

ROBERT F. MCCULLOUGH, JR.  
PRINCIPAL

## Reassessment of Site C Financial Viability

### Updating Site C Cost Estimates to September 28, 2021

Robert McCullough  
McCullough Research

Since actual construction began in 2015, Site C has been delayed twice and had its budget re-assessed four times. Public information on Site C has gradually reduced from a flood to a trickle, so understanding the project requires review of a variety of British Columbia publications: annual reports, quarterly reports, service plans, BCUC quarterly reports, BCUC annual reports, and special reports. There is little continuity or consistency between the sources. In some years, Site C will release more quarterly reports than others. Last year, for example, had only two quarters.

In February of this year, BC Hydro increased the budget from \$10.7 to \$16.0 billion. Unlike previous budget revisions, the new budget had few details. Last month, BC Hydro released its 22<sup>nd</sup> Quarterly Report. This provides sufficient information to reverse engineer the \$16.0 billion calculation.

Unfortunately, even the most superficial analysis indicates that as of June 2021, British Columbia Hydro projected that Site C was \$164 million over budget. Adding the missing values for the last twenty months of the construction indicates that Site C will be a \$950 million over budget. The calculations are straightforward:

1. Table 7 (below) indicates that as of June 2021, the Site C's construction costs were \$6.693 billion. From April 2021 through March 2024, the 2021/2022 Service Plan indicates additional construction expenses of \$7.265 billion are required. To avoid double counting the construction costs in the April 2021 through June 2021, \$541 million should be subtracted. The total is  $\$6.693 + \$7.265 - \$0.541 = \$13.417$  billion. In addition, the project will cost \$2.028 billion for interest during construction. This is \$182 million over the proposed budget after only three months.
2. The situation is exacerbated since the numbers above only represent construction costs through March 2024. Since the project is now scheduled to enter service in November 2025, the proposed budget understate expenses

Reassessment of Site C Financial Viability

October 11, 2021

Page 2

for the final twenty months between April 2024 and November 2025. A conservative estimate of costs during this period can be based on the trend of costs reported in the most recent Service Plan. In this case, Site C costs would be approximately \$950 million over budget.

These are very conservative calculations given that the most recent quarterly report indicates a continuing concern with the primary geotechnical issue – slippage of the earthfill dam, problems with the diversion tunnel – delamination, and rubble accumulating downstream of the dam.

The scale of the first problem is significant since it was the primary focus of the Milburn report, the \$5.3 billion budget increase, and the one-year delay. The two other issues may well represent geotechnical issues, but the limited description in the current quarterly report makes it difficult to judge at this time.

To walk through the \$16 billion dollar budget, the starting point is Table 7 of Site C Quarterly Progress Report 22 that was issued just ten days ago:

**Table 7 Project Budget by Key Work Area (\$ million)**

Description	Project Budget (Note 4)	Actuals, LTD (as of June 2021)	Remaining Budget (as of June 2021)
Dam, Power Facilities and Associated Structures and Transmission (Note 1)	8,258	4,055	4,203
Offsite Works, Direct Construction Supervision and Site Services (Note 2)	2,895	1,507	1,388
<b>Total Direct Construction Cost</b>	<b>11,153</b>	<b>5,562</b>	<b>5,591</b>
Indirect Costs (Note 3)	2,082	1,131	951
<b>Total Construction and Indirect Costs</b>	<b>13,235</b>	<b>6,693</b>	<b>6,542</b>
Interest During Construction	2,028	719	1,309
Contingency	737	0	737
<b>Total</b>	<b>16,000</b>	<b>7,412</b>	<b>8,588</b>

Note 1: Key items included are river diversion infrastructure, earthfill dam and related works, spillways, powerhouse, generation equipment and transmission and substation work.

Note 2: Key items included are highway re-alignment and reservoir related work, direct construction supervision, and site services such as workers accommodation.

Note 3: Key items included are mitigation and compensation programs, development and regulatory costs, project management, engineering and other support services such as project controls, contracts management, environmental, and Indigenous relations.

Note 4: The Project Budget, approved in June 2021 by Treasury Board, is the same budget as the revised Project cost estimate reported on in Quarterly Progress Report No. 21.

<sup>1</sup> Site C Quarterly Progress Report 22, September 28, 2021, page 52.

Reassessment of Site C Financial Viability

October 11, 2021

Page 3

Although BC Hydro’s quarterly reports to the British Columbia Utilities Commission do not provide detail on future construction expenditures, the BC Hydro’s annual Service Plan provides such estimates for the next three financial years.<sup>2</sup>

(Smillions)	2020/21 Forecast	2021/22 Forecast	2022/23 Forecast	2023/24 Forecast
Site C Project <sup>3</sup>	2,107	3,129	2,685	1,451
Subtotal – BC Hydro Capital Expenditures before CIA	3,573	4,738	4,413	3,305
CIA	(160)	(214)	(167)	(171)
Total BC Hydro Capital Expenditures net of CIA	3,413	4,524	4,246	3,134

- <sup>1</sup> BC Hydro classifies capital expenditures as either sustaining capital or growth capital:
- Sustaining capital includes expenditures to ensure the continued availability and reliability of generation, transmission and distribution facilities. It also includes expenditures to support the business, such as vehicles and information technology.
  - Growth capital includes expenditures to meet customer load growth and other business investments. Growth capital includes expenditures to expand existing generation assets as well as expand and reinforce the transmission and distribution system, and includes Site C.
- <sup>2</sup> Contributions in aid of construction are amounts paid by certain customers toward the cost of property, plant and equipment required for the extension of services to supply electricity.
- <sup>3</sup> Site C project forecast expenditures have been updated to reflect the costs estimated at \$16 billion, which was announced on February 26, 2021.

3

BC Hydro’s financial year is April through March. Table 7 from Quarterly Report 22 provides actual costs at the end of the first quarter. To calculate the actual costs at the end of the previous financial year, it is necessary to subtract the first quarter construction costs. The actual construction cost is found in BC Hydro’s first quarter financial report:

<i>For the three months ended June 30 (\$ in millions)</i>	<b>2021</b>		<b>2020</b>	
Transmission lines and substation replacements and expansion	\$	<b>96</b>	\$	61
Generation replacements and expansion		<b>78</b>		63
Distribution system improvements and expansion		<b>145</b>		130
General, including technology, vehicles and buildings		<b>28</b>		58
Site C Project		<b>541</b>		386
<b>Total Capital Expenditures</b>	\$	<b>888</b>	\$	698

4

<sup>2</sup> BC Hydro publishes two different annual reports with the name “Service Plan.” These are largely duplicative, but the “Annual Service Plan Report” also includes the traditional annual financial reports as well.

<sup>3</sup> 2021/22 – 2023/24 Service Plan, April 2021, page 22.

<sup>4</sup> 2021/22 First Quarter Report, page 8.

The associated interest during construction can be calculated by multiplying \$541 million by the interest rate provided in the Service Plan for 2021/2022 financial year – 1.86%.<sup>5</sup>

This allows the following reverse engineering of the proposed budget:

Reverse Engineered Proposed Budget (\$ in millions)					
Ending Date	Cumulative Construction Expenses	Construction Expense	Cumulative Interest During Construction	Interest During Construction	Total Life to Date Cost
11/30/2025	\$14,136	\$0	\$1,863	\$235	\$15,999
3/31/2025	\$14,136	\$0	\$1,628	\$353	\$15,764
3/31/2024	\$14,136	\$1,451	\$1,275	\$318	\$15,411
3/31/2023	\$12,685	\$2,685	\$957	\$240	\$13,642
3/31/2022	\$10,000	\$3,129	\$717	\$164	\$10,717
6/30/2021	\$7,412	\$2,588	\$719		\$8,131

The calculations taken from the quarterly reports, the annual Service Plan, and the Site C Quarterly Progress Report support the \$16 billion budgetary estimate.

A problem becomes obvious with the new estimate. This can easily be shown from an updated Site C Construction Schedule diagram. This diagram was an important part of the quarterly Site C reports until July 2020. Since that time, the schedule has apparently become confidential.<sup>6</sup>

The revised schedule extends the in-service dates per BC Hydro’s new budget:

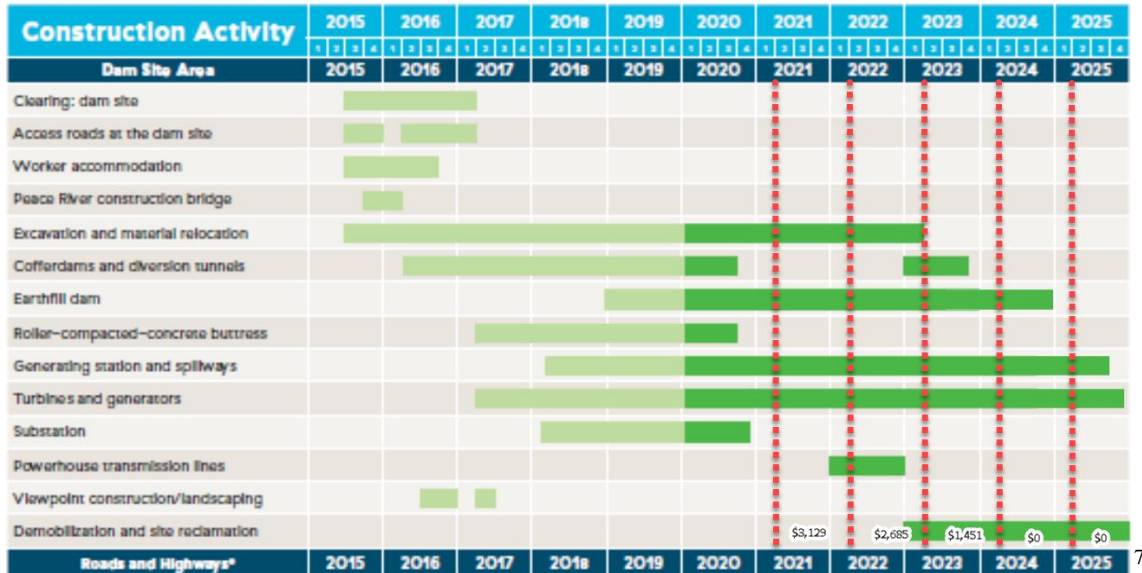
---

<sup>5</sup> 2021/22 – 2023/24 Service Plan, April 2021, page 20.

<sup>6</sup> In March 2021’s progress report the missing material was promised in future reports on page 27.

## Site C Construction Schedule

February 2020  
 4000-91



The final twenty months of the Site C project show a zero incremental construction cost for the project if it could meet the \$16 billion budget.

The dotted red lines show the financial years from 2020-2021 through 2024-2025.

The dollar amounts at the bottom of the chart are the incremental construction costs reported from the most recent Service Plan. The green bars reflect the updated in-service dates from Table 8 of Site C Quarterly Progress Report No. 22.

<sup>7</sup> Quarterly Progress Report No. 19 Appendix G Site Construction Schedule, page 1. This chart has been omitted from the following three progress reports. The version here has been updated with the in-service dates from Table 8 from Site C Quarterly Progress Report No. 22, September 28, 2021, page 49.

Reassessment of Site C Financial Viability

October 11, 2021

Page 6

**Table 6      In-Service Dates**

Description	In-Service Dates based on the Announcement from the Government of B.C. <sup>10</sup>	Status
5L5 500 kV transmission line	October 2020	Complete
Site C substation	October 2020	Complete
5L6 500 kV transmission line	July 2023	On track
Unit 1 (first power)	December 2024	On track
Unit 2	February 2025	On track
Unit 3	May 2025	On track
Unit 4	July 2025	On track
Unit 5	September 2025	On track
Unit 6	November 2025	On track

8

It is very unlikely that construction could proceed for twenty months without additional cost. Even if the powerhouses and turbines had been paid for in advance, there will still be operational costs completing the installations. The following analysis adds construction expenses for the final twenty months extrapolated from the thirty-six months of construction expenses reported in the last Service Plan:

Reverse Engineered Proposed Budget (\$ in millions)					
Ending Date	Cumulative Construction Expenses	Construction Expense	Cumulative Interest During Construction	Interest During Construction	Total Life to Date Cost
11/30/2025	\$15,064	\$184	\$1,886	\$249	\$16,950
3/31/2025	\$14,880	\$744	\$1,637	\$362	\$16,517
3/31/2024	\$14,136	\$1,451	\$1,275	\$318	\$15,411
3/31/2023	\$12,685	\$2,685	\$957	\$240	\$13,642
3/31/2022	\$10,000	\$3,129	\$717	\$164	\$10,717

Much, but not all, of the budget overrun will be covered by the \$737 million dollar contingency.

Overall, the most recent report indicates that the completed proportion of Site C has fallen to 46%. The analysis above indicates that fraction of the project completed has actually fallen to less than 44%.

Relying on British Columbia Hydro’s own data, as of June 30, 2021 – one quarter after the new budget and schedule was released – Site C is already \$168 million over budget.

<sup>8</sup>Site C Quarterly Progress Report No. 22, September 28, 2021, page 49.

Reassessment of Site C Financial Viability

October 11, 2021

Page 7

---

Correcting – very conservatively – for the assumed zero costs in the last twenty months of the project, places Site C at \$950 million dollars over budget. By all indications, February’s new budget was simply an approximation with traditional construction cost forecasts scrambling to fit within the \$16 billion target.