McCullough Research

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Reassessment of Site C Financial Viability

Updating Site C Cost Estimates for Seismic and Design Changes as of February 26, 2021

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After fourteen months of study, Premier Horgan released a number of brief studies supporting a decision to go ahead with Site C based on a budget of C$16 billion. Unfortunately, this brings Site C to the most expensive – both in terms of gross costs and costs per megawatt-hour of the three troubled projects currently underway in Canada -- outpacing the Keeyask project in Manitoba and the Muskrat Falls project in Newfoundland in both delay and cost.

At roughly twice its initial cost, Site C now has the distinction of not only being the most expensive hydro dam project in BC history, but at C$16 billion, with no assurance this will be the final cost, the most expensive single dam in Canadian history.

No justification for the new budget was provided. In October 2020, we predicted the one-year delay and calculated the likely financial impacts. At the time, the one-year delay raised the completed cost to C$12.9 billion. Yesterday's announcement raises the following question: "Why has the cost increased an additional C$3.1 billion dollars?"

Since the Technical Advisory Board questioned the seismic risks of a major hydroelectric facility built on shale in May 2019, Site C has operated on a completely secret basis.[1] The additional costs are probably a combination of existing cost overruns and the proposed augmentation of the earthfill dam and the anti-slip pylons designed to reduce the chance of breach in an earthquake.

The Peace Valley Landowners Association has asked us whether it is in the best interests of British Columbians to immediately cancel or to continue construction of Site C.

[1] Site C has missed the last two quarterly reports to the British Columbia Utilities Commission. Reports on the scale of losses in financial hedges (last reported as C$1 billion have also not been filed.

The revised percentage of completion has fallen from 48% based on the existing budget to 35% based on the new budget figure. Approximately two thirds of the cost of Site C will occur between now and 2025.

Site C's ability to compete in an increasingly competitive energy sector has deteriorated sharply over time. At the current schedule, if output is exported, Site C will cost rate payers significantly more than the energy can be sold for in the market. Assuming an additional C$3.1 billion in costs, Site C's value relative to the market has declined even further.

In the most likely case, Site C's output will be surplus to needs in British Columbia. If so, BC Hydro will spend C$134.82/MWh to complete and transmit Site C to market where it will be sold for C$37.06/MWh. In this case British Columbia Hydro loses 72.5% on each MWh produced by Site C.

Export Case					
Scenario	**Site C Costs to Completion**	**Cost Per MWh Deleivered to BC Border**	**Cost Per MWh Delivered to Mid-Columbia**	**Mid-Columbia Price**	**Loss per Mwh**
	(C$ Millions)	**(C$/MWh)**	**(C$/MWh)**	**(C$/MWh)**	**(%)**
2017 Budget	$ 5,138.85	$ 62.46	$ 69.94	$ 38.85	$ (31.10)
2021 Updated Budget	$10,566.56	$ 126.12	$ 134.82	$ 37.06	$ (97.76)

Alternatively, if the 1,100 megawatts of capacity and 5,100,00 MWh/year are needed in British Columbia, it is vastly more cost effective to simply purchase the energy on the Intercontinental Exchange (ICE) for delivery in 2025 and later years. Unlike the frequently escalating forecasts of the cost of Site C, a contract on the ICE forward market is a contract that assures delivery at the agreed price.

Compared to the newest Site C cost to completion, Friday's ICE price plus the cost of delivery to British Columbia is only 34.9% of Site C's currently predicted cost:

Import Case					
Scenario	Site C Costs to Completion	Cost Per MWh Deleivered to BC Border	Mid-Columbia Price	Cost Per MWh Delivered to BC Border	Loss per Mwh
	(C$ Millions)	(C$/MWh)	(C$/MWh)	(C$/MWh)	(%)
2017 Budget	$ 5,138.85	$ 62.46	$ 38.85	$ 45.88	$ (16.57)
2021 Updated Budget	$10,566.56	$ 126.12	$ 37.06	$ 44.07	$ (82.06)

The calculations above treat the existing C$5.4 billion invested in Site C as a sunk cost. This concept is difficult for political figures to grasp – a syndrome addressed in mainstream Economic literature. Regardless of their beliefs, the current investment cannot be offset or reduced.

In terms of ratemaking, however, the total cost of Site C – at a budget of C$16 billion – is C$171.04/MWh if collected over 30 years or C$116.93/MWh if collected over 75 years.

The BC government, apparently on the advice of BC Hydro, asserts that applicable regulatory law requires Site C cancellation costs of $10.2 billion to be written off within 10 years, putting the finances and Triple A credit rating of the province at risk, not to mention burdening current ratepayers.

The issue of timing of collections does not change the economics of the project. Currently, the project is being financed by bonds issued by the province. British Columbia Hydro does not have an independent financial existence apart from the province – it issues no bonds and its finances are guaranteed by the province. In 2025, if and when the project is forecasted to reach completion, the C$16 billion in debt will continue to be serviced by the province. At that time, it would appear that the provincial government plans to order the British Columbia Utilities Commission to delay reimbursement of the project's costs for a period of 75 years. The difference between the cost of the 30-year bonds and the payments from BC Hydro's ratepayers will be paid for by tax payers.

If this plan succeeds, in 2055, rate payers will begin paying the province back for the costs tax payers have borne for the first thirty years. In the year 2100, ratepayers will finally have repaid taxpayers for the amounts under collected during the first 30 years.

We can suspect that your children's grand children will puzzle over their electric bill in 2100, wondering what the charge is for. Looking backwards 75 years, the first modern

computer was introduced in 1947. It was able to store 100 numbers. Its power consumption was such that lights in Philadelphia would dim while it was in operation.[2,3]

Given that Site C is economically obsolete in 2021, your great grandchildren will certainly be puzzled by this surcharge to their electric bill.

The BC government has not presented a detailed breakdown and justification for the $10.2 billion cost estimate to cancel Site C. Nor is there any discussion of possible mitigation strategies to reduce this cost. Ignoring the sunk cost fallacy, the BC Government justifies proceeding on the basis that this $10.2 billion would otherwise be thrown away.

Of even more relevance is the repeated statement that recovery of the existing debt and termination costs will need to be collected over 10 years. In theory, BC Hydro follows the same accounting standards as other utilities in the U.S. and Canada. Rate treatment of terminated plant is the responsibility of the regulatory agency – the British Columbia Utilities Commission. Recovery of terminated projects elsewhere are not subject to an arbitrary 10-year period,

In 2017, when Site C's budget was C$8.345 billion and the cost to completion was C$6.7 billion, the Site C inquiry was initiated to see if completion of the project was prudent. Today, the cost to completion has increased to C$10.8 billion. It is logical to ask if an independent inquiry was required four years ago, whether a new review is even more necessary today.

Most North American jurisdictions refer projects such as Site C to an independent body with the power to review and call experts to shine light on the project costs and implications and make orders to protect ratepayers. Site C cancellation costs and repayment options have not received nearly enough independent scrutiny.

Given the scale of the mismanagement to date, a financially prudent government would refer the issue of cost of cancellation and repayment of outstanding debt to the independent BC Utilities Commission for expedited review. After all, it will be the BC Utilities Commission that will set the rates to repay the debt, if Site C is completed.

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[2] https://en.wikipedia.org/wiki/ENIAC

[3] "The ENIAC had 17,468 vacuum tubes that blew out every couple of days. It took up 1,800 square feet of warehouse space and weighed more than 25 tons (which is as much as some of the heaviest actual dinosaurs). And for all that, it could execute 5,000 instructions per second. The iPhone 6, weighing in at 4.55 ounces? 25 billion instructions per second." https://allthatsinteresting.com/first-computer#:~:text=The%20ENIAC%20had%2017%2C468%20vacuum,out%20every%20couple%20of%20days.&text=Sure%2C%20at%201720%20pounds%2C%20it's,times%20smaller%20than%20the%20ENIAC.