

**OPERATING LOSSES COULD ADD ANOTHER \$5.5 BILLION TO THE COST OF SITE C**

The Site C dam is likely to result in accumulated operating losses of \$5.5 billion for the first 15 years of operation. The losses result from the cost of production (primarily debt service) exceeding the additional sales revenue. For a number of years, the new power supplied by the dam will add to BC Hydro's surplus power and will be exported at a much lower price than the cost of production. Over time BC Hydro forecasts that domestic demand will begin to reduce the surplus, and all the new power will be used for domestic purposes by year 16.

BC Hydro has not provided an annual loss projection, nor a plan for covering these losses. Its current rate change submission to the BC Utilities Commission covers the fiscal years 2022/23 to 2024/25. As a result, it does not provide information on Site C's annualized debt service costs, nor the forecast of additional sales revenue. This paper provides a high-level estimate of the operating losses, and possible funding measures.<sup>1</sup>

**1.0 Estimating the Increase in Expenditures**

In February 2021, the government announced that the new estimate for the Site C project had jumped from \$10.7 billion to \$16.0 billion. Some detail as to what this forecast included were included in BC Hydro's F23 to F25 rate request application (RRA) filed with the BC Utilities Commission dated 31 August 2021. The public utility stated that the amortization cost impact on the rates would not be addressed until the next rate filing, probably September 2023. As some of the new capacity would be activated in FY2024/25, BC Hydro did include funding for additional staff and operating expenses in the requested rate increase for that year.

The largest annual cost impact of the Site C project is debt service cost, which is a function of the amount borrowed, the amortization term and the cost of borrowing (the interest rate). BC Hydro has said that all of the \$16.0 billion will be borrowed. It has implied that the amortization period will be 84 years, rather than the 70-year period

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<sup>1</sup> In June 2017, I estimated the net losses of a \$8.8 billion Site C project; see [https://www.bcpolicyperspectives.com/media/attachments/view/doc/occasional\\_paper\\_no\\_33\\_cost\\_estimates\\_of\\_site\\_c\\_24\\_june\\_2017/pdf/occasional\\_paper\\_no\\_33\\_cost\\_estimates\\_of\\_site\\_c\\_24\\_june\\_2017.pdf](https://www.bcpolicyperspectives.com/media/attachments/view/doc/occasional_paper_no_33_cost_estimates_of_site_c_24_june_2017/pdf/occasional_paper_no_33_cost_estimates_of_site_c_24_june_2017.pdf)

that was used in earlier estimates.<sup>2</sup> In its current RRA, BC Hydro said the existing deferral in the Site C regulatory account (forecast at \$613 million by 2025/26) will be recovered from ratepayers over 84 years,<sup>3</sup> and it has confirmed to the writer that the balance in the deferral account is part of the \$16.0 billion project cost that will be amortized. No provision has been made in my estimate for any financial settlement for infringement of the Treaty 8 rights.<sup>4</sup>

I have used a 3.6% interest rate to estimate the annual debt service cost using standard amortization tables. The interest rate is a key assumption. As of 31 March 2021, BC Hydro’s average weighted cost of borrowing was 3.6%, down from 4.0% in the prior year.<sup>5</sup> Approximately \$8.0 billion of the total Site C cost was borrowed by the end of the last fiscal year, so this portion of the \$16 billion total was included in the 3.6% average cost.

Finally, I have assumed \$45 million in additional annual operating costs, including \$10 million for staff, operating costs, and grants in-lieu, plus \$35 million in increased water rentals paid to the province.

Assuming a 84-year amortization of \$16.0 billion at 3.6% the annual payment for principal and interest is \$605 million, and a \$650 million annual increase in total operating expenditures. This equates to a cost per MWh of \$127.

### Other Scenarios

Table 1 shows four scenarios, with Scenario A as the primary forecast. Scenario B assumes the original 70-year amortization period and results in a higher annual cost. Scenarios C and D assume that the annual debt service cost is reduced by committing \$3.0 billion of BC Hydro’s equity to reduce the amount borrowed. These two options lower the annual increase in the debt service costs.

**Table 1 – Operating Scenarios With 3.6% Borrowing Cost (\$=million)**

	<b>Scenario A</b>	<b>Scenario B</b>	<b>Scenario C</b>
Total Borrowed	\$16 Billion	\$16 Billion	\$14 Billion
Amortization	84 Years	70 Years	84 Years

<sup>2</sup> In its RRA, BC Hydro said the existing deferral in the Site C regulatory account (forecast at \$613 million by 2025/26; see RRA, Chapter 7, section 7.7.3.4) will be recovered from ratepayers over 84 years, and it has confirmed to the writer that the balance in the deferral account is part of the \$16.0 billion project cost that will be amortized.

<sup>3</sup> BC Hydro RRA F23 to F25, Chapter 7, section 7.3.3.4.

<sup>4</sup> <https://vancouversun.com/news/politics/vaughn-palmer-how-many-times-do-we-have-to-stand-here-and-defend-our-treaty-rights>

<sup>5</sup> BC Hydro Annual Report 2020/21, p.87.

Annual Debt Service	605	625	530
Operating Expenditures	10	10	10
Water Rental	35	35	35
ANNUAL TOTAL	650	670	575
\$/MWh	\$127	\$131	\$113

Using 84 years rather than 70 years at 3.6% on \$16 billion adds approximately \$7.0 billion in interest costs over the period, or \$83.3 million per year (equivalent to 1.5% rate increase). BC Hydro had been assuming a 70-year amortization period, but the increase in the total cost estimate, partly offset by lower borrowing costs, likely resulted in the longer payback period and the extended amortization.<sup>6</sup>

## 2.0 Estimating Site C Sales Revenue

To estimate BC Hydro’s net operating loss caused by the operation of the Site C dam one must subtract the anticipated sales revenue from the annual expenditures. The sales revenue is a function of the volume of electricity (GWh) sold and the price. The three main domestic customer classes pay different prices. For example, in 2020/21 Residential customers paid an average of \$116.42 per MWh, while Large Industrial customers paid an average of \$61.26 per MWh.<sup>7</sup> Power exported (Trade) generated an average of only \$42.52 per MWh last year.

### Total Power Available

Last year BC Hydro reported that it generated from owned sources or purchased through long-term contracts with independent power producers (IPPs), approximately 64,500 GWh, of which some 8,300 GWh was exported.<sup>8</sup> With the addition of Site C’s 5,100 GWh by 2026/27 (see Appendix Table A1 for the phase-in), the surplus sales will grow until Domestic sales grow to absorb the surplus.

This estimate assumes that the gross domestic production available (after line loss) will be 62,100 GWh for 2025/26 and plateau at 64,500 GWh for the next 15 years.<sup>9</sup>

<sup>6</sup> [https://www.bchydro.com/news/press\\_centre/news\\_releases/2016/70-year-economic-life-site-c.html](https://www.bchydro.com/news/press_centre/news_releases/2016/70-year-economic-life-site-c.html)

<sup>7</sup> BC Hydro Annual Report 2020/21, p. 22.

<sup>8</sup> Table 4 in

[https://www.bcpolicyperspectives.com/media/attachments/view/doc/occasional\\_paper\\_no\\_76\\_bc\\_hydro\\_annual\\_report\\_5\\_sept\\_2021/pdf/occasional\\_paper\\_no\\_76\\_bc\\_hydro\\_annual\\_report\\_5\\_sept\\_2021.pdf](https://www.bcpolicyperspectives.com/media/attachments/view/doc/occasional_paper_no_76_bc_hydro_annual_report_5_sept_2021/pdf/occasional_paper_no_76_bc_hydro_annual_report_5_sept_2021.pdf)

<sup>9</sup> BC Hydro is attempting to reduce the IPP commitment for the period under review.

## Forecasting Sales Revenue and Operating Loss

BC Hydro included its December 2020 Domestic sales (load) forecast in its recent rate request filing with the BCUC.<sup>10</sup> This forecast shows total Domestic sales of 56,513 GWh in 2025/26, when the additional power from Site C begins to come on-stream. By 2040/41, BC Hydro forecasts that total Domestic sales will be approximately 64,000 GWh.

Assuming an average price of \$102.40/MWh for the Domestic sales, and \$42.50/MWh for the export price, it is possible to estimate the annual losses from the generation of the Site C power priced at \$127.00/MWh.

For the period 2025/26 to 2032/33, all the Site C production is surplus to Domestic requirements and would be exported at a loss of approximately \$84.00/MWh. The annual loss is \$428.4 million for seven years, plus \$225.5 million for the partial 2025/26 year. The total operating loss for the first eight years is approximately \$3.2 billion.

For the balance of the 15-year period BC Hydro forecasts that Domestic sales will grow by approximately 400 GWh per year, which significantly increases the revenue received for the Site C power (by about \$60/MWh) compared to the revenue received by exporting the power. By year 15 (2040/41) the December 2020 forecast suggests that all but 500 GWh of the additional Site C power will be required for Domestic sales.

However, the average 2020/21 price for the Domestic market is still almost \$25/MWh less than the cost of generation, which means that as Domestic sales grow to absorb the Site C surplus, BC Hydro will still be suffering losses.

Using a simple average Domestic price, rather than tracking the forecast sales to each customer class, I have estimated that the net losses for the 2033/34 to 2040/41 years at between \$2.2 billion and \$2.5 billion.<sup>11</sup> Annual inflationary Domestic rate increases would reduce the loss because most of the Site C annual cost is a relatively fixed amortization cost.

### 3.0 Funding Options

By this estimate BC Hydro is facing a potential cumulative operating loss of approximately \$5.5 billion after the first 15 years of operation of the Site C dam. This equates to an average Domestic rate increase for BC Hydro customers of approximately 10% for the period.

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<sup>10</sup> Appendix F, p. 4 of 256; [https://docs.bcuc.com/Documents/Proceedings/2021/DOC\\_64006\\_B-2-1-BCH-F23-F25-RRA-Appendix-public.pdf](https://docs.bcuc.com/Documents/Proceedings/2021/DOC_64006_B-2-1-BCH-F23-F25-RRA-Appendix-public.pdf) pdf 183/2694.

<sup>11</sup> In 2035/36, for example, of the 5,100 GWh available some 3,150 would be exported (for a loss of \$246 million) and 1,950 GWh would be sold domestically (for a loss of \$47 million). In 2039/40, the export sales drop to 1,750 (a \$147 million loss) while domestic sales consume 3,350 GWh (a loss of \$84 million).

BC Hydro has not indicated how it will pay for the losses; it has yet to acknowledge that major losses are pending. It has asked the BCUC to treat the 2024/25 rate request as tentative pending a later review (presumably for the 2025/26 and later years) of the capital costs that will be allowed to be recovered in future rates.<sup>12</sup>

### **a) Deferral Option**

Given the desire of the government and most interveners to keep electricity rate increases as low as possible it is probable that BC Hydro will ask the BCUC to defer the operating losses in a regulatory account. This could have the effect of spreading the \$5.5 billion in potential losses over a longer time period, thereby reducing the much of the annual rate increase required to eliminate the annual loss.<sup>13</sup>

If the payback period were deferred over a long period (e.g., 84 years to match the debt amortization) the rate stability objective achieved by avoiding a rate shock would be in conflict with the objective of intergenerational equity. Why should future generations of ratepayers be required to pay for the operating losses incurred by the current ratepayers?

### **b) Increase Electricity Sales**

The government has been making announcements about encouraging the use of more hydroelectricity as part of the CleanBC initiative. Some of the rate reduction programs use deferral accounts to fund temporary price subsidies, especially in the Large Industrial sector.<sup>14</sup> Others provide incentives to switch home heating from natural gas to electric heat pumps.<sup>15</sup>

As yet there is no firm forecast as to what additional GWh sales will be realized from these new programs. The rising cost of natural gas may assist in the switch to electricity, but a Site C induced jump in the price of BC Hydro's electricity would widen the price difference between electricity and gas for heating.

### **c) Commit \$2.0 billion in BC Hydro Equity**

The current plan has BC Hydro borrowing all of the estimated \$16.0 billion for the Site C project. According to BC Hydro's first quarter 2021/22 report, there is approximately \$2.0 billion in equity net of "regulatory assets." If this equity were used to replace borrowing the annual operating cost would be reduced by \$75

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<sup>12</sup> [https://docs.bcuc.com/Documents/Proceedings/2021/DOC\\_64391\\_A-3-Panel-Letter-DSM-and-SiteC.pdf](https://docs.bcuc.com/Documents/Proceedings/2021/DOC_64391_A-3-Panel-Letter-DSM-and-SiteC.pdf) p. 2.

<sup>13</sup> The government could soften the blow to ratepayers by lowering the high return on equity required of BC Hydro.

<sup>14</sup> <https://www.bchydro.com/powersmart/business/programs.html>

<sup>15</sup> <https://www.bchydro.com/powersmart/residential/rebates-programs/home-renovation/renovating-heating-system/fuel-switching.html>

million (Table 1—Scenario C). This would reduce the Site C cost from \$127/MWh to \$113/MWh and lower the annual losses.

#### **d) Subsidize Site C Losses with Carbon Tax Revenue.**

Some form of taxpayer subsidy to cover the first 15 years of losses would recognize the extraordinary nature of the decision to proceed with this expensive dam project in the absence of a readily defined market for the additional power. As noted in the earlier study, directing some of the additional provincial carbon tax to help offset the first 15 years of operating losses would be in keeping with the objectives of the tax. It would help to avoid the shock of a 10% rate increase, or the dilemma of forcing future generations to pay operating losses incurred in the short and mid-term.

There is precedent for subsidizing electricity prices with taxpayer funds. Ontario already subsidizes its residential electricity rates with taxpayer funds. The federal government has agreed to subsidize the Muskrat Falls project to avoid the rate shock expected from that costly Hydro dam and transmission project.

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The writer is a retired senior BC government public servant whose paper describing the BC government's manipulation of the finances of BC Hydro from 2008 to 2014 was published by *BC Studies* in November 2016. *BC Studies* published his paper on the 40-year financial history of ICBC in 2013. He is an intervener in the BC Utilities Commission's recent reviews of ICBC's and B.C. Hydro's rate requests.

## **APPENDIX**

### **Increase to Domestic GWh Supply**

The six generators at Site C will be brought online in phases commencing December 2024 and ending November 2025.<sup>16</sup>

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<sup>16</sup> See F23 to F25 RRA, Table 6-60; [https://docs.bcuc.com/Documents/Proceedings/2021/DOC\\_64005\\_B-2-BCH-F23-F25-RRR-public.pdf](https://docs.bcuc.com/Documents/Proceedings/2021/DOC_64005_B-2-BCH-F23-F25-RRR-public.pdf) p. 6-125 (pdf 948/1079).

Using the actual owned and long-term contracted generating capacity from FY2020/21, Site C will add 5,100 GWh capacity by FY 2026/27; with 2,685 GWh added in FY2025/26, and an additional 2,415 GWh added in FY2026/27. Table 333 shows the assumed generating capacity.

**Table A1—Phase-In of Site C Capacity (GWh)**

	<b>FY2025/26</b>	<b>FY2026/27</b>
Domestic Generation		
Owned - Hydro	49,796	49,796
Site C	2,685	5,100
Thermal	150	150
Total	52,630	55,046
Indep. Power Purchase	14,600	14,600
Line Loss	(5,100)	(5,100)
Net Available	62,130	64,545
Domestic Sales	56,513	57,255
Surplus/(Deficit)	5,617	7,290

Source: Generation (except for Site C) projected from 2020/21 annual report. Sales forecast from F23 to F25 RRA, Load Forecast from Appendix F, p. pdf 256;  
[https://docs.bcuc.com/Documents%2fProceedings%2f2021%2fDOC\\_64006\\_B-2-1-BCH-F23-F25-RRA-Appendix-public.pdf](https://docs.bcuc.com/Documents%2fProceedings%2f2021%2fDOC_64006_B-2-1-BCH-F23-F25-RRA-Appendix-public.pdf)