economy-by-3-billion-hurt-loonie-in-2018-study>

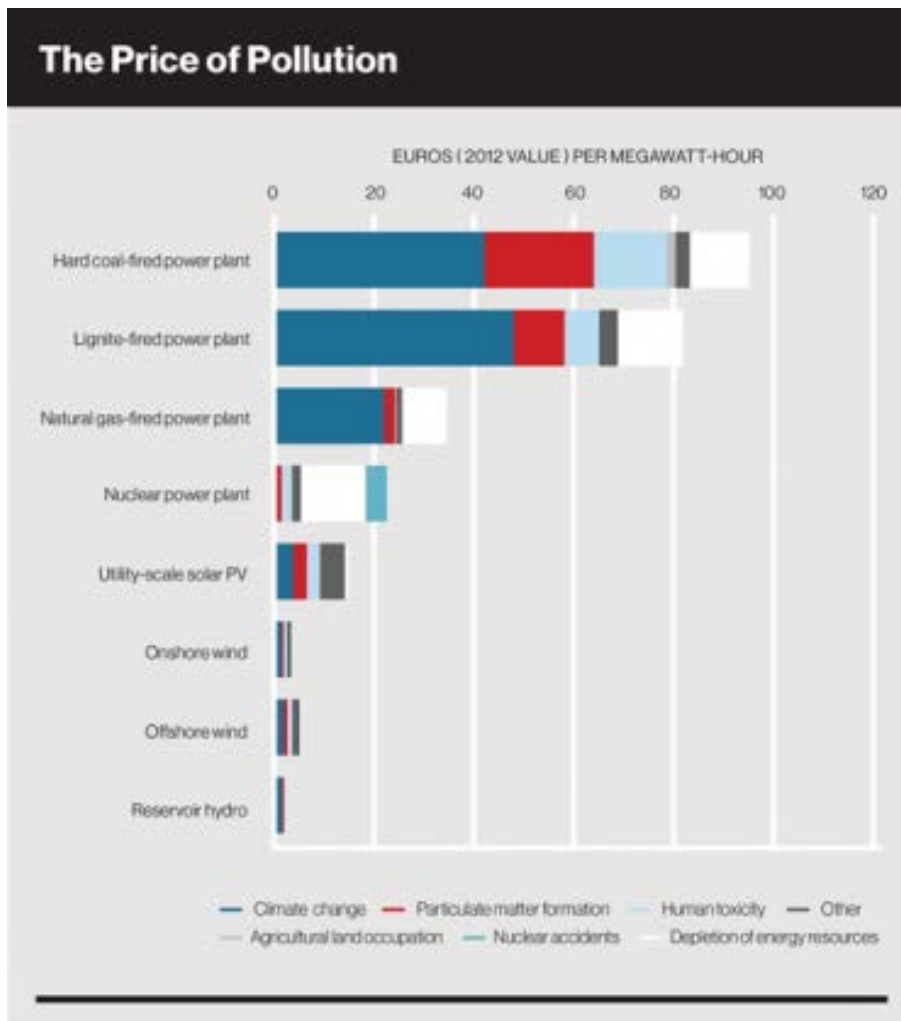
2. Least cost option: Without drowning you in data, I will assume you know the current costs of the energy options. If so, then you are going forward understanding that Hydro electricity generation, where available and acceptable, is the least cost per watt hour.

<http://electrical-engineering-portal.com/hydro-vs-wind-vs-solar-power>

3. Long term reliability: Where reliability implies consistent electricity generation, from the original generating product, over an extended time period. Solar, is generally given a 25 year, best before date, albeit with diminishing output. Windmills? But, did you happen to attend the 50th Anniversary of the Site C neighbouring W.A.C. Bennett Dam? Or, how about the BC Hydro Ruskin Generating Station, recently rebuilt, after 86 years, and now, purportedly, ready for another 80 years?

4. Delivery: Perhaps an atypical inclusion, but is a cost, on many levels, that needs to be considered. Power corridors are NOT in public favour, in most locations, and are very expensive to construct. Site C, as with its reuse of upstream stored water, can piggy back on the ready, in-place, BC Hydro grid delivery system.

5. Low Carbon Footprint: Surprisingly, that would be hydro electric generating, when that analysis includes the extended carbon footprint.



Source: Ecofys

That, according to the Ecofys analysis, which found that new coal and natural gas plants in the E.U. have leveled costs of just over €50 (\$64) (in 2012 euros) per megawatt-hour (assuming they are running at maximum capacity); onshore wind is around €80 (\$102) per megawatt-hour; utility scale solar PV is about €100 (\$127); nuclear power is around €90 (\$115); and hydropower is as cheap as €10. The chart below shows the estimated environmental cost for several technologies, per megawatt-hour.

<https://www.technologyreview.com/s/531841/why-solar-is-much-more-costly-than-wind-or-hydro/>

6. Low cost of Capital: Time, in this case, really is money. As the Bank of Canada proceeds with its recent signals on interest rates, each .25 % increase means millions of dollars more, in interest costs, over the life of the billions of dollars in contracts, still to be let.

7. Recovers lost capital. IF you recommend that Site C should be cancelled, the waste of \$5.7 Billion, in imbedded and anticipated cancellation costs, should be applied to whatever alternative source(s) you may choose to recommend. After all, it is only the total cost of meeting BC's energy needs that concerns the significant majority of BC Hydro customers, **NOT** whether or not it is from Site C. This is particularly so, when the choice you recommend be between hydro, and the less “green” alternatives.

Given: That the most popular “less green” alternatives are, neither nuclear, nor run-of-river, but:

1. WIND: Notwithstanding the expensive, often subsidized, construction cost factors, and the well documented variability of source (wind) supply problems, a search of "public against windmills," will yield many locations where the populace does NOT want any windmills, anywhere near them.

To list but a couple:

1. Energy companies planning wind farms are being opposed across Ontario by residents who don't want wind turbines near their homes.

https://www.thestar.com/news/canada/2013/07/31/wind_farm_wars_playing_out_in_rural_ontario.html

2. Home wind turbine has Vancouver neighbourhood upset

<http://www.cbc.ca/news/canada/british-columbia/home-wind-turbine-has-vancouver-neighbourhood-upset-1.1197571>

Wind works well, when air velocity is not to much, not to little, but just right. So, wind can work, except please, NOT in my backyard, thank you just the same.



Beautiful view, except for the windmills.

Recommendation: If wind farms are to be part of your suggested “go to” solution, that you include,

within your recommendation, that the first windmills are to be erected near where you live – only fair.

2. Solar: Unfortunately, not all sunny ways here, either, especially in Canada, in the Winter.

Peak energy demand, in BC, occurs at night, in the winter.

1. Shortest daytime period, for possible sunlight.
2. Lower angle of sun rays, can decrease solar output potential.
3. Clouds, may further decrease solar output.
4. Snow/ice are, potentially, a double whammy, covering/damaging panels.



Also, with solar, proponents usually ignore those Summer hail events, but you do so, only at our peril.



The alternatives, of solar and wind, only work if you:

1. Overlook current seasonality and weather factors, which decrease optimum outputs.
2. NOT factor in any climate change factors, that are more likely to impact the new technologies, than a proven hydro generation alternative.
3. Forget the significant increase in demand, that the anticipated transition to hundreds of thousands of EVs, on BC roads, will require.
4. Forgo the option of having a significant, ready, and reliable power supply source in place, and operational, as BC moves into Q2 of the 22nd Century. A period of expected;
 - a) Continued population growth.
 - b) Increasing industrial and market development.

c) Changing times and technologies.

All of which invariably equate to higher energy demand loads.

Option 3. PROCEED: Considering the imbedded Billions in costs, to cancel the Site C project, what possible alternative is there that will meet BC's future energy requirements, without marching us down the path of ever escalating, non-performing, energy related cancelled contract costs seen in other (eg. Ontario) jurisdictions? According to Chris O'Riley, BC Hydro's President, "we have among the lowest rates in North America and among the most reliable systems in the country. We have 98%-plus clean generation, which is among the highest in the country, and we have room to support our growing economy."

What's wrong with that?

Best Option: PROCEED.

Conclusion:

From my perspective, and with all due respect, I believe the real question, for your review, should NOT include any reference to:

1. Whether or not the Site C project should ever have been undertaken.
2. Whether or not the previous Government was correct to by-pass your valued oversight.
3. Considering the alternative, "Suspending," that only adds further costs, without viable payback. **BUT**, rather the BCUC base mandate, in this case, should be to review and evaluate how, given with Site C as it is, NOW, what is the best choice by **which** we, BC Hydro clients, may reasonably expect to continue to benefit from a relatively low cost per watt consumed, without unduly increasing our carbon footprint.

While I have chosen to ignore nuclear and run-of -river as less viable options, my intent has not been to also infer that solar and wind are not good alternatives. For, indeed, they may so be, for all those jurisdictions that do not have an available hydro electric generating alternative. i.e. **Just, NOT in BC.**

As you look to the future, which I view as an extremely critical, yet not directed, part of your mandate, electronically speaking:

1. Late at night, in the dead of Winter, when the wind don't blow, what keeps you warm?
2. Do you really want your EV fuel supply to be at the whims of the wind, cloud cover, and season of the year?
3. Do you anticipate that large scale development investments will go where there is a long life, cost effective, assured, ready, and reliable supply of energy?
4. Do you want to be associated with selecting the most "green" of the possible energy alternatives for BC's Citizens of Tomorrow?

BEST OPTION:

Albeit less than perfect, **PROCEED**, with **SITE C**.

Hydro: Old technology, not sexy, no sizzle, just a proven resource, offering low cost, long term reliability.

Very Telling: terms of reference issued by provincial government. In summary, the questions before the BCUC are:

- a. whether the project is on time and within budget;
- b. the cost to ratepayers of suspending the project;
- c. the cost to ratepayers of terminating the project;
- d. what portfolio of generating projects and demand-side management initiatives could provide similar benefits; and
- e. what are expected peak capacity demand and energy demand.