

Duncan, Kate EMPR:EX

From: Clark, Layne PREM:EX
Sent: November 1, 2017 11:33 AM
To: LP Ministerial Assistants; LP Executive Assistants; LP Premiers Vancouver Office
Subject: Updated Site C Materials
Attachments: MLAs_KMs-QA_Site C Review_Final Report_Oct31_725pm Final.docx; Site C Response - Finalv.1.docx

Hi Everyone,

As I am sure you are aware, the BC Utilities Commission (BCUC) has released its Site C report. Attached to this e-mail you will find key messages, Q&A and a suggested response for correspondence. This has also been sent to all MLAs and Constituency Assistants.

I ask that you walk through these notes with your Ministers. If you have any questions, do not hesitate to reach out.

Thanks again,

Layne

QUESTION AND ANSWERS (MLAs)
SITE C REVIEW – FINAL REPORT
Oct. 31, 2017

Ministry of Energy and Mines

- Our government initiated the BCUC review of Site C to assist us in making the best decision for keeping BC Hydro rates affordable in the long-term.
- The BCUC's findings are based on 620 written and 304 oral submissions from individuals and organizations, and thousands of pages of information on the project provided to the BCUC and made available to the public.
- I want to thank the BCUC, BC Hydro and all participants for their contributions and for completing the review under extremely demanding timelines.
- Now it is our turn, as government, to determine whether Site C is in the best interests of British Columbians, after considering the BCUC's findings and other issues outside the scope of this review.
- I don't want to pre-judge that decision in anyway, so I will not be commenting or taking meetings on the specific findings in the final report at this time, but I would encourage everyone to go to the BCUC website and read it.

If asked about timing of decision:

- This will be an extremely difficult decision – we inherited a project that was advanced by the previous government without proper regulatory oversight and that is now more than two years into construction, employs more than 2,000 people and on which about \$2 billion has already been spent.

- We are going to take the time we need to make a decision on Site C that works for B.C. families, businesses and the sustainability of our environment and economy.
- As part of our decision-making process, this month the Minister of Indigenous Relations and the Minister of Energy, Mines and Petroleum Resources will be meeting with Treaty 8 First Nations impacted by the project. We will also be taking other First Nation interests expressed during the Site C review and other processes into account.
- Given the complexity of the issues involved and the significant and long-term impacts for our province, this is a decision we take very seriously. We anticipate a decision by the end of the year.

Page 004 to/à Page 006

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TEMPLATE MEETING REQUEST/LETTER/EMAIL RESPONSE
SITE C REVIEW – FINAL REPORT
Oct. 27, 2017

Ministry of Energy and Mines

Thank you for writing about the Site C dam.

As you may be aware, on August 2, 2017, the Government directed the BC Utilities Commission (BCUC) to undertake a review of the Site C project and provide advice on ratepayer impacts should the project be continued, cancelled or suspended. Our Government initiated the BCUC review of Site C to ensure we make the right decision for B.C. families and keep BC Hydro rates affordable in the long-term.

The BCUC has completed the review and their work has been informed by technical experts, a broad range of stakeholders, hundreds of members of the public and First Nations. The level of participation shows just how important the issue of Site C is to everyone and supports our decision to send the project to the BCUC. This is an important decision, and the Government appreciates and thanks all who participated and shared their views.

We will now take the time we need to consider the findings and other issues that are outside the scope of the review and make a decision on whether or not Site C is in the best interests of British Columbians. Given the complexity of the issues involved and the significant and long-term impacts for our province, this is a decision we take very seriously. We anticipate a decision by the end of the year.

Once again, thank you for taking the time to contact my office. I appreciate you reaching out to share your perspective with me.

Sincerely,

xx

Duncan, Kate EMPR:EX

From: Vasilev, Susan LASS:EX
Sent: November 8, 2017 5:34 PM
To: McNish, James EMPR:EX; Sanderson, Melissa EMPR:EX
Subject: Keep another dam out of the Peace Valley

FYI – campaign by the Yellowstone to Yukon Conservation Initiative. I let her know they will not be responded to centrally.

Susan Vasilev | Internal Communications Manager | New Democrat BC Government Caucus | t: 250.952-7637
Susan.Vasilev@leg.bc.ca | www.bcndpcaucus.ca | www.facebook.com/johnhorganbc

From: Bains.MLA, Harry
Sent: Wednesday, November 08, 2017 11:20 AM
To: Vasilev, Susan <Susan.Vasilev@leg.bc.ca>
Subject: FW: Keep another dam out of the Peace Valley

Hi Susan,

I apologize if this has already been addressed. We have received about 200 of these messages. I believe they are likely sending to all MLAs as they are not our constituents. Will someone be responding to these emails centrally?

Thanks,

Amber Armstrong

Constituency Assistant to Hon. Harry Bains, MLA, Surrey-Newton
#102-7380 King George Blvd., Surrey, BC, V3W 5A5
P: (604) 597- 8248 | E: amber.armstrong@leg.bc.ca

From s.22
Sent: Wednesday, November 8, 2017 10:39 AM
To: Bains.MLA, Harry <Harry.Bains.MLA@leg.bc.ca>
Subject: Keep another dam out of the Peace Valley

Today I'm writing your government because I'd like you to cancel the Site C dam.

While the economic arguments are also important to me, today I wish to remind you that the wildlife and environmental impacts from this dam are unprecedented in the history of environmental assessment in Canada. No other project even comes close.

The valley bottom ecosystem in the Peace is unique and irreplaceable. There is no way to mitigate or compensate for the impacts of Site C. Fish, birds, wetlands and rare plants would all be affected. The islands moose and deer need for calving would be drowned. Other species — such as fishers — that rely on valley-bottom habitat would simply lose their habitat. The few remaining fish would be contaminated with mercury.

Fish and wildlife are about food security, for First Nations in particular. Please do not allow this project to go through. There is too much to lose for a project that we don't even need. B.C. deserves better.

s.22

Duncan, Kate EMPR:EX

From: Haslam, David GCPE:EX
Sent: November 10, 2017 5:08 PM
To: Sanderson, Melissa EMPR:EX
Subject: Fwd: CONFIDENTIAL DRAFT Site C Nov 10
Attachments: CONFIDENTIAL DRAFT Site C Nov 10.docx; ATT00001.htm

Use this version.

Sent from my iPhone

Begin forwarded message:

From: "Haslam, David GCPE:EX" <David.Haslam@gov.bc.ca>
Date: November 10, 2017 at 4:59:40 PM PST
To: "Zadravec, Don GCPE:EX" <Don.Zadravec@gov.bc.ca>
Subject: CONFIDENTIAL DRAFT Site C Nov 10

Edit made

CONFIDENTIAL DRAFT
Site C Report Critical Path
(Nov 13 - Nov 20)

Timing	Event	Notes
Nov 14	Consultation with Treaty 8 First Nations in Fort St. John by MMM and MSF	Fulfil consultation commitment
Nov 15	Send letter to BCUC to clarify some of the analysis and findings (joint EMPR and Fin). Issue IB and letter to media (TBD)	Info gathering as part of decision-making process
Nov 16 TBD	BCH letter to BCUC	Due diligence
Nov 15-16	MMM media avail following her meeting with First Nations and Letter from government being submitted to BCUC	Minister to briefed prior to interviews One-on-one interviews from Minster's constituency
Nov xx	Finance Ministry fiscal and financial analysis of BCUC report	Info gathering as part of decision-making process
Nov xx	Officials (TBD) brief media on decision-making inputs	Technical background briefing
Nov xx	Briefing of caucus on technical/ financial review of BCUC report	Caucus briefing

Required Collateral materials

Key messages
Q&As

Duncan, Kate EMPR:EX

From: Nikolejsin, Dave EMPR:EX
Sent: November 12, 2017 2:13 PM
To: Wright, Don J. PREM:EX; Lloyd, Evan GCPE:EX; Wanamaker, Lori FIN:EX; Haslam, David GCPE:EX; Sanderson, Melissa EMPR:EX
Subject: Fwd: Re; Site C Inquiry and Climate Change Commitments
Attachments: Site C Inquiry - Letter of Concern to Premier John Horgan.pdf; ATT00001.htm

Dave Nikolejsin
Deputy Minister
Energy, Mines and Petroleum Resources

Begin forwarded message:

From: "Oskar T. Sigvaldason"s.22
Date: November 12, 2017 at 11:19:10 AM PST
To: "John Horgan" <Premier@gov.bc.ca>
Cc: "Andrew Weaver" <andrew.weaver.mla@leg.bc.ca>, "Justin Trudeau" <justin.trudeau@parl.gc.ca>, "Michelle Mungall" <EMPR.Minister@gov.bc.ca>, "George Heyman" <ENV.Minister@gov.bc.ca>, "James Carr" <jim.carr@parl.gc.ca>, "Catherine McKenna" <Catherine.McKenna@parl.gc.ca>, "Don Wright" <Premier@gov.bc.ca>, "Dave Nikolejsin" <Dave.Nikolejsin@gov.bc.ca>, "Bobbi Plecas" <Bobbi.Plecas@gov.bc.ca>, "Mark Zacharias" <Mark.Zacharias@gov.bc.ca>, "Christyne Tremblay" <Christyne.Tremblay@canada.ca>, "Stephen Lucas" <Stephen.Lucas@canada.ca>, "Les MacLaren" <Les.MacLaren@gov.bc.ca>, "Kenneth Peterson" <Kenneth.Peterson@bchydro.com>, "James Burpee" s.22, "Kenneth Ogilvie" s.22 "Oskar Sigvaldason"s.22
Subject: Re; Site C Inquiry and Climate Change Commitments
Reply-To: :s.22

Dear Honorable Premier Mr. John Horgan

Please find enclosed a letter, with supporting documentation, defining stated concerns about BCUC's Final Report, submitted on November 1, 2017, on the Site C Inquiry. Our concerns are a direct consequence of the lack of consideration given for low carbon electrification for meeting ambitious and urgent greenhouse gas emissions reductions commitments made by Governments in Canada, including the Governments of British Columbia and Canada.

We have taken the liberty of forwarding copies of this communication to the Leader of the Green Party of British Columbia, to the Prime Minister of Canada, and to Ministers and Deputy Ministers, responsible for Energy and Environment/ Climate Change in your Government and in the Government of Canada. We have also copied the Assistant Deputy Minister responsible for electricity and alternative energy in your Government, and the Executive Chairman of the Board of BC Hydro and Power Authority.

I will be forwarding the "original" of this communication to you by regular mail.

Respectfully submitted by; Oskar Sigvaldason
On behalf of Oskar Sigvaldason, Jim Burpee and Ken Ogilvie

November 13, 2017

Honorable Mr. John Horgan
Premier; Government of British Columbia
P.O. Box 9041, Stn. Prov. Govt.
Victoria, BC; V8W 9E1

Dear Premier John Horgan

Re; Site C Inquiry and Climate Change Commitments

The undersigned are concerned that the Site C Inquiry by British Columbia Utilities Commission (BCUC) did not properly include global, national and provincial climate change commitments in its deliberations, as reported in their Final Report of November 1, 2017. This omission is at obvious variance with commitments made by Canada in the Paris Accord of December 12, 2015, First Ministers in their Vancouver Declaration of March 3, 2016, and federal and provincial governments, including British Columbia, in the Pan-Canadian Framework on Clean Growth and Climate Change of December 9, 2016.

Comprehensive studies on strategies for achieving major greenhouse gas (GHG) emissions reductions in Canada all show that fossil fuel consumption will have to decrease dramatically over the coming decades, with corresponding increases in the use of low-carbon electricity to meet the safe and reliable energy needs of a growing population and economy. The Site C Inquiry did not adequately consider low-carbon electrification as a critical element in B.C. and Canada for meeting climate change commitments.

Our conclusion is that the Site C Inquiry is flawed and its report does not provide a suitable basis for informing the important decisions that British Columbia and Canada need to make on climate change. A more detailed statement of our concerns with the Inquiry is attached to this letter.



Respectfully submitted by Oskar Sigvaldason
On behalf of Oskar Sigvaldason, Jim Burpee and Ken Ogilvie (summary bios enclosed)

Copies to:

Honorable Dr. Andrew Weaver; Leader, Green Party of British Columbia
Right Honorable Justin Trudeau; Prime Minister of Canada
Honorable Michelle Mungall; Minister, Energy, Mines and Petroleum Resources
Honorable George Heyman; Minister, Environment & Climate Change Strategy
Honorable James Carr; Minister, Natural Resources Canada
Honorable Catherine McKenna; Minister, Environment and Climate Change Canada
Dr. Don Wright; Deputy Minister to the Premier
Mr. Dave Nikolejsin; Deputy Minister; Ministry of Energy, Mines and Petroleum Resources
Ms. Bobbi Plecas; Deputy Minister, Climate Change, Ministry of Environment & Climate Change Strategy
Dr. Mark Zacharias, Deputy Minister, Environment, Ministry of Environment & Climate Change Strategy
Ms. Christyne Tremblay; Deputy Minister, Natural Resources Canada
Dr. Stephen Lucas; Deputy Minister, Environment & Climate Change Canada
Mr. Les MacLaren; Assistant Deputy Minister, Electricity and Alternative Energy Division, Ministry of Energy, Mines and Petroleum Resources
Mr. Ken Peterson; Executive Chairman of the Board, B.C. Hydro and Power Authority

Page 014

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The following is a copy of the first of two submissions to the BCUC. It was posted on the BCUC web-site on September 27, as Submission F197-1. A second more comprehensive submission was posted on October 10, as Submission F197-2.

Climate Change Considerations with respect to Site C Hydro-electric Project

Submitted by Oskar Sigvaldason, Jim Burpee and Ken Ogilvie

Copyright

Page 016 to/à Page 018

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Copyright

Duncan, Kate EMPR:EX

From: Nikolejsin, Dave EMPR:EX
Sent: November 13, 2017 11:25 AM
To: Sanderson, Melissa EMPR:EX; Haslam, David GCPE:EX
Subject: DMs to BCUC 13-11-17 FINAL
Attachments: DMs to BCUC 13-11-17 FINAL.docx

Here is the final letter. Just working with Lori Wannamaker to sign off.
Will have staff format and put on letterhead on Tuesday AM

DRAFT

Via E-mail

David Morton
Chair
BC Utilities Commission

Re: Inquiry Respecting Site C

We thank the BC Utilities Commission (Commission) for the report on the Inquiry Respecting Site C delivered to the Minister of Energy, Mines and Petroleum Resources on November 1, 2017. Completing the report in a short time frame with such high levels of public and First Nations input and transparency is a significant achievement.

Our Ministries are supporting government's decision making on the future of Site C, which will consider the Commission's report along with other implications associated with proceeding or terminating the project. In considering the Commission's report, we want to ensure we fully understand the Commission's assumptions and computations in its analysis of Site C and of potential alternative sources of generation and capacity.

As such we have identified a number of items in the final report as detailed below and in the attached Appendix which we hope you can address. Your responses will help us provide the advice necessary to support a government decision on Site C that is in the best interests of British Columbians.

Identified issues relate to the following key questions:

- Does the Commission's report include both sunk costs (the estimated \$2.1 billion already spent on the project) and termination costs (the \$1.8 billion determined by the Commission) when comparing the costs to ratepayers of completing Site C with those of pursuing a proposed alternative portfolio of generation resources?
 - Specifically, it is not clear if the sensitivity analysis presented on page 17 of the report's executive summary includes both costs in a consistent manner. If not, can you please advise how including those sunk and/or termination costs may change the cost to ratepayers and the unit energy cost in both scenarios?
- Were the government to terminate the project, does the Commission report assume that BC Hydro would develop and finance the projects included in the proposed alternative portfolio (wind, geothermal) rather than independent power producers (IPPs)?
 - We seek clarification on this issue, inasmuch as the Commission, in some cases, appears to use BC Hydro's lower cost of capital financing when calculating the cost of the alternative portfolio, thus affecting the valuation of those projects.

- Could the Commission thus offer some insight into what affect a higher cost of capital for the proposed alternative portfolio (consistent with financing rates for IPPs) would have on ratepayers?
- Government will need to consider the total cost of potential DSM initiatives (rather than just the utilities costs) as it considers the alternatives. How has the Terms of Reference led the Commission to conclude that demand-side measures should be assessed based on the Utility Resource Cost standard, when Total Resource Cost has been the standard used in prior Commission proceedings?
- If the project is cancelled, the approximately \$4 billion of sunk and remediation costs will need to be recovered and the amortization period will affect BC Hydro rates. Does the Commission report assume that these costs would be recovered over 10, 30 or 70 years?
 - From the Commission's perspective, is recovery of these costs over longer periods of 30 or 70 years consistent with appropriate rate-setting principles for rate-regulated utilities, which generally ensure future generations aren't paying for investments from which they derive no benefits?
 - Recently it has been stated that recovering the project's sunk and remediation costs over a 10-year period would lead to a 10% BC Hydro rate hike. Is this assertion consistent with the Commission's thinking?
- Finally, we are unaware of prior instances when anything other than BC Hydro's mid-load forecast has been used for planning purposes.
 - Does the Commission assume lower demand for electricity (the low-load forecast used in the report) because it is forecasting a period of lower economic growth for the province in which major power consumers like mining, forestry, technology and commercial sectors are in decline?
 - Can the Commission include in its load forecast the potential growth in demand for electrical power to meet the province's stated objectives to reduce greenhouse gas emissions through greater electrification of our economy? How much would load forecast change if these objectives were fully considered?

The government has stated that it plans to make a decision on Site C by the end of the year. The Commission's timely response to the matters identified below will help our Ministries provide the advice necessary to support government's decision-making.

Dave Nikolejsin
Deputy Minister
Ministry of Energy, Mines

Lori Wanamaker
Deputy Minister
Ministry of Finance

and Petroleum Resources

Attachment

DRAFT

Appendix: Detailed Questions for Response of the Commission

We note that the Commission has stated in the report that the “alternative portfolio developed by Commission staff are not a substitute for BC Hydro’s planning processes.” We understand that BC Hydro modelled over 60 scenarios testing various assumptions, including a number of alternatives requested by the Commission, but that the Alternative Portfolio in the final report was not analyzed using BC Hydro’s standard modelling tools accepted by the Commission. We have therefore asked BC Hydro to provide an assessment of the model used to develop the Commission’s final Alternative Portfolio, and we understand that BC Hydro will be providing the Commission with the results of that assessment separately.

There are a number of report matters that our Ministries and BC Hydro have identified during initial analysis that we would like the Commission’s feedback on. Our staff have also discussed with BC Hydro the impact of certain assumptions, and how the costs of those assumptions would be recovered from ratepayers. We would appreciate the Commission’s views on these too.

We understand that BC Hydro follows standards for rate-regulated utilities in its financial statements and in preparing its applications for review by the Commission. This accounting framework follows a number of principles in relation to the amortization of capital assets and the deferral of other costs for the purpose of matching recoveries from ratepayers to periods over which benefits are provided. BC Hydro’s use of rate-regulated accounts is also currently a subject of review by the provincial Auditor General.

It would be helpful if the Commission could clarify how the choices of cost amortization and recovery periods in the Termination scenario fit within appropriate utility rate-setting principles that recognize and avoid unnecessarily transferring current utility costs to future user generations when there are clearly no longer directly-related assets or benefits being provided. Such decisions lead rate-regulated accounting practice and use of regulatory accounts, which are areas of particular interest by the provincial Auditor General as well as credit rating agencies.

We understand that there was significant discussion during the Commission’s process on the cost of capital. The proposed Alternative Portfolio assumes that BC Hydro finances all new resources on its balance sheet. Other than redevelopment of existing sites and Site C, BC Hydro has, for almost three decades, been primarily procuring new supply from competitive processes or bilateral agreements benchmarked to competitive processes. This effectively means that BC Hydro avoids assuming such debt on its balance sheet and only recognizes the incremental costs of new energy purchases which would include the private sector’s annual debt servicing costs and equity return within approved purchase contract pricing structures.

It would be helpful to understand how the Commission assesses the impact on ratepayers of the additional debt associated with the assumptions underlying the proposed Alternative Portfolio. We wish to further understand the Commission’s approach to using BC Hydro’s cost of capital for IPP projects and the approach used for the cost of capital faced by an IPP (i.e. what IPPs actually pay) and the resultant rate impacts. For example, we note on page 159-160, the Commission report appears to conclude that IPP financing is the relevant assumption for the proposed Alternative Portfolio, and the BC Hydro financing assumption should only be used for

the Unit Energy Cost (UEC) analysis. Whereas, on pages 167, 170 and Appendix C (Assumption 2), it appears that the Commission report has used BC Hydro financing (100% debt financing at a cost of 3.43%) for the proposed Alternative Portfolio. We would appreciate clarification on which cost of capital should be used in analysing rate impacts.

BC Hydro has suggested that recovery through rates for sunk costs in a Termination scenario should occur over a 10-year period. If the project were to continue as planned, the sunk costs, as part of the overall project, will be recovered over a 70-year period, consistent with the assumed amortization of the Site C asset life. The Commission staff model does not appear to include sunk costs in either the Termination scenario or the Continue Site C scenario. Effectively, this assumes that sunk costs will be recovered through rates over 70 years if the Project is terminated. Recovering costs in rates over a shorter period has a material impact on the proposed Alternative Portfolio. It would be helpful if the Commission could provide an estimate of the rates impact using these two time-frames. Noting our earlier comment about appropriate rate-setting principles, we are also interested in how the Commission reconciles its 30-year amortization of termination costs, and this modelling result of sunk cost amortization over 70 years, with the rate-setting principle of intergenerational equity.

The table on page 17 of the Executive Summary and Table 43 in the main report include a summary of the Commission's sample scenarios showing the effect of modifying one or more variables to the resulting NPV cost to ratepayers. As noted above, the Commission's proposed Alternative Portfolio does not appear to include sunk costs, and sunk costs have also been removed on the Continue scenario. The tables also include UECs. For the Site C scenario, the UECs reflect costs, including sunk costs, of Site C being either \$10 billion or \$12 billion depending on assumptions. Our review of the Commission report suggests that the proposed Alternative Portfolio does not include termination costs. It would be helpful if the Commission could confirm this and provide a new version of the UEC portion of the table, where the Alternative Portfolio includes termination costs. This would help to ensure a consistent basis of comparing the costs of the Site Continue scenario with the Termination scenario on a forward-looking basis.

It is our understanding that in previous proceedings the Commission has concluded that the Total Resource Cost (TRC) test is the appropriate way to evaluate demand side management (DSM) in comparison to other resources. The Commission staff model uses the Utility Resource Cost (URC) standard. We believe that using the URC may underestimate the actual cost of DSM to ratepayers. It would be helpful for us to understand the Commission's rationale in choosing a test methodology that is inconsistent with past practice, and if the Commission could confirm that the TRC test remains the appropriate metric, and if so, what impact would this have on the analysis.

We have noted that the Commission has concluded that BC Hydro's Low Load Forecast is most appropriate for an assessment of Site C need. It would be helpful for us to further understand the rationale, and for the Commission to confirm, that the assessment does not include additional load requirements to meet the Province's *Clean Energy Act* energy objectives of: reducing greenhouse gas emissions by 2050 by 80% less than 2007 levels; encouraging the switching from one kind of energy source or use to another that decreases greenhouse gas emissions in British

Columbia; and encouraging communities to reduce greenhouse gas emissions and use energy efficiently. It would also be useful to know if the Commission examined the value of “dispatchable” resources versus intermittent resources, particularly as applied to the goal of moving industrial loads now and in future to electricity.

It has been government’s assumption that electrification with low carbon electricity would be a key initiative to achieve greenhouse gas reductions. The provincial government is working with the Federal government on electricity system infrastructure investments to reduce and avoid greenhouse gas emissions, and has enabled BC Hydro to pursue electrification initiatives under the *Greenhouse Gas Reduction (Clean Energy) Regulation* under the *Clean Energy Act*. It would be helpful to understand if the Commission has a different view, and if the Commission could further describe the impact on its analysis of electrification initiatives to meet greenhouse gas reduction objectives.

The Commission report identifies an aggressive DSM program, coupled with load curtailments a way to achieve the proposed Alternative Portfolio scenario. It would be helpful if the Commission could further describe how such load curtailments would practically be achieved in the province’s natural resource sector without impairing operations, jobs and economic growth for sectors already facing trade sanctions and pressures.

We understand that BC Hydro has provided the Commission with a description of what the BC economic environment would look like under a low load outlook scenario. It would be helpful if the Commission could further describe its view of the low load outlook, noting that the Commission believes that the outlook could be even lower, and how that outlook contributes to realistic economic sustainability, around which an Alternative Portfolio would be based.

With respect to project schedule and budget, it would be helpful if the Commission could clarify that today the Site C project is not 1 year behind schedule from the target in-service date of November 2024 that was approved by the provincial Cabinet in December 2014. While there are risks identified by the Commission, with varying degrees of probability, that this date could be exceeded, it is still early in the project and mitigation measures have not yet been fully assessed.

We may identify further questions as our due diligence continues to support government decision-making.

Duncan, Kate EMPR:EX

From: Haslam, David GCPE:EX
Sent: November 13, 2017 12:06 PM
To: Nikolejsin, Dave EMPR:EX
Cc: Sanderson, Melissa EMPR:EX; Beaupre, Darren GCPE:EX
Subject: Re: DMs to BCUC 13-11-17 FINAL

We'll have km and qa tomorrow to support.

Sent from my iPhone

On Nov 13, 2017, at 11:25 AM, Nikolejsin, Dave MNGD:EX <Dave.Nikolejsin@gov.bc.ca> wrote:

Here is the final letter. Just working with Lori Wannamaker to sign off.
Will have staff format and put on letterhead on Tuesday AM
<DMs to BCUC 13-11-17 FINAL.docx>

Duncan, Kate EMPR:EX

From: Nikolejsin, Dave EMPR:EX
Sent: November 14, 2017 10:53 PM
To: Mungall, Michelle EMPR:EX; Sanderson, Melissa EMPR:EX; Haslam, David GCPE:EX
Subject: Fwd: Letter
Attachments: BCUC clarification Letter - FINAL.DOCX; ATT00001.htm; BCUC clarification Letter - FINAL - clean.docx; ATT00002.htm

FYI.

Dave Nikolejsin
Deputy Minister
Energy, Mines and Petroleum Resources

Begin forwarded message:

From: "Nikolejsin, Dave MNGD:EX" <Dave.Nikolejsin@gov.bc.ca>
Date: November 14, 2017 at 5:55:42 PM PST
To: "Cochrane, Marlene EMPR:EX" <Marlene.Cochrane@gov.bc.ca>, "De Champlain, Rhonda EMPR:EX" <Rhonda.DeChamplain@gov.bc.ca>
Subject: Fwd: Letter

Here is the current version of the letter. Please check for typos, make sure it's clean re track changes history, put in my letterhead and attach esigs asap and send.

Lori has approved this version.
Thanks

Dave Nikolejsin
Deputy Minister
Energy, Mines and Petroleum Resources

Begin forwarded message:

From: "Nikolejsin, Dave MNGD:EX" <Dave.Nikolejsin@gov.bc.ca>
Date: November 14, 2017 at 4:33:10 PM MST
To: "Wright, Don J. PREM:EX" <Don.J.Wright@gov.bc.ca>, "Wanamaker, Lori FIN:EX" <Lori.Wanamaker@gov.bc.ca>
Subject: Letter

Here is my suggested final version. Lori, I essentially took what I got from Doug and just fixed a couple typos and took out the duplicate reference to the OAG.
I'm not copying Les and Doug anymore!

I'm attaching a clean version and a tracked changes back to your/Don's version
Lori. That version is not substantially different from Don's earlier cut.

If you guys like this I'll get it formatted and sent.

DRAFT

Via E-mail

David Morton
Chair
BC Utilities Commission

Re: Inquiry Respecting Site C

The Ministry of Energy, Mines and Petroleum Resources and Ministry of Finance are supporting the government decision process surrounding the future of the Site C project. On behalf of our respective Ministers, we would like to thank the BC Utilities Commission (Commission) for the report *Inquiry Respecting Site C*. Completing an inquiry of this scope over an abbreviated timeframe and with high levels of public and First Nations input is a considerable achievement.

As our ministries analyze the Commission's report, along with other implications associated with government proceeding with or terminating the Site C project, we want to ensure that we fully understand the assumptions and computations that the Commission made in the analysis of potential alternative sources of energy generation and capacity. Accordingly, we are requesting further explanation or additional information on the points listed below and in the Appendix attached to this letter.

1. Did the Commission include sunk costs (the estimated \$2.1 billion that has been spent to date on the project) and termination costs (the \$1.8 billion determined by the Commission) in comparing the costs to ratepayers of completing Site C against the costs of pursuing an alternative portfolio of generation resources?

We were not able to determine whether the sensitivity analysis included on Page 17 of the report's executive summary includes sunk costs and termination costs consistently. If it does not, could the Commission advise on how including these sunk and termination costs might change the cost to ratepayers and the unit energy cost (UEC) in both scenarios?

2. In the event that government elects to terminate the Site C project, has the Commission assumed that BC Hydro would develop and finance the projects included in the alternative portfolio (wind, geothermal) rather than independent power producers (IPPs)?

We observe that the Commission has in some cases used BC Hydro's lower cost of capital financing to calculate the cost of the alternative portfolio presented in the report, affecting the valuation of those projects. Could the Commission offer its view of the impact that a higher cost of capital would have on ratepayers if the alternative portfolio were developed by independent power producers rather directly by BC Hydro?

3. Government will need to consider the total cost of potential demand side management initiatives (rather than just the utility's costs) as it considers the alternatives. Could the Commission advise how the inquiry Terms of Reference led to assessing demand-side measures based on the Utility Resource Cost standard, when Total Resource Cost has been

the standard for prior Commission proceedings?

4. If the Site C project were terminated, the \$4 billion sunk and remediation costs would need to be recovered, and the amortization period of that recovery would affect BC Hydro rates. Could the Commission please clarify whether it assumed that that these costs would be recovered over 10, 30 or 70 years?
 - Fair and appropriate rate-setting principles for rate-regulated utilities typically aim to avoid causing future generations to pay for investments from which they will derive no benefit. From the Commission's perspective, can recovery of the sunk and remediation costs of Site C over longer periods of 30 to 70 years remain consistent with these inter-generational principles?
 - Recently it has been stated that recovering the project's sunk and remediation costs over a 10-year period would lead to a 10 per cent hike in BC Hydro rates. Is this assertion consistent with the Commission's thinking?
5. We are unaware of prior instances when anything other than BC Hydro's mid-load forecast has been used for planning purposes. For that reason, we would like to clarify:
 - Did Commission assume lower demand for electricity (reflected in the low-load forecast used in the report) because it is forecasting a period of lower economic growth for the province in which major power consumers such as mining, forestry, technology and commercial sectors are in decline?
 - Does the Commission include in its load forecast the potential increased electrical power demand of meeting the province's stated objectives to reduce greenhouse gas emissions through greater electrification of our economy?

We sincerely appreciate the Commission's timely response to these questions and requests for clarification. Government has committed to making a decision on the Site C project before the end of the year. The Commission's responses to our questions will assist our ministries in better understanding the report and the assumptions that underlie it as we prepare advice to support government in making a decision that will be in the best interests of British Columbians.

Dave Nikolejsin
Deputy Minister
Ministry of Energy, Mines
and Petroleum Resources

Lori Wanamaker
Deputy Minister
Ministry of Finance

Attachment

Appendix: Detailed Questions for the Commission

We understand that while BC Hydro modelled over 60 scenarios and tested various assumptions, including a number of alternatives requested by the Commission, the alternative portfolio that the Commission included in the final report was not analyzed using BC Hydro's modelling tools. On this basis, government has asked BC Hydro to provide an assessment of the model used to develop the Commission's final alternative portfolio. BC Hydro will provide the Commission with the results of that assessment separately.

In our initial analysis of the report, our ministries have identified several areas that we would appreciate the Commission's feedback on. Several of our questions relate to the impact of certain assumptions made in the report, and how the costs of those assumptions would be recovered from ratepayers.

We understand that BC Hydro follows standards for rate-regulated utilities in its financial statements and in preparing its applications for review by the Commission. This accounting framework follows a number of principles in relation to the amortization of capital assets and the deferral of other costs for the purpose of matching recoveries from ratepayers to periods over which benefits are provided.

It would be helpful if the Commission could clarify how the choices of cost amortization and recovery periods in the Termination scenario fit within appropriate utility rate-setting principles that recognize and avoid unnecessarily transferring current utility costs to future user generations when there are clearly no longer directly-related assets or benefits being provided. Such decisions lead rate-regulated accounting practice and use of regulatory accounts, which are areas of particular interest by the provincial Auditor General as well as credit rating agencies.

The Commission's process involved some deliberations on the cost of capital. The alternative portfolio presented in the report assumes that BC Hydro will finance all new resources on its balance sheet. However, other than redevelopment of existing sites and Site C, BC Hydro has, for almost three decades, been primarily procuring new supply from competitive processes or bilateral agreements that are benchmarked to competitive processes. This effectively means that BC Hydro avoids assuming such debt on its balance sheet and only recognizes the incremental costs of new energy purchases which would include the private sector's annual debt servicing costs and equity return within approved purchase contracts.

It would be helpful to understand how the Commission assesses the impact on ratepayers of the additional debt associated with the assumptions underlying the alternative portfolio. We would particularly appreciate better understanding the Commission's approach to using BC Hydro's cost of capital for IPP projects and the approach used for the cost of capital faced by an IPP (i.e. what IPPs actually pay) and the resultant rate impacts. For example, on page 159-160, the Commission appears to conclude that IPP financing is the relevant assumption for the alternative portfolio, and the BC Hydro financing assumption should only be used for the Unit Energy Cost (UEC) analysis. However, on pages 167, 170 and Appendix C (Assumption 2), it appears that the Commission has used BC Hydro financing (100% debt financing at a cost of 3.43%) for the

alternative portfolio. If we are interpreting this correctly, we would appreciate clarification on which cost of capital should be used in analysing rate impacts.

BC Hydro has suggested that recovery in rates of sunk costs in a termination scenario should occur over a 10-year period. If the project were to continue as planned, the sunk costs, as part of the overall project costs, will be recovered over a 70-year period, consistent with the amortization of the Site C asset. The Commission model appears to exclude sunk costs in the termination scenario, and has removed those costs from the completion scenario as well. Effectively this assumes that sunk costs will be recovered through rates over 70 years if the project is terminated. Recovering costs in rates over a shorter period has a material impact on the costs of the alternative portfolio. It would be helpful if the Commission could provide an estimate of the impact on rates of using these two timeframes.

The tables on page 17 of the executive summary and page 170 in the main report include a summary of the Commission's sample scenarios showing the effect of modifying one or more variables to the resulting NPV cost to ratepayers. As noted above, the Commission's alternative portfolio does not appear to include sunk costs, and sunk costs have also been removed on the continue scenario. The tables also include UECs. For the Site C scenario, the UECs reflect costs, including sunk costs, of Site C being either \$10 billion or \$12 billion depending on assumptions. Our review of the Commission report suggests that the alternative portfolio does not include termination costs. It would be helpful if the Commission could confirm this and provide a version of the UEC portion of the table with termination costs included in the alternative portfolio. This would help provide a consistent basis for comparing costs between the scenarios of completing or terminating the project.

It is our understanding that in previous proceedings the Commission has concluded that the Total Resource Cost (TRC) test is the appropriate way to evaluate demand side management (DSM) in comparison to other resources. In this inquiry, the Commission's model uses the Utility Resource Cost (URC) standard. We believe that using the URC may underestimate the actual cost of DSM to ratepayers. It would be helpful for us to understand the Commission's rationale in choosing a test methodology that differs from past practice. Could the Commission confirm that the TRC test remains the appropriate metric, and if so, what impact would this have on the analysis?

We have noted that the Commission has concluded that BC Hydro's low load forecast was most appropriate for an assessment of the need for the capacity of Site C. It would be helpful for us to further understand the rationale, and whether the assessment includes the load requirements needed to meet the Province's *Clean Energy Act* energy objectives of:

- Reducing greenhouse gas emissions by 2050 by 80% less than 2007 levels;
- Encouraging the switching from one kind of energy source or use to another that decreases greenhouse gas emissions in British Columbia; and,
- Encouraging communities to reduce greenhouse gas emissions and use energy efficiently.

It would also be useful to know if the Commission examined the value of “dispatchable” resources versus intermittent resources, particularly as applied to the goal of moving industrial energy requirements now and in future to low carbon electricity.

It has been government’s assumption that electrification with low carbon electricity would be a key initiative to achieve greenhouse gas reductions. The provincial government is working with the Government of Canada on electricity system infrastructure investments to reduce and avoid greenhouse gas emissions, and has enabled BC Hydro to pursue electrification initiatives under the *Greenhouse Gas Reduction (Clean Energy) Regulation* under the *Clean Energy Act*. It would be helpful for our ministries to understand if the Commission has a different outlook, and if the Commission could further describe the impact on its analysis of electrification initiatives to meet greenhouse gas reduction objectives.

The report identifies an aggressive DSM program, coupled with load curtailments as a way to achieve the alternative portfolio scenario. We would appreciate further information from the Commission on how such load curtailments would practically be achieved in the natural resource sector without impairing operations, jobs and economic growth for sectors already facing trade sanctions and pressures.

We understand that BC Hydro has provided the Commission with a description of its view of what BC’s economic environment would look like under a low load outlook scenario. It would be helpful if the Commission could further describe its interpretation of the low load outlook. We observe that the Commission’s view is that the outlook could be even lower than that presented in BC Hydro’s low-load scenario, and we are interested in understanding how that outlook is based on realistic economic sustainability around which the alternative portfolio would be premised.

DRAFT

Via E-mail

David Morton
Chair
BC Utilities Commission

Re: Inquiry Respecting Site C

The Ministry of Energy, Mines and Petroleum Resources and Ministry of Finance are supporting the government decision process surrounding the future of the Site C project. On behalf of our respective Ministers, we would like to thank the BC Utilities Commission (Commission) for the report *Inquiry Respecting Site C*. Completing an inquiry of this scope over an abbreviated timeframe and with high levels of public and First Nations input is a considerable achievement.

As our ministries analyze the Commission's report, along with other implications associated with government proceeding with or terminating the Site C project, we want to ensure that we fully understand the assumptions and computations that the Commission made in the analysis of potential alternative sources of energy generation and capacity. Accordingly, we are requesting further explanation or additional information on the points listed below and in the Appendix attached to this letter.

1. Did the Commission include sunk costs (the estimated \$2.1 billion that has been spent to date on the project) and termination costs (the \$1.8 billion determined by the Commission) in comparing the costs to ratepayers of completing Site C against the costs of pursuing an alternative portfolio of generation resources?

We were not able to determine whether the sensitivity analysis included on Page 17 of the report's executive summary includes sunk costs and termination costs consistently. If it does not, could the Commission advise on how including these sunk and termination costs might change the cost to ratepayers and the unit energy cost (UEC) in both scenarios?

2. In the event that government elects to terminate the Site C project, has the Commission assumed that BC Hydro would develop and finance the projects included in the alternative portfolio (wind, geothermal) rather than independent power producers (IPPs)?

We observe that the Commission has in some cases used BC Hydro's lower cost of capital financing to calculate the cost of the alternative portfolio presented in the report, affecting the valuation of those projects. Could the Commission offer its view of the impact that a higher cost of capital would have on ratepayers if the alternative portfolio were developed by independent power producers rather directly by BC Hydro?

3. Government will need to consider the total cost of potential demand side management initiatives (rather than just the ~~utilities~~utility's costs) as it considers the alternatives. Could the Commission advise how the inquiry Terms of Reference led to assessing demand-side measures based on the Utility Resource Cost standard, when Total Resource Cost has been

the standard for prior Commission proceedings?

4. If the Site C project were terminated, the \$4 billion sunk and remediation costs would need to be recovered, and the amortization period of that recovery would affect BC Hydro rates. Could the Commission please clarify whether ~~the Commission~~ it assumed that that these costs would be recovered over 10, 30 or 70 years?
 - ~~Aaccepted accounting~~ Fair and appropriate rate-setting principles for rate-regulated utilities typically aim to avoid causing future generations to pay for investments from which they will derive no benefit. From the Commission's perspective, can recovery of the sunk and remediation costs of Site C over longer periods of 30 to 70 years remain consistent with these ~~accounting~~ inter-generational principles?
 - Recently it has been stated that recovering the project's sunk and remediation costs over a 10-year period would lead to a 10 per cent hike in BC Hydro rates. Is this assertion consistent with the Commission's thinking?
5. We are unaware of prior instances when anything other than BC Hydro's mid-load forecast has been used for planning purposes. For that reason, we would like to clarify:
 - Did Commission assume lower demand for electricity (reflected in the low-load forecast used in the report) because it is forecasting a period of lower economic growth for the province in which major power consumers such as mining, forestry, technology and commercial sectors are in decline?
 - Does the Commission include in its load forecast the potential increased electrical power demand of meeting the province's stated objectives to reduce greenhouse gas emissions through greater electrification of our economy?

We sincerely appreciate the Commission's timely response to these questions and requests for clarification. Government has committed to making a decision on the Site C project before the end of the year. The Commission's responses to our questions will assist our ministries in better understanding the report and the assumptions that underlie it as we prepare advice to support government in making a decision that will be in the best interests of British Columbians.

Dave Nikolejsin
Deputy Minister
Ministry of Energy, Mines
and Petroleum Resources

Lori Wanamaker
Deputy Minister
Ministry of Finance

Attachment

DRAFT

Appendix: Detailed Questions for the Commission

We understand that while BC Hydro modelled over 60 scenarios and tested various assumptions, including a number of alternatives requested by the Commission, the alternative portfolio that the Commission included in the final report was not analyzed using BC Hydro's modelling tools. On this basis, government has asked BC Hydro to provide an assessment of the model used to develop the Commission's final alternative portfolio. BC Hydro will provide the Commission with the results of that assessment separately.

In our initial analysis of the report, our ministries have identified several areas that we would appreciate the Commission's feedback on. Several of our questions relate to the impact of certain assumptions made in the report, and how the costs of those assumptions would be recovered from ratepayers.

We understand that BC Hydro follows standards for rate-regulated utilities in its financial statements as well as and in preparing its applications for the Commission's review by the Commission. This accounting framework follows established a number of principles for in relation to the amortization of capital assets and the deferral of other costs for the purpose of matching recoveries from ratepayers to periods over which benefits are provided. BC Hydro's use of rate-regulated accounting framework accounts is also currently a subject of review by the provincial Auditor General.

WeIt would particularly appreciatebe helpful if the Commission could provide further information on its view of clarify how the variouschoices of cost amortization and recovery periods involved in the project terminationTermination scenario would be acceptable to provincial auditors as being reasonable and justifiablefit within the rate-regulated accounting and appropriate utility rate-setting framework. That framework typically requiresprinciples that decisionrecognize and avoid unnecessarily transferring current utility costs be recognized at the time they occur, except where they can be assigned to future periods based on asset lifeuser generations when there are clearly no longer directly-related assets or the delivery of future benefits being provided. Such decisions lead rate-regulated accounting practice and use of regulatory accounts, which are areas of particular interest by the provincial Auditor General as well as credit rating agencies.

The Commission's process involved some deliberations on the cost of capital. The alternative portfolio presented in the report assumes that BC Hydro will finance all new resources on its balance sheet. However, other than redevelopment of existing sites and Site C, BC Hydro has, for almost three decades, been primarily procuring new supply from competitive processes or bilateral agreements that are benchmarked to competitive processes. This effectively means that BC Hydro avoids assuming such debt on its balance sheet and only recognizes the incremental costs of new energy purchases which would include the private sector's annual debt servicing costs and equity return within approved purchase contracts.

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We have noted that the Commission has concluded that BC Hydro's low load forecast was most appropriate for an assessment of the need for the capacity of Site C. It would be helpful for us to further understand the rationale, and whether the assessment includes the load requirements needed to meet the Province's *Clean Energy Act* energy objectives of:

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The report identifies an aggressive DSM program, coupled with load curtailments as a way to achieve the alternative portfolio scenario. We would appreciate further information from the Commission on how such load curtailments would practically be achieved in the natural resource sector without impairing operations, jobs and economic growth for sectors already facing trade sanctions and pressures.

We understand that BC Hydro has provided the Commission with a description of its view of what BC’s economic environment would look like under a low load outlook scenario. It would be helpful if the Commission could further describe its interpretation of the low load outlook. We observe that the Commission’s view is that the outlook could be even lower than that presented in BC Hydro’s low-load scenario, and we are interested in understanding how that outlook is based on realistic economic sustainability around which the alternative portfolio would be premised.

Dave Nikolejsin

Deputy Minister

Energy, Mines and Petroleum Resources

Duncan, Kate EMPR:EX

From: Nikolejsin, Dave EMPR:EX
Sent: November 14, 2017 10:55 PM
To: Munqall, Michelle EMPR:EX; Sanderson, Melissa EMPR:EX
Subject: Fwd s.13
Attachments: s.12,s.13

FYI

Dave Nikolejsin
Deputy Minister
Energy, Mines and Petroleum Resources

Begin forwarded message:

From: "Nikolejsin, Dave MNGD:EX" <Dave.Nikolejsin@gov.bc.ca>
Date: November 14, 2017 at 3:44:26 PM PST
To: "Wright, Don J. PREM:EX" <Don.J.Wright@gov.bc.ca>
Cc: "MacLaren, Les EMPR:EX" <Les.MacLaren@gov.bc.ca>
Subject: s.12,s.13

s.12,s.13

Thanks.

Dave Nikolejsin
Deputy Minister
Energy, Mines and Petroleum Resources

Page 041 to/à Page 045

Withheld pursuant to/removed as

s.12;s.13

Independent Expert Advice on the BC Utilities Commission's Site C Inquiry Final Report

Purpose:

Government is seeking expert advice with respect to the BC Utilities Commission's (BCUC's) Final Report to Government on Site C. Advisors will review, assess and advise Government on the reasonableness and appropriateness of the assumptions developed and used by the BCUC in their Final Report. Advisors will also review the due diligence undertaken by the Ministries of Energy, Mines and Petroleum Resources and Finance. The findings of each advisor will be presented to Cabinet.

Terms of Reference:

Background

The BCUC completed its inquiry into BC Hydro's Site C project, as directed by the Provincial Government through an Order-in-Council (OIC). On November 1, 2017, the British Columbia Utilities Commission Inquiry Respecting Site C Final Report was submitted to the Government of British Columbia (BCUC Final Report).

The BCUC Final Report included the BCUC's estimated costs of completing, suspending or terminating Site C based on assumptions and analysis it developed during the course of the inquiry. The Final Report included an Illustrative Alternative Portfolio, which the BCUC estimated could provide the same level of benefits, GHG emissions and at an equivalent cost when compared to the Site C project.

The BCUC qualified its recommendations on whether to continue or terminate the project, as the most appropriate path forward depended on which assumptions on future conditions are most reasonable. These key assumptions included: the load forecast; the costs of terminating the project; the cost of completing the project; and the cost of the alternative portfolio.

Scope of Work

To aid in informing Cabinet's decision, Government is seeking expert advice on the reasonableness and accuracy of the assumptions used by the BCUC, and the government's analysis of those assumptions, in determining whether the:

- electricity demand in the future will be at the lower band of BC Hydro's load forecast;
- costs of completing or terminating Site C are appropriate and allow for fair and equal estimates for comparison; and
- costs and performance attributes of the Illustrative Alternative portfolio are reasonable and accurate.

In addition, government would like to hear advice on potential mitigation strategies for both terminating and proceeding with the Site C project, and any other advice that will inform government's decision.

The advisors will operate under terms of confidentiality agreements, and will not publicly disclose information related to materials they review, or the advice they provide to Cabinet.

Commented [NDM1]: Just thinking about this term. I know we discussed this but is it reasonable to expect confidentiality? I expect the media and public will want to know what was said.

Deliverable and Proposed Schedule

Advisors will provide a presentation to Cabinet on [November 29, 2017].

Secretariat Support

The Ministry of Energy, Mines and Petroleum Resources will provide secretariat support to advisors.

Advisors:

1. David Craig – presenting advice through lens of major industrial and commercial rate payers

David is President of Consolidated Management Consultants Ltd. He has over 40 years of experience as an executive, officer, and member of Boards of Directors of public institutions, private companies and non-profit organizations. David is consultant for the Commercial Energy Consumers Association of BC and Policy Chair for the BC Chamber of Commerce. The CEC participated in the Site C Inquiry and submitted data and analysis informed by David Craig's experience.

2. Colleen Giroux-Schmidt – presenting advice through lens of alternative portfolio industry players

Colleen Giroux-Schmidt brings over a decade and a half of experience in BC and Canadian resource development with an extensive knowledge of the renewable energy sector. As Senior Director – Government Relations and Regulatory Affairs for Innergex Renewable Energy Inc., her focus is on working with various stakeholders including all levels of government, First Nations and communities to increase renewable energy opportunities to help the jurisdictions Innergex works in meeting their climate change goals. As the former Chair and a current member of the Board of Directors for Clean Energy BC (CEBC), she helps promote and support the growth of British Columbia's Clean Energy industry. CEBC participated in the BCUC's Site C Inquiry.

3. Jim Quail – presenting advice through lens of consumers and disadvantaged rate payers

Jim has had a varied career in progressive legal work. He was called to the BC Bar in 1980 and then worked as general counsel, director of planning, and acting executive director at the Legal Services Society of BC, providing free legal services to low-income people. He has also held roles as the Executive Director of the BC Public Interest Advocacy Centre, the Business Manager at Vancouver Municipal and Regional Employees' Union (now CUPE local 15), the Legal Director at the Hospital Employees' Union, and the Legal and Regulatory Director at COPE Local 378.

Jim has special expertise in regulatory law, and has a wealth of experience representing communities, low-income consumers, and BC Hydro workers at the BC Utilities Commission. He comments regularly in the media on issues related to utility rates and energy policy. Jim is an Honourary Member of CUPE Local 15 and an Honourary Life Member of the BC Freedom of Information and Privacy Association.

4. Karen Tam Wu – presenting through lens of environmental/climate advocates

Karen Tam Wu is the acting B.C. director at the Pembina Institute, Canada's leading clean energy think-tank. She is also the director of the institute's Buildings and Urban Solutions Program, and a member of the B.C. Government's Climate Solutions and Clean Growth Advisory Council.

Through cross-sectoral consultation and engagement, Karen leads initiatives to advance clean energy solutions and improve energy efficiency in B.C. and across Canada. Previously, Karen worked with First Nations, communities, government, and industry on important conservation initiatives in B.C. A registered professional forester, Karen worked with forest companies worldwide for over a decade developing and implementing sustainable forest management systems.

Duncan, Kate EMPR:EX

From: Sanford, Donna L GCPE:EX
Sent: November 14, 2017 12:12 PM
To: Nikolejsin, Dave EMPR:EX; MacLaren, Les EMPR:EX
Cc: Sanderson, Melissa EMPR:EX
Subject: RE: Request for follow up conversation on Site C/BCUC review

Hello Dave and Les. I spoke with Liz this morning. The Green Caucus will submit follow-up questions in writing.

Regards,
Donna

From: Nikolejsin, Dave MNGD:EX
Sent: Tuesday, November 14, 2017 9:03 AM
To: Sanford, Donna L GCPE:EX; MacLaren, Les EMPR:EX
Cc: Sanderson, Melissa EMPR:EX
Subject: RE: Request for follow up conversation on Site C/BCUC review

Let's stick to in writing.

From: Sanford, Donna L GCPE:EX
Sent: November 14, 2017 10:02 AM
To: Nikolejsin, Dave MNGD:EX <Dave.Nikolejsin@gov.bc.ca>; MacLaren, Les EMPR:EX <Les.MacLaren@gov.bc.ca>
Cc: Sanderson, Melissa EMPR:EX <Melissa.Sanderson@gov.bc.ca>
Subject: RE: Request for follow up conversation on Site C/BCUC review

Hi Dave and Les. I also thought the questions would come in writing. I will contact Liz Lilly and Sarah Miller today to follow up. If an in-person meeting is the result, I will attend. Stay tuned.

-Donna

From: Nikolejsin, Dave MNGD:EX
Sent: Tuesday, November 14, 2017 8:48 AM
To: MacLaren, Les EMPR:EX; Sanford, Donna L GCPE:EX
Cc: Sanderson, Melissa EMPR:EX
Subject: RE: Request for follow up conversation on Site C/BCUC review

I thought we agreed that they would supply the questions in writing?

From: MacLaren, Les EMPR:EX
Sent: November 14, 2017 7:42 AM
To: Sanford, Donna L GCPE:EX <Donna.Sanford@gov.bc.ca>
Cc: Nikolejsin, Dave MNGD:EX <Dave.Nikolejsin@gov.bc.ca>; Sanderson, Melissa EMPR:EX <Melissa.Sanderson@gov.bc.ca>
Subject: FW: Request for follow up conversation on Site C/BCUC review

Hi Donna:

How are these follow-up requests dealt with under CASA? Perhaps an in-person meeting with you present? I want to be careful given the sensitivity on this file.

Les

From: Miller, Sarah [<mailto:Sarah.Miller@leg.bc.ca>]
Sent: Friday, November 10, 2017 3:50 PM
To: MacLaren, Les EMPR:EX
Subject: Request for follow up conversation on Site C/BCUC review

Dear Les,

Thank you for taking the time yesterday to brief our caucus on Site C. As our Chief of Staff Liz Lilly mentioned at the end of the meeting, I have a few outstanding questions that I was hoping to ask you about Site C and the BCUC review.

Would you possibly be available sometime next week to talk briefly by phone (or in person, whichever is easier for you)?

Thank you in advance,
Sarah

Sarah Miller
Research and Communications Officer
BC Green Party Caucus
Room 028, Parliament Buildings
Victoria, BC V8V 1X4
Ph: [250.387.8358](tel:250.387.8358)

Duncan, Kate EMPR:EX

From: Krog.MLA, Leonard LASS:EX
Sent: November 14, 2017 12:23 PM
To: Sanderson, Melissa EMPR:EX
Subject: FW: BCUC Inquiry Respecting Site C

Dear Melissa,

Leonard asked me to pass this email along to you as it is very useful information about Site C from s.22
s.22

Yours truly,

Pauline Carroll, Constituency Assistant
Leonard Krog, MLA, Nanaimo
4-77 Victoria Crescent, Nanaimo, BC
Telephone: 250-714-0630 / Fax 250-714-0859 /
Email: leonard.krog.mla@leg.bc.ca
www.leonardkrog-mla.ca/

From: Krog.MLA, Leonard Eugene
Sent: November 10, 2017 3:06 PM
To: s.22
Subject: RE: BCUC Inquiry Respecting Site C

Dear s.22

I really appreciate your thoughtful comments and have passed them on to the Minister's office outlining that given your
s.22 they need to pay attention.s.22

Cheers,

Leonard

From: s.22
Sent: November 10, 2017 10:49 AM
To: Krog.MLA, Leonard Eugene <Leonard.Krog.MLA@leg.bc.ca>
Subject: Fwd: BCUC Inquiry Respecting Site C

Hi Leonard:

My comment for page 131 should read "...using regression analysis." rather than "...using statistical simulation."

s.22

Begin forwarded message:

From: s.22

Subject: BCUC Inquiry Respecting Site C

Date: November 9, 2017 at 7:08:22 PM PST

To: Krog Leonard <leonard.krog.mla@leg.bc.ca>

Hi Leonard:

I would like to contribute to the deliberations on the Site C project. You are the only provincial politician that I know so I will inflict my comments on you.

I read the British Columbia Utilities Commission Inquiry Respecting Site C (the BCUC Report) and concluded that the alternative renewable generation proposals are economically more favourable than the Site C project. Moreover if environmental and social effects are considered the alternative proposals are even more favourable than the Site C project.

My comments on the BCUC Report are below. The specific comments are thoughts that came to mind as I read the report and are not necessarily important.

SUMMARY

The report is very comprehensive. The authors should be commended for incorporating and addressing a wide range of views.

The BCUC's comparison of costs to ratepayers between the continuation of the Site C project and alternatives is in Table 47 on page 185 of the BCUC Report. The estimated costs seem reasonable to me. In effect the difference in rate impacts is statistically insignificant and the unit energy cost (usually called the levelized cost of electricity, or LCOE) of the Alternative Portfolio is significantly less than that of Site C. The values in the table are point estimates. I am confident that a statistical simulation would show the Alternative Portfolio to be even more favourable because the cost of the Site C project is more likely to increase and the cost of the proposed alternative projects is more likely to decrease.

When environmental and social considerations are included in the assessment the Alternative Portfolio becomes even more favourable.

SPECIFIC COMMENTS

Page 50

Deloitte's review of BC Hydro load forecasts back to 1964 is inappropriate. The load forecast model at that time was very crude and very different than it was even in the 1970's.

Page 100

Earned Value Analysis should have been started at the beginning of the project. The scheduling structure should have been established before the project started. (In my experience on private projects this is a requirement of the lenders.)

Page 114

Table 23 seems consistent with the value finally used by the BCUC in Table 47 (i.e. \$10 billion). The values in the table are suitable for use in a statistical simulation.

Page 131

Table 31 contains BC Hydro's estimated LCOE for onshore wind power, which is \$85/MWh. Assuming that the alternative generation is predominantly wind power, the value seems high compared to other sources, as has been noted elsewhere in the report. The values from other sources vary from \$40.8/MWh to \$96.8/MWh, with \$68.7/MWh being the non-weighted average. LCOE is sensitive to the plant capacity factor (called energy delivery factor in wind power technology). Given the amount of data available (e.g. from the Energy Information Administration, National Renewable Energy Laboratory, the Canadian Wind Energy Association) it may be possible to more accurately estimate the LCOE for the proposed wind energy sites using statistical simulation.

Page 145

The suggestion that Independent Power Producers (IPP's) are more innovative than BC Hydro and better positioned to take project risks is incorrect.^{s.22}
s.22 and was impressed with how innovative the technical employees were, both individually and collectively and on both small and large projects. Note also that many IPP's seriously damaged the environment in building their projects.

I think that the use of local community IPP's in the Non-Integrated Area (NIA) of the BC Hydro system is justified because they are more sensitive to their environment. The hydroelectric project in Atlin is a case in point. IPP's connected to the grid should be developed by BC Hydro in my opinion.

Page 146

BC Hydro is as well positioned as any IPP, and better than most, to take risks on small projects. In fact BC Hydro can probably avoid many of the risks associated with small projects. Note also that many IPP's are financially unable to assume most project risks so have to transfer the risks to contractors (typically via turnkey contracts). Contractors almost invariably increase the cost of contracts to reflect the increase in the number of risks that they must assume. This cost is passed on to the BC Hydro customer of course. This is one reason why the cost of energy from IPP's is so high (\$100/MWh on average).

The cost of capital for IPP's is much higher than for BC Hydro (8.8% vs. 3.4% in this report). This is another reason why the cost of energy from IPP's is so high. See Appendix A page 8.

The observation of 100% debt financing seems suspicious, as has been noted by others. In my experience in the private sector the lenders usually require the borrower to finance the project partly with equity (typically 20% to 30%) to ensure that the owner assumes some of the project risk. In this case it is unclear to me how the government or BC Hydro is assuming some risk.

The evaluation of Meagher Creek as a geothermal resource was an interesting project. We had hired a consultant (from New Zealand if I remember correctly) to do the evaluation and they concluded early on that the site was not commercially viable. They submitted their report accordingly to the responsible BC Hydro engineer but he kept it hidden in his desk and continued with explorations and development. It was some time before management discovered what he had done and he was accordingly fired. Perhaps that is why the costs associated with the evaluation of Meagher Creek were so high. See also page 9 of Appendix A.

Page 147

Credit worthiness should not be a concern. Project financing is based on the expected revenues generated by the project rather than the credit worthiness of the borrower.

Page 167

The sensitivity analysis method identified here and in other places in the report is dated. Currently sensitivity analyses are more often done using statistical simulation (available with the advent of the desktop computer), resulting in more accurate estimates of results with corresponding probabilities.

Page 185 Table 47

The estimated costs seem reasonable to me. In effect the difference in rate impacts is statistically insignificant and the unit energy cost (usually called the levelized cost of electricity, or LCOE) of the Alternative Portfolio is significantly less than that of Site C.

The values in the table are point estimates. If the costs were subjected to a statistical simulation (e.g. Monte Carlo, Latin Hyper Cube sampling) using appropriate probability density functions (e.g. normal, lognormal, uniform) the differences may be even more distinct. That is, the result of the simulation may show that the rate impact favours the Alternative Portfolio (with statistical significance) and that the unit energy cost favours the Alternative Portfolio even more. This is because the capital cost for Site C is more likely to increase than decrease and the capital cost for the Alternative Portfolio is more likely to decrease than increase.

Other comments

Assessing social and environmental effects was not in the scope of the BCUC inquiry. In my opinion if those effects are considered they would favour alternative renewable resources.

My interest in the Site C project results from over s.22
s.22

s.22

Duncan, Kate EMPR:EX

From: Minister, EMPR EMPR:EX
Sent: November 15, 2017 3:10 PM
To: Sanderson, Melissa EMPR:EX
Subject: FW: BCUC Site C Inquiry - Errata to Final Report
Attachments: 11-15-2017_Site C Report Errata.pdf

From: Commission Secretary BCUC:EX
Sent: Wednesday, November 15, 2017 1:46 PM
To: Minister, EMPR EMPR:EX
Subject: BCUC Site C Inquiry - Errata to Final Report

Dear Minister,

Please see attached correspondence with respect to the above-noted matter.

Original will not follow. A hard copy of the attached is available upon request.
Please call the BCUC Regulatory Services at 604-660-4700 to request a copy.

Regards,

Katie Berezan

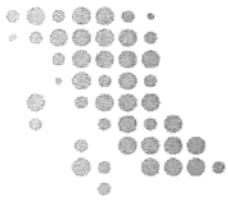
Administrative Assistant, Regulatory Services

British Columbia Utilities Commission

P: 604.660.4700 **BC Toll Free:** 1.800.663.1385 **F:** 604.660.1102

bcuc.com

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bcuc
British Columbia
Utilities Commission

Patrick Wruck
Commission Secretary

Commission.Secretary@bcuc.com
bcuc.com

Suite 410, 900 Howe Street
Vancouver, BC Canada V6Z 2N3
P: 604.660.4700
TF: 1.800.663.1385
F: 604.660.1102

November 15, 2017

BCUC INQUIRY RESPECTING SITE C

A-25

Sent via eFile

The Honourable Michelle Mungall, M.L.A.
Minister of Energy, Mines and Petroleum Resources
Parliament Buildings
PO Box 9060 Stn Gov't
Victoria, BC V8W 9E2
EMPR.Minister@gov.bc.ca

**Re: British Columbia Hydro and Power Authority – British Columbia Utilities Commission Inquiry
Respecting Site C – Project No. 1598922 – Final Report**

Dear Minister:

In accordance with Order in Council No. 244 dated August 2, 2017, the British Columbia Utilities Commission (Commission) submitted its Final Report with respect to the Site C Inquiry (Final Report) on November 1, 2017.

The Commission hereby submits an errata to the Final Report. The Mid C price forecasts used in the Site C Calculator are in real terms and should have been inflated to nominal terms. Therefore, the Commission is issuing an errata correcting the tables and figures in the Final Report and the Executive Summary. A "copy and paste" error in Table 43 on page 170 of the Final Report is also corrected. As noted in the errata, the corrections do not change the Panel's findings.

The Commission acknowledges it has received certain comments from participants regarding the Commission Illustrative Alternative Portfolio (Exhibit A-24-2-1) and confirms it is looking into those comments.

Sincerely,

Patrick Wruck
Commission Secretary

Report errata

1.1 Math Error regarding Mid-C price forecasts used in the Site C Calculator

Issue

The Mid C price forecasts used in the Site C unit energy cost (UEC) Calculator are in real terms and should have been inflated to nominal terms.

Commission comments

The Panel confirms that the graph upon which the Mid C price forecasts were derived are in real F\$2018 and therefore should be inflated to nominal. In the alternative portfolio spreadsheets, these same price forecasts were inflated to nominal.

By correcting the Mid-C price forecasts to nominal in the Site C UEC calculator, we find that the rate impact (NPV) from Site C under the **low load case** is \$336 million lower, at \$2,852 million instead of \$3,188. Under the **mid load case**, the rate impact from Site C is \$68 million, at \$3,901 million instead of \$3,969 million. There is no impact on the high load case as there is no surplus energy in that scenario.

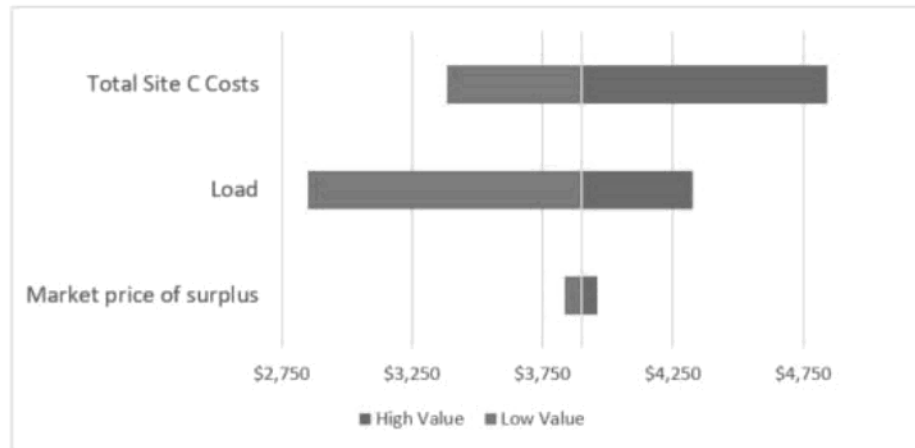
The tables and figure in the Executive Summary would read correctly as follows:

Corrected Table on p. 7 of the Executive Summary:

Scenario	Rate Impact (\$ million)			Unit Energy Cost (\$/MWh)	
	A. Illustrative Alternative Portfolio	B. Site C	Difference (A - B)	Illustrative Alternative Portfolio	Site C
Commission Assumptions	\$3,234	\$2,852	\$382	\$32	\$44

Finding: The Panel confirms there is no change to its finding that “[a]s can be seen in the table below, the cost to ratepayers of Site C and the Illustrative Alternative Portfolio are virtually equivalent, within the uncertainty inherent in the assumptions.”

Corrected Site C Rate Impact Sensitivity Analysis on p. 16 of the Executive Summary



Finding: The Panel confirms there is no change to its finding that “For Site C, as seen in the graph above, the base case is completion costs of \$10 billion, BC Hydro’s mid load forecast and the Panel’s Mid C forecast assumptions. The inputs and assumptions that have the greatest impact on rates are the Site C total costs and the load forecast. The market price of surplus energy has much less impact on the costs to ratepayers.”

Corrected Sensitivity Analysis on page 17 of the Executive Summary

Scenarios	Rate Impact (\$'m)			Unit energy cost (\$/MWh)	
	A. Revised Illustrative Alternative Portfolio	B. Site C	Difference (A - B)	Revised Illustrative Alternative Portfolio	Site C
Commission Assumptions	\$3,234	\$2,852	\$382	\$32	\$44
Scenarios					
Medium load forecast	\$4,618	\$3,901	\$717	\$34	\$44
Medium load forecast + \$12 billion Site C cost	\$4,618	\$4,842	(\$224)	\$34	\$54
Low load forecast, \$12 billion Site C cost	\$3,234	\$3,793	(\$559)	\$32	\$54
Low load forecast + higher wind-geothermal financing	\$3,360	\$2,852	\$508	\$33	\$44
High load forecast	\$5,121	\$4,325	\$796	\$31	\$44
High load forecast, \$12 billion Site C cost	\$5,121	\$5,266	(\$145)	\$31	\$54

Findings: The Panel confirms there is no change to the paragraph introducing the sensitivity analysis: “The sensitivity analysis illustrates the effect of changing one input assumption at a time. To see the effect of changing more than one variable at a time, we provide a few sample scenario results below.”

The Panel also confirms there is no change to the paragraph immediately below the sensitivity analysis: “The Illustrative Alternative Portfolio indicates that it is possible to design an alternative portfolio of commercially feasible generating projects and demand-side management initiatives that could provide similar benefits to ratepayers as Site C.”

1.2 “Copy & Paste Error” in Table 43 (\$4.9 billion, -\$293 million)

Issue

In Table 43 in the Final Report, in the scenario “Medium load forecast + \$12 billion Site C cost”, Site C NPV should read \$4,911 million and the difference (-\$293 million).

Table 43: Summary of Sample Scenarios

Scenarios	Rate Impact (\$'m)			Unit energy cost (\$/MWh)	
	A. Revised Illustrative Alternative Portfolio ¹	B. Site C ²	Difference (A - B)	Revised Illustrative Alternative Portfolio	Site C
Commission Assumptions ³	\$3,234	\$3,188	\$46	\$32	\$44
Scenarios⁴					
Medium load forecast	\$4,618	\$3,969	\$649	\$34	\$44
Medium load forecast + \$12 billion Site C cost	\$4,618	\$4,129 \$4,911	\$489 (\$293)	\$34	\$54
Low load forecast, \$12 billion Site C cost	\$3,234	\$4,129	(\$895)	\$32	\$54
Low load forecast + higher wind-geothermal financing	\$3,360	\$3,188	\$172	\$33	\$44
High load forecast	\$5,121	\$4,325	\$796	\$31	\$44
High load forecast, \$12 billion Site C cost	\$5,121	\$5,266	(\$145)	\$31	\$54

Commission comments

The Panel confirms there was a copy and paste error in Table 43. The numbers should have been \$4,911 and (-\$293), therefore adding an additional scenario where the Alternative Portfolio is less expensive than Site C.

Finding: The Panel notes that these numbers are now outdated due to the need to correct the Mid C price forecast. The Panel also notes that the correction to Mid C price forecasts results in changes to a number of scenarios.

¹ Revised Illustrative Alternative Portfolio cost plus Site C termination costs minus exports revenues.

² Site C cost to complete less flexibility credit and export revenues.

³ Low Load Forecast, Panel Mid C market electricity price forecast, Site C total costs of \$10 billion, \$1.8 billion in termination costs amortized over 30 years, and BC Hydro financing for all resources in the Revised Illustrative Alternative Portfolio.

⁴ The five scenarios presented in this table start with using the “Commission Assumptions” and modifying one or two variables as described therein.

1.3 Other Corrected Tables and Figures in the Final Report

The following tables and figure in the Final Report would read correctly as follows:

Corrected Table 40: Cost to ratepayers and UEC of Site C (p. 167)

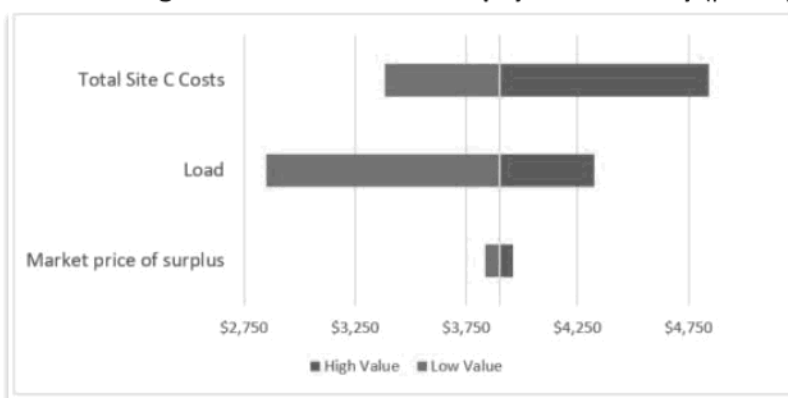
Output: Low LF - Site C		
A	Sunk Costs (F\$18)	\$ 2,100 million
B	Site C Cost to Complete (F\$18)	\$ 4,391 million
C	Flexibility Credit (F\$18)	\$ (66) million
D	Surplus Energy Sales (F\$18)	\$ (1,473) million
E	Total Rate Impact (B+C+D)	\$ 2,852 million
F	Volume (F18)	98,993
G	UEC (F\$18) (B/F)	\$ 44.35 per MWh

Finding: The Panel confirms that the paragraph below Table 40 should read: “The comparison in the tables above show that the cost to ratepayers Illustrative Alternative Portfolio has a lower UEC than Site C (\$31.64/MWh compared to \$44.35/MWh) but a cost to ratepayers slightly higher (\$3.234 billion compared to ~~\$3.188~~ \$2.852 billion for Site C).”

Corrected Table 42: Sensitivity Analysis of Site C (p. 169)

Site C							
Base Case Rate Impact		\$ 3,901 million					
Input Variable	Low Value	Difference from Base Case	High Value	Difference from Base Case	Low Value	Base Case	High Value
Total Site C costs	\$ 3,383	\$ (518)	\$ 4,842	\$ 941	\$8,900 M	\$10,000 M	\$12,000 M
Load	\$ 2,852	\$ (1,049)	\$ 4,325	\$ 424	Low LF	Med LF	High LF
Market price of surplus	\$ 3,835	\$ (66)	\$ 3,962	\$ 61	BC Hydro RRA	Panel Mid C	Panel Mid C ABBLow

Corrected Figure 29: Site C Cost to ratepayers Sensitivity (p. 169)



Finding: The Panel confirms there is no change to its finding that: “For Site C, the inputs and assumptions that have the greatest impact on rates are the Site C total costs and the magnitude of the load. As with the Illustrative Alternative Portfolio, the market price of surplus energy has much less impact on the costs to ratepayers.”

Corrected Table 43: Summary of Sample Scenarios (p. 170)

Scenarios	Rate Impact (\$'m)			Unit energy cost (\$/MWh)	
	A. Revised Illustrative Alternative Portfolio ⁵	B. Site C ⁶	Difference (A - B)	Revised Illustrative Alternative Portfolio	Site C
Commission Assumptions ⁷	\$3,234	\$2,852	\$382	\$32	\$44
Scenarios⁸					
Medium load forecast	\$4,618	\$3,901	\$717	\$34	\$44
Medium load forecast + \$12 billion Site C cost	\$4,618	\$4,842	(\$224)	\$34	\$54
Low load forecast, \$12 billion Site C cost	\$3,234	\$3,793	(\$559)	\$32	\$54
Low load forecast + higher wind-geothermal financing	\$3,360	\$2,852	\$508	\$33	\$44
High load forecast	\$5,121	\$4,325	\$796	\$31	\$44
High load forecast, \$12 billion Site C cost	\$5,121	\$5,266	(\$145)	\$31	\$54

Finding: The Panel confirms that there is no change to the paragraph introducing the sensitivity analysis: “A summary of some sample scenarios is shown below.”

⁵ Revised Illustrative Alternative Portfolio cost plus Site C termination costs minus exports revenues.

⁶ Site C cost to complete less flexibility credit and export revenues.

⁷ Low Load Forecast, Panel Mid C market electricity price forecast, Site C total costs of \$10 billion, \$1.8 billion in termination costs amortized over 30 years, and BC Hydro financing for all resources in the Revised Illustrative Alternative Portfolio.

⁸ The five scenarios presented in this table start with using the “Commission Assumptions” and modifying one or two variables as described therein.

Corrected Figure 32: Cost of Site C to Ratepayers of a Zero-Load Growth (p. 172)

Output		
A	Sunk Costs (F\$18)	\$ 2,100 million
B	Site C Cost to Complete (F\$18)	\$ 4,391 million
C	Flexibility Credit (F\$18)	\$ (66) million
D	Surplus Energy Sales (F\$18)	\$ (3,861) million
E	Total Rate Impact (B+C+D)	\$ 464 million
F	Volume (F18)	98,993
G	UEC (F\$18) (B/F)	\$ 44.35 per MWh

Finding: The Panel confirms that there is no change to the finding that “This illustrates that under current market value assumptions, not all of the costs of Site C would be recovered and that the surplus energy is therefore being sold “below cost.” However, if ratepayers need Site C energy, but don’t need it immediately, as with the low load forecast scenario and higher, surplus sales actually lower the cost to ratepayers of Site C.”

Duncan, Kate EMPR:EX

From: Sanderson, Melissa EMPR:EX
Sent: November 15, 2017 3:21 PM
To: Lloyd, Evan GCPE:EX; Gibbs, Robb GCPE:EX; Kristianson, Eric GCPE:EX; Zadravec, Don GCPE:EX; Haslam, David GCPE:EX; Sanderson, Melissa EMPR:EX; Howlett, Tim GCPE:EX
Cc: MacLaren, Les EMPR:EX; Nikolejsin, Dave EMPR:EX
Subject: FW: BCUC Site C Inquiry - Errata to Final Report
Attachments: 11-15-2017_Site C Report Errata.pdf

Hi all,

This just arrived in our Ministers general email box. I spoke with Viki at BCUC who called me. They will publish this on their site, however most likely next week due to the announcement today.

Please call if you have any questions.

Melissa

From: Commission Secretary BCUC:EX
Sent: Wednesday, November 15, 2017 1:46 PM
To: Minister, EMPR EMPR:EX
Subject: BCUC Site C Inquiry - Errata to Final Report

Dear Minister,

Please see attached correspondence with respect to the above-noted matter.

Original will not follow. A hard copy of the attached is available upon request. Please call the BCUC Regulatory Services at 604-660-4700 to request a copy.

Regards,

Katie Berezan

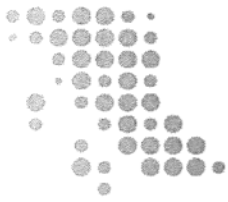
Administrative Assistant, Regulatory Services

British Columbia Utilities Commission

P: 604.660.4700 **BC Toll Free:** 1.800.663.1385 **F:** 604.660.1102

bcuc.com

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bcuc
British Columbia
Utilities Commission

Patrick Wruck
Commission Secretary

Commission.Secretary@bcuc.com
bcuc.com

Suite 410, 900 Howe Street
Vancouver, BC Canada V6Z 2N3
P: 604.660.4700
TF: 1.800.663.1385
F: 604.660.1102

November 15, 2017

BCUC INQUIRY RESPECTING SITE C

A-25

Sent via eFile

The Honourable Michelle Mungall, M.L.A.
Minister of Energy, Mines and Petroleum Resources
Parliament Buildings
PO Box 9060 Stn Gov't
Victoria, BC V8W 9E2
EMPR.Minister@gov.bc.ca

**Re: British Columbia Hydro and Power Authority – British Columbia Utilities Commission Inquiry
Respecting Site C – Project No. 1598922 – Final Report**

Dear Minister:

In accordance with Order in Council No. 244 dated August 2, 2017, the British Columbia Utilities Commission (Commission) submitted its Final Report with respect to the Site C Inquiry (Final Report) on November 1, 2017.

The Commission hereby submits an errata to the Final Report. The Mid C price forecasts used in the Site C Calculator are in real terms and should have been inflated to nominal terms. Therefore, the Commission is issuing an errata correcting the tables and figures in the Final Report and the Executive Summary. A "copy and paste" error in Table 43 on page 170 of the Final Report is also corrected. As noted in the errata, the corrections do not change the Panel's findings.

The Commission acknowledges it has received certain comments from participants regarding the Commission Illustrative Alternative Portfolio (Exhibit A-24-2-1) and confirms it is looking into those comments.

Sincerely,

Patrick Wruck
Commission Secretary

Report errata

1.1 Math Error regarding Mid-C price forecasts used in the Site C Calculator

Issue

The Mid C price forecasts used in the Site C unit energy cost (UEC) Calculator are in real terms and should have been inflated to nominal terms.

Commission comments

The Panel confirms that the graph upon which the Mid C price forecasts were derived are in real F\$2018 and therefore should be inflated to nominal. In the alternative portfolio spreadsheets, these same price forecasts were inflated to nominal.

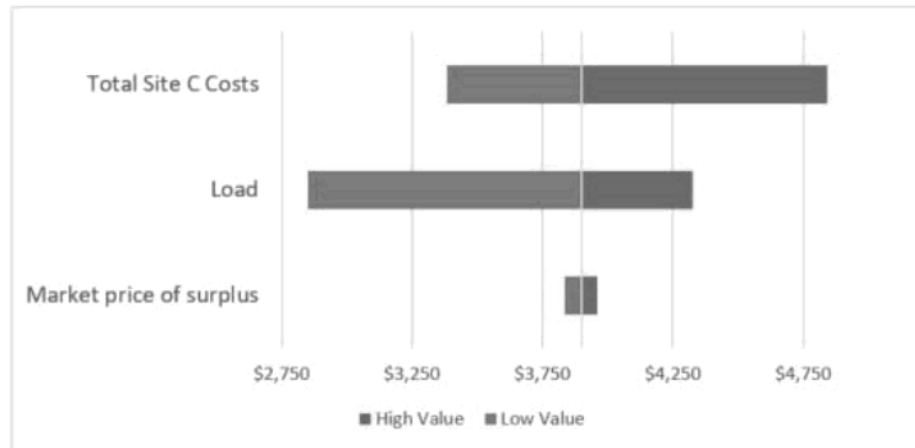
By correcting the Mid-C price forecasts to nominal in the Site C UEC calculator, we find that the rate impact (NPV) from Site C under the **low load case** is \$336 million lower, at \$2,852 million instead of \$3,188. Under the **mid load case**, the rate impact from Site C is \$68 million, at \$3,901 million instead of \$3,969 million. There is no impact on the high load case as there is no surplus energy in that scenario.

The tables and figure in the Executive Summary would read correctly as follows:

Corrected Table on p. 7 of the Executive Summary:

Scenario	Rate Impact (\$ million)			Unit Energy Cost (\$/MWh)	
	A. Illustrative Alternative Portfolio	B. Site C	Difference (A - B)	Illustrative Alternative Portfolio	Site C
Commission Assumptions	\$3,234	\$2,852	\$382	\$32	\$44

Finding: The Panel confirms there is no change to its finding that “[a]s can be seen in the table below, the cost to ratepayers of Site C and the Illustrative Alternative Portfolio are virtually equivalent, within the uncertainty inherent in the assumptions.”

Corrected Site C Rate Impact Sensitivity Analysis on p. 16 of the Executive Summary

Finding: The Panel confirms there is no change to its finding that “For Site C, as seen in the graph above, the base case is completion costs of \$10 billion, BC Hydro’s mid load forecast and the Panel’s Mid C forecast assumptions. The inputs and assumptions that have the greatest impact on rates are the Site C total costs and the load forecast. The market price of surplus energy has much less impact on the costs to ratepayers.”

Corrected Sensitivity Analysis on page 17 of the Executive Summary

Scenarios	Rate Impact (\$'m)			Unit energy cost (\$/MWh)	
	A. Revised Illustrative Alternative Portfolio	B. Site C	Difference (A - B)	Revised Illustrative Alternative Portfolio	Site C
Commission Assumptions	\$3,234	\$2,852	\$382	\$32	\$44
Scenarios					
Medium load forecast	\$4,618	\$3,901	\$717	\$34	\$44
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High load forecast	\$5,121	\$4,325	\$796	\$31	\$44
High load forecast, \$12 billion Site C cost	\$5,121	\$5,266	(\$145)	\$31	\$54

Findings: The Panel confirms there is no change to the paragraph introducing the sensitivity analysis: “The sensitivity analysis illustrates the effect of changing one input assumption at a time. To see the effect of changing more than one variable at a time, we provide a few sample scenario results below.”

The Panel also confirms there is no change to the paragraph immediately below the sensitivity analysis: “The Illustrative Alternative Portfolio indicates that it is possible to design an alternative portfolio of commercially feasible generating projects and demand-side management initiatives that could provide similar benefits to ratepayers as Site C.”

1.2 “Copy & Paste Error” in Table 43 (\$4.9 billion, -\$293 million)

Issue

In Table 43 in the Final Report, in the scenario “Medium load forecast + \$12 billion Site C cost”, Site C NPV should read \$4,911 million and the difference (-\$293 million).

Table 43: Summary of Sample Scenarios

Scenarios	Rate Impact (\$'m)			Unit energy cost (\$/MWh)	
	A. Revised Illustrative Alternative Portfolio ¹	B. Site C ²	Difference (A - B)	Revised Illustrative Alternative Portfolio	Site C
Commission Assumptions ³	\$3,234	\$3,188	\$46	\$32	\$44
Scenarios⁴					
Medium load forecast	\$4,618	\$3,969	\$649	\$34	\$44
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Commission comments

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¹ Revised Illustrative Alternative Portfolio cost plus Site C termination costs minus exports revenues.

² Site C cost to complete less flexibility credit and export revenues.

³ Low Load Forecast, Panel Mid C market electricity price forecast, Site C total costs of \$10 billion, \$1.8 billion in termination costs amortized over 30 years, and BC Hydro financing for all resources in the Revised Illustrative Alternative Portfolio.

⁴ The five scenarios presented in this table start with using the “Commission Assumptions” and modifying one or two variables as described therein.

1.3 Other Corrected Tables and Figures in the Final Report

The following tables and figure in the Final Report would read correctly as follows:

Corrected Table 40: Cost to ratepayers and UEC of Site C (p. 167)

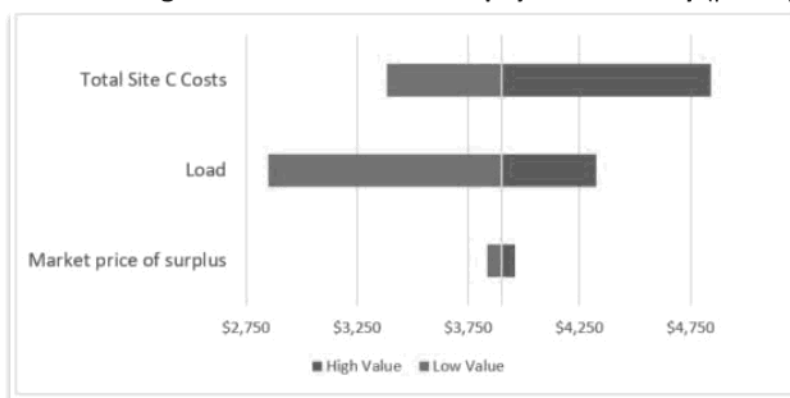
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B	Site C Cost to Complete (F\$18)	\$ 4,391 million
C	Flexibility Credit (F\$18)	\$ (66) million
D	Surplus Energy Sales (F\$18)	\$ (1,473) million
E	Total Rate Impact (B+C+D)	\$ 2,852 million
F	Volume (F18)	98,993
G	UEC (F\$18) (B/F)	\$ 44.35 per MWh

Finding: The Panel confirms that the paragraph below Table 40 should read: “The comparison in the tables above show that the cost to ratepayers Illustrative Alternative Portfolio has a lower UEC than Site C (\$31.64/MWh compared to \$44.35/MWh) but a cost to ratepayers slightly higher (\$3.234 billion compared to ~~\$3.188~~ \$2.852 billion for Site C).”

Corrected Table 42: Sensitivity Analysis of Site C (p. 169)

Site C							
Base Case Rate Impact		\$ 3,901 million					
Input Variable	Low Value	Difference from Base Case	High Value	Difference from Base Case	Low Value	Base Case	High Value
Total Site C costs	\$ 3,383	\$ (518)	\$ 4,842	\$ 941	\$8,900 M	\$10,000 M	\$12,000 M
Load	\$ 2,852	\$ (1,049)	\$ 4,325	\$ 424	Low LF	Med LF	High LF
Market price of surplus	\$ 3,835	\$ (66)	\$ 3,962	\$ 61	BC Hydro RRA	Panel Mid C	Panel Mid C ABBLow

Corrected Figure 29: Site C Cost to ratepayers Sensitivity (p. 169)



Finding: The Panel confirms there is no change to its finding that: “For Site C, the inputs and assumptions that have the greatest impact on rates are the Site C total costs and the magnitude of the load. As with the Illustrative Alternative Portfolio, the market price of surplus energy has much less impact on the costs to ratepayers.”

Corrected Table 43: Summary of Sample Scenarios (p. 170)

Scenarios	Rate Impact (\$'m)			Unit energy cost (\$/MWh)	
	A. Revised Illustrative Alternative Portfolio ⁵	B. Site C ⁶	Difference (A - B)	Revised Illustrative Alternative Portfolio	Site C
Commission Assumptions ⁷	\$3,234	\$2,852	\$382	\$32	\$44
Scenarios⁸					
Medium load forecast	\$4,618	\$3,901	\$717	\$34	\$44
Medium load forecast + \$12 billion Site C cost	\$4,618	\$4,842	(\$224)	\$34	\$54
Low load forecast, \$12 billion Site C cost	\$3,234	\$3,793	(\$559)	\$32	\$54
Low load forecast + higher wind-geothermal financing	\$3,360	\$2,852	\$508	\$33	\$44
High load forecast	\$5,121	\$4,325	\$796	\$31	\$44
High load forecast, \$12 billion Site C cost	\$5,121	\$5,266	(\$145)	\$31	\$54

Finding: The Panel confirms that there is no change to the paragraph introducing the sensitivity analysis: “A summary of some sample scenarios is shown below.”

⁵ Revised Illustrative Alternative Portfolio cost plus Site C termination costs minus exports revenues.

⁶ Site C cost to complete less flexibility credit and export revenues.

⁷ Low Load Forecast, Panel Mid C market electricity price forecast, Site C total costs of \$10 billion, \$1.8 billion in termination costs amortized over 30 years, and BC Hydro financing for all resources in the Revised Illustrative Alternative Portfolio.

⁸ The five scenarios presented in this table start with using the “Commission Assumptions” and modifying one or two variables as described therein.

Corrected Figure 32: Cost of Site C to Ratepayers of a Zero-Load Growth (p. 172)

Output		
A	Sunk Costs (F\$18)	\$ 2,100 million
B	Site C Cost to Complete (F\$18)	\$ 4,391 million
C	Flexibility Credit (F\$18)	\$ (66) million
D	Surplus Energy Sales (F\$18)	\$ (3,861) million
E	Total Rate Impact (B+C+D)	\$ 464 million
F	Volume (F18)	98,993
G	UEC (F\$18) (B/F)	\$ 44.35 per MWh

Finding: The Panel confirms that there is no change to the finding that “This illustrates that under current market value assumptions, not all of the costs of Site C would be recovered and that the surplus energy is therefore being sold “below cost.” However, if ratepayers need Site C energy, but don’t need it immediately, as with the low load forecast scenario and higher, surplus sales actually lower the cost to ratepayers of Site C.”

Duncan, Kate EMPR:EX

From: Haslam, David GCPE:EX
Sent: November 15, 2017 3:44 PM
To: Zadavec, Don GCPE:EX; Lloyd, Evan GCPE:EX; Gibbs, Robb GCPE:EX; Kristianson, Eric GCPE:EX; Sanderson, Melissa EMPR:EX; Howlett, Tim GCPE:EX
Cc: MacLaren, Les EMPR:EX; Nikolejsin, Dave EMPR:EX
Subject: FW: IN_Allied Hydro Council Report on BCUC Review_15 Nov_2017_V3
Attachments: IN_Allied Hydro Council Report on BCUC Review_15 Nov_2017_V3.docx

All – attached is our IN on the Allied Hydro Council Report. We have one media request seeking comment – GM reporter Sunny Dhillon. See below recommended response – discussed with Don. His deadline is 345. We can probably buy a another 15 minutes or so:

- We just received the Allied Hydro Council of BC's report on the BCUC's review of the Site C project.
- The Allied Hydro Council's report clearly indicates a high level of interest in the government's decision on the Site C project.
- Government will review all the information available to make the best decision in the interests of British Columbians and ratepayers.

Good afternoon. Sunny Dhillon with the Globe.

I'm heading to a news conference at which the Allied Hydro Council of BC is expected to say the BCUC report on Site C was fundamentally flawed and the project should proceed.

Will the minister be offering a response today?

Please let me know.

Thank you.



Sunny Dhillon | Reporter

p: 604-631-6619 (o), 604-349-2593 (m)

e: sdhillon@globeandmail.com | t: @TheSunnyDhillon

ADVICE TO MINISTER

**CONFIDENTIAL
GCPE-EMPR ISSUE NOTE**

Ministry of Energy and Mines

Date: Nov. 15, 2017

Minister Responsible: Hon. Michelle Mungall

ALLIED HYDRO COUNCIL REPORT

ADVICE AND RECOMMENDED RESPONSE:

- We just received the Allied Hydro Council of BC's report on the BCUC's review of the Site C project.
- The Allied Hydro Council's report clearly indicates a high level of interest in the government's decision on the Site C project.
- Government will review all the information available to make the best decision in the interests of British Columbians and ratepayers.
- I do not expect the timing of our decision to be affected by this new report.

If asked about timing of decision:

- This will be an extremely difficult decision – we inherited a project that was advanced by the previous government without proper regulatory oversight and that is now more than two years into construction, employs more than 2,000 people and on which about \$2 billion has already been spent.
- We are going to take the time we need to make a decision on Site C that works for B.C. families, businesses and the sustainability of our environment and economy.
- Given the complexity of the issues involved and the significant and long-term impacts for our province, this is a decision we take very seriously. We anticipate a decision by the end of the year.

KEY FACTS REGARDING THE ISSUE:

The Allied Hydro Council of BC's (AHC) response to the British Columbia Utility Commission's (BCUC) report concludes that BCUC's final report on BC Hydro's Site C dam is fundamentally flawed and has made up to a \$3 billion error on the "sunk costs" already invested in the project, leading to faulty conclusions about the viability of Site C to provide clean, green hydroelectric power for 100 years.

The AHC analysis strongly argues that the government should go ahead with Site C.

ADVICE TO MINISTER

In addition to the “sunk costs” issue, AHC has identified numerous other issues with the BCUC final report on Site C, including the following:

- BC Hydro’s load growth estimate of future electricity needs is reasonable – and that if demand grows by just 1% per year from 2017 through 2036 – the equivalent of three Site C dams will be needed, Demand growth can be expected in order to meet BC and Canadian greenhouse gas emission reduction commitments;
- If the demand for electric vehicles continues to grow as rapidly as recent statistics show, even BC Hydro’s growth forecast will be low;
- The BCUC claim that alternative energy sources will have similar benefits and cost the same or less than Site C is not realistic. Alternative supplies are unreliable, particularly given there are no commercial solar power or geothermal power facilities in BC;
- The BCUC is wrong in saying that any surplus Site C power could not be exported to Alberta or the United States for a profit;
- The Columbia River Treaty Downstream Benefits cannot be considered as a reliable alternative to Site C as they are subject to complex international negotiations and can be revoked on notice;
- Project labour agreements as used successfully by BC Premier W.A.C. Bennett on the BC Hydro Heritage Dams and all major dam construction since would greatly assist BC Hydro in completing Site C on schedule;
- While First Nations and environmental concerns are legitimate and should be further addressed to gain support, no Canadian law or Supreme Court decision gives First Nations a veto over resource projects. BC Hydro has undertaken exhaustive environmental permitting and First Nations consultations;
- And contrary to opponents’ claims, BC Hydro’s growth projections are not dependent on the development of a liquefied natural gas industry, nor is Site C power predicated on the needs of an LNG industry.

The AHC is positioning its response the BCUC final report on Site C as essential analysis for government to consider as it makes a landmark decision by the end of the year that will have repercussions for decades to come.

Key Findings:

The AHC contends that the Province of British Columbia should proceed with completion of the Site C Project in the public and ratepayer’s interest with some adjustments to BC Hydro’s procurement approach and overall project management.

Background:

The Allied Hydro Council of BC represents 14 building and construction trade unions, as well as three non-traditional construction trade unions. Veteran energy lawyer Jim Quail, and former Columbia Power Corporation CEO Lorne Sivertson, were retained by AHC to analyze the BCUC’s November 1 report on the Site C project.

On October 13, 2017, AHC made a technical presentation to the BCUC, which followed on from their August 21, 2017 formal submission to the BCUC. That submission recommended that the Site C project

ADVICE TO MINISTER

be continued, with minor adjustments to the procurement approach and overall project management.

Communications Contact:	Colin Grewar	250-952-0650
Program Area Contact:	Les MacLaren	778-698-7183
File Created:	15 Nov. 2017	
File Updated:		

Duncan, Kate EMPR:EX

From: Marshall, Fraser EMPR:EX
Sent: November 16, 2017 12:01 PM
To: Sanderson, Melissa EMPR:EX
Subject: Site C Correspondence

Hi Melissa, I'm not sure we completely arrived at this, but my recommendation on all Site C correspondence is this: hold it all until the decision is made in a few weeks time. Then we can respond to all at once.

Make sense?

Fraser

Duncan, Kate EMPR:EX

From: Haslam, David GCPE:EX
Sent: November 16, 2017 3:09 PM
To: Sanderson, Melissa EMPR:EX; McNish, James EMPR:EX
Cc: Zadavec, Don GCPE:EX; Howlett, Tim GCPE:EX; Grewar, Colin GCPE:EX; Beaupre, Darren GCPE:EX; Sovka, David GCPE:EX; Giles, Alison GCPE:EX; Currie, David GCPE:EX
Subject: Media Requet_CTV_Letter to BCUC

Melissa – Bhinder approached Finance GCPE for a clip of MCJ. She's unavailable. As is MMM. Bhinder will accept a statement from MMM via email. She may seek a minister on camera tomorrow but that's to be confirmed depending on availability. Recommended messaging is pre-approved.

Reporter

Bhinder Sajan, Reporter

Deadline Thursday, November 16, 2017 4:00 PM

Request

Is a minister available for a clip on the joint letter sent to BCUC re Site C?

Recommendation

- The current uncertainty and division over the Site C project is a direct result of the previous government's irresponsible decision to start construction without proper regulatory oversight.
- It fell to our government to correct that oversight and send the project to the BCUC for review.
- We are now considering the BCUC's final report and other issues as we work towards a final decision on completing or terminating the project that will keep rates affordable for B.C. families and businesses in the long-term.
- We are taking time and care in our decision-making process to ensure the data and analysis we are relying upon is accurate, and that we have a clear understanding of the impacts on ratepayers associated with completing the project or cancelling it.
- That includes working with the Ministry of Finance to conduct an intense economic review of the project over the next few weeks.
- Government has asked the BCUC to clarify some elements of its final report on the Site C project delivered November 1, 2017.
- Our request to the BCUC is part of our due diligence as we work towards a final decision on Site C that will keep rates affordable for B.C. families and businesses in the long term.
- In the report the BCUC assesses a large amount of complex data and analysis and we want to make sure we fully understand the Commission's assumptions and calculations.
- Additionally, as part of our decision-making process the Ministry of Finance will be undertaking a financial analysis of BCUC report, including the implications for and risks to the fiscal plan in the event the project is continued or terminated.

Duncan, Kate EMPR:EX

From: Minister, EMPR EMPR:EX
Sent: November 16, 2017 5:11 PM
To: Sanderson, Melissa EMPR:EX
Subject: FW: BCUC Site C Inquiry - Errata to Final Report
Attachments: 11-16-2017_A-26 Site C Report Errata.pdf; A-26-1_Appendix-C_Commission-Illustrative-Alternative-Portfolio.xlsx

From: Commission Secretary BCUC:EX
Sent: Thursday, November 16, 2017 4:42 PM
To: Minister, EMPR EMPR:EX
Subject: BCUC Site C Inquiry - Errata to Final Report

Dear Minister,

Please see attached correspondence with respect to the above-noted matter.

Original will not follow. A hard copy of the attached is available upon request.
Please call the BCUC Regulatory Services at 604-660-4700 to request a copy.

Regards,

Katie Berezan

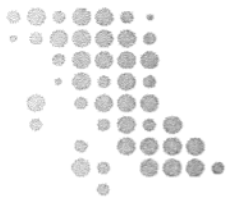
Administrative Assistant, Regulatory Services

British Columbia Utilities Commission

P: 604.660.4700 **BC Toll Free:** 1.800.663.1385 **F:** 604.660.1102

bcuc.com

The information being sent is intended only for the person or organization to which it is addressed. If you receive this e-mail in error, please delete the material and contact the sender.



bcuc

British Columbia
Utilities Commission

Patrick Wruck
Commission Secretary

Commission.Secretary@bcuc.com
bcuc.com

Suite 410, 900 Howe Street
Vancouver, BC Canada V6Z 2N3
P: 604.660.4700
TF: 1.800.663.1385
F: 604.660.1102

November 16, 2017

BCUC INQUIRY RESPECTING SITE C

A-26

Sent via eFile

The Honourable Michelle Mungall, M.L.A.
Minister of Energy, Mines and Petroleum Resources
Parliament Buildings
PO Box 9060 Stn Gov't
Victoria, BC V8W 9E2
EMPR.Minister@gov.bc.ca

**Re: British Columbia Hydro and Power Authority – British Columbia Utilities Commission Inquiry
Respecting Site C – Project No. 1598922 – Final Report**

Dear Minister:

Further to our letter yesterday attaching the errata to the Site C Inquiry Final Report, please be advised we have also corrected the Commission's Illustrative Alternative Portfolio spreadsheet as described in more detail within the errata.

Please see the complete errata attached to this letter, which will now be inserted into the Commission's Final Report and associated Executive Summary.

Please contact our office if you have any questions.

Sincerely,

Patrick Wruck
Commission Secretary

Report errata

1.1 Math Error regarding Mid C price forecasts used in the Site C Calculator

Issue

The Mid C price forecasts used in the Site C unit energy cost UEC Calculator are in real terms and should have been inflated to nominal terms.

Commission comments

The Panel confirms that the graph upon which the Mid C price forecasts were derived are in real F\$2018 and therefore should be inflated to nominal. In the alternative portfolio spreadsheets, these same price forecasts were inflated to nominal.

By correcting the Mid C price forecasts to nominal in the Site C UEC calculator, we find that the rate impact (NPV) from Site C under the **low load case** is \$336 million lower, at \$2,852 million instead of \$3,188. Under the **mid load case**, the rate impact from Site C is \$68 million, at \$3,901 million instead of \$3,969 million. There is no impact on the high load case as there is no surplus energy in that scenario.

1.2 Formulas issues regarding the Commission Illustrative Alternative Portfolio

Issues

1. In the “Energy & capacity gap” sheet, the text box pointing to cell R42 says “Assumes ramp up at 800 GWh/yr” but the ramp up did not occur in the cells to the right of R42. This should be corrected to include the 800 GWh/yr ramp up for the years F2037 to F2041.
2. In the “Low LF – portfolio” sheet, the cells titled “(capacity) gap to fill” beginning at Y28 and ending at CB28 contain equal values of 1145 MW but the corresponding values in row 33 of the “Energy & capacity gap” sheet are 985 MW (*i.e.*, Site C gross capacity less 14% planning reserve). This should be corrected so that the values in both sheets are the same and the correct value is 985 MW.
3. Pursuant to the change made according to #2 above, a further change is required to cells AJ31 to CB31 of the “Low LF – portfolio” sheet, all of which have the hard number of -629.96 MW rather the cell difference formula which appears in the adjacent AI31 cell and would yield a result of -470 MW.
4. Pursuant to the changes according to #1 to 3, there is no need for capacity from industrial curtailment in F2039 and F2040 and the in-service date for the first wind project (PC 18) can be delayed by one year from F2039 to F2040.

Commission comments

The Panel confirms that the issues outlined above need to be corrected. By correcting them, we find that the rate impact (NPV) from the Illustrative Alternative Portfolio under the **low load case** is \$87 million lower, at \$3,147 million instead of \$3,234. There is no impact on the mid and high load cases as the issues affected only the low load case.

The tables and figure in the Executive Summary would read correctly as follows:

Corrected Table on p. 7 of the Executive Summary:

Scenario	Rate Impact (\$ million)			Unit Energy Cost (\$/MWh)	
	A. Illustrative Alternative Portfolio	B. Site C	Difference (A - B)	Illustrative Alternative Portfolio	Site C
Commission Assumptions	\$3,147	\$2,852	\$295	\$31	\$44

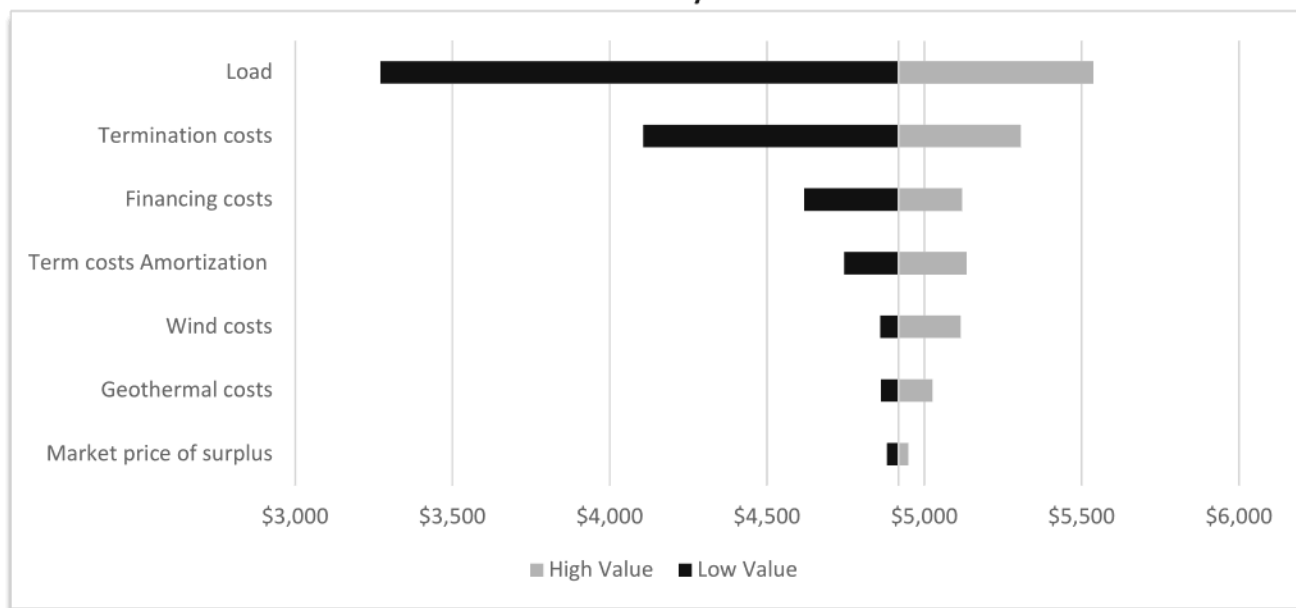
Finding: The Panel confirms there is no change to its finding that “[a]s can be seen in the table below, the cost to ratepayers of Site C and the Illustrative Alternative Portfolio are virtually equivalent, within the uncertainty inherent in the assumptions.”

Corrected Table on p. 15 of the Executive Summary:

Summary Results of the Illustrative Alternative Portfolio (2018\$)

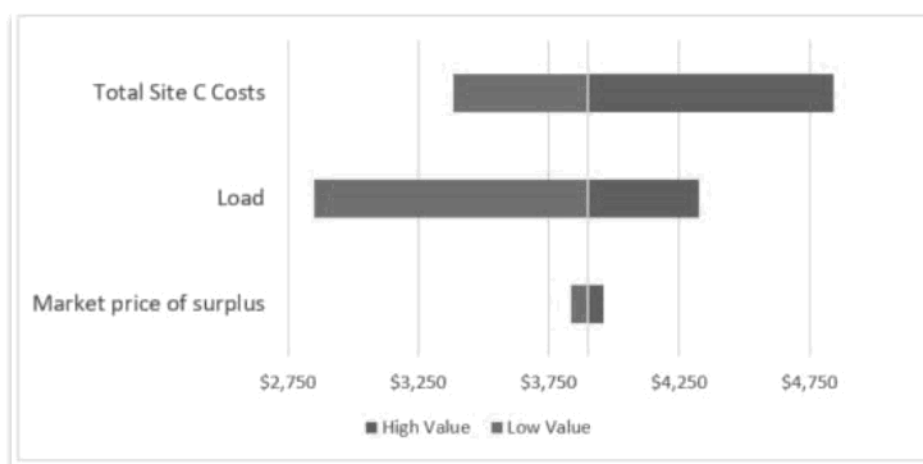
	High Load Forecast	Medium Load Forecast	Low Load Forecast
Revised Alternative Portfolio composition	<ul style="list-style-type: none"> • 441 MW of wind projects starting in F2025, 288MW in F2026 • DSM initiatives (energy efficiency, optional time of use (TOU) rate, capacity focused DSM, industrial curtailment) • 81 MW of geothermal projects starting in F2025 	<ul style="list-style-type: none"> • 438 MW of wind projects starting between F2029 and F2031 • DSM initiatives (energy efficiency, optional TOU rate, capacity focused DSM, industrial curtailment) • 81 MW of geothermal projects starting in F2025 	<ul style="list-style-type: none"> • 444 MW of wind projects starting between F2040 and F2041 • DSM initiatives (energy efficiency, optional TOU rate, capacity focused DSM)
Rate Impact of portfolio	\$ 5,121 million	\$ 4,618 million	\$ 3,147 million

Corrected Illustrative Alternative Portfolio Rate Impact Sensitivity Analysis on p. 15 of the Executive Summary



Finding: The Panel confirms that the paragraph starting with “The graph shows” in the middle of page 16 should read: “The graph shows the cost to ratepayers of the Base Case described below, and variations around the base case. The Base Case is in the centre of the graph and is \$4.918 billion. Then, each variable is changed to a low or high value and the cost to ratepayers of that single change (while holding the other inputs constant) is shown. For example, if the Load forecast is changed to Low instead of Medium, the cost to ratepayers would be reduced by ~~\$1.558~~\$1.647 billion from \$4.918 billion to ~~\$3.36~~\$3.271 billion, while all the other inputs remained as defined in the Base Case.”

Corrected Site C Rate Impact Sensitivity Analysis on p. 16 of the Executive Summary



Finding: The Panel confirms there is no change to its finding that “For Site C, as seen in the graph above, the base case is completion costs of \$10 billion, BC Hydro’s mid load forecast and the Panel’s Mid C forecast assumptions. The inputs and assumptions that have the greatest impact on rates are the Site C total costs and the load forecast. The market price of surplus energy has much less impact on the costs to ratepayers.”

Corrected Sensitivity Analysis on page 17 of the Executive Summary

Scenarios	Rate Impact (\$'m)			Unit energy cost (\$/MWh)	
	A. Revised Illustrative Alternative Portfolio	B. Site C	Difference (A - B)	Revised Illustrative Alternative Portfolio	Site C
Commission Assumptions	\$3,147	\$2,852	\$295	\$31	\$44
Scenarios					
Medium load forecast	\$4,618	\$3,901	\$717	\$34	\$44
Medium load forecast + \$12 billion Site C cost	\$4,618	\$4,842	(\$224)	\$34	\$54
Low load forecast, \$12 billion Site C cost	\$3,147	\$3,793	(\$646)	\$31	\$54
Low load forecast + higher wind-geothermal financing	\$3,271	\$2,852	\$419	\$32	\$44
High load forecast	\$5,121	\$4,325	\$796	\$31	\$44
High load forecast, \$12 billion Site C cost	\$5,121	\$5,266	(\$145)	\$31	\$54

Findings: The Panel confirms there is no change to the paragraph introducing the sensitivity analysis: “The sensitivity analysis illustrates the effect of changing one input assumption at a time. To see the effect of changing more than one variable at a time, we provide a few sample scenario results below.”

The Panel also confirms there is no change to the paragraph immediately below the sensitivity analysis: “The Illustrative Alternative Portfolio indicates that it is possible to design an alternative portfolio of commercially feasible generating projects and demand-side management initiatives that could provide similar benefits to ratepayers as Site C.”

1.3 “Copy & Paste Error” in Table 43 (\$4.9 billion, -\$293 million)

Issue

In Table 43 in the Final Report, in the scenario “Medium load forecast + \$12 billion Site C cost”, Site C NPV should read \$4,911 million and the difference (-\$293 million).

Table 43: Summary of Sample Scenarios

Scenarios	Rate Impact (\$'m)			Unit energy cost (\$/MWh)	
	A. Revised Illustrative Alternative Portfolio	B. Site C	Difference (A - B)	Revised Illustrative Alternative Portfolio	Site C
Commission Assumptions	\$3,234	\$3,188	\$46	\$32	\$44
Scenarios					
Medium load forecast	\$4,618	\$3,969	\$649	\$34	\$44
Medium load forecast + \$12 billion Site C cost	\$4,618	\$4,129 \$4,911	\$489 (\$293)	\$34	\$54
Low load forecast, \$12 billion Site C cost	\$3,234	\$4,129	(\$895)	\$32	\$54
Low load forecast + higher wind-geothermal financing	\$3,360	\$3,188	\$172	\$33	\$44
High load forecast	\$5,121	\$4,325	\$796	\$31	\$44
High load forecast, \$12 billion Site C cost	\$5,121	\$5,266	(\$145)	\$31	\$54

Commission comments

The Panel confirms there was a copy and paste error in Table 43. The numbers should have been \$4,911 and (-\$293), therefore adding an additional scenario where the Alternative Portfolio is less expensive than Site C.

Finding: The Panel notes that these numbers are now outdated due to the need to correct the Mid C price forecast and the issues pertaining to the low load case in the Commission Illustrative Alternative Portfolio. The Panel also notes that the correction to Mid C price forecasts results in changes to a number of scenarios.

1.4 Other Corrected Tables and Figures in the Final Report

The following tables and figure in the Final Report would read correctly as follows:

Corrected table for Illustrative Alternative Portfolio Results (p. 165)

Summary Results of the Revised Illustrative Alternative Portfolios (2018\$)			
	High Load Forecast	Medium Load Forecast	Low Load Forecast
Revised Alternative Portfolio composition	<ul style="list-style-type: none"> 441 MW of wind projects starting in F2025, 288MW in F2026 DSM initiatives (energy efficiency, optional time of use (TOU) rate, capacity focused DSM, industrial curtailment) 81 MW of geothermal projects starting in F2025¹ 	<ul style="list-style-type: none"> 438 MW of wind projects starting between F2029 and F2031 DSM initiatives (energy efficiency, optional TOU rate, capacity focused DSM, industrial curtailment) 81 MW of geothermal projects starting in F2025² 	<ul style="list-style-type: none"> 444 MW of wind projects starting between F2039 F2040 and F2041 DSM initiatives (energy efficiency, optional TOU rate, capacity focused DSM, industrial curtailment)³
Rate Impact of portfolio⁴	\$ 5,121 million ⁵	\$ 4,618 million ⁶	\$ 3,234 <u>3,147</u> million ⁷

Corrected Table 39: Cost to ratepayers and UEC of Site C (p. 167)

Output: Low LF - Alternative Portfolio		
A	Site C Termination Cost (F\$18)	\$ 1,395 million
B	Alternative Portfolio Cost (F\$18)	\$ 2,539 million
C	Surplus Energy Sale (F\$18)	\$ (788) million
D	Total Rate Impact (A+B+C)	\$ <u>3,147</u> million
E	Alt. Portfolio Volume (F18)	82,784
F	UEC (F\$18) (B/E)	\$ 30.67 per MWh

¹ Appendix HC – Commission Illustrative Alternative Portfolio, Tab ‘High LF – portfolio’, with costs in Tab ‘High LF - portfolio costs’.

² Ibid, Tab ‘Med LF – portfolio’, with costs in Tab ‘Med LF - portfolio costs’.

³ Ibid, Tab ‘Low LF – portfolio’, with costs in Tab ‘Low LF - portfolio costs’.

⁴ Discount rate of 4% real, 6% nominal; export revenues valued at Panel’s Mid C Forecast (at plant gate location), Site C \$1.8 billion termination costs amortized over 30 years and assuming all resources are financed at BC Hydro’s financing rate.

⁵ Appendix HC – Commission Illustrative Alternative Portfolio, Tab ‘Input and Output’, Cell O26.

⁶ Ibid, Tab ‘Input and Output’, Cell O17.

⁷ Ibid., Tab ‘Input and Output’, Cell O8.

Corrected Table 40: Cost to ratepayers and UEC of Site C (p. 167)

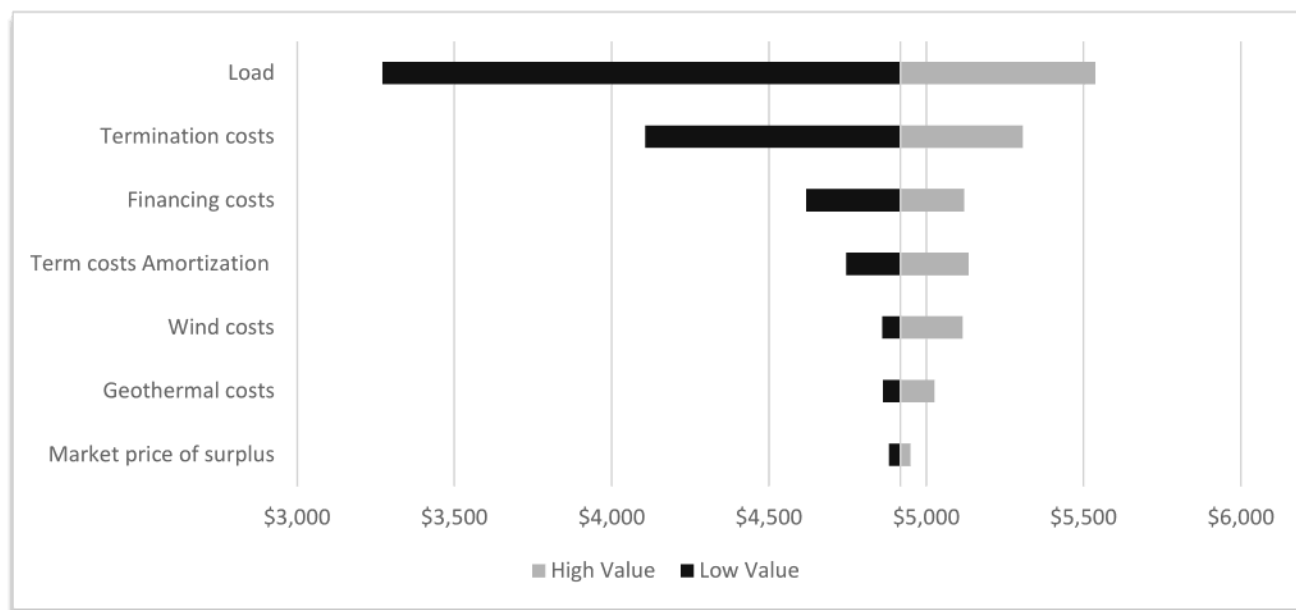
Output: Low LF - Site C		
A	Sunk Costs (F\$18)	\$ 2,100 million
B	Site C Cost to Complete (F\$18)	\$ 4,391 million
C	Flexibility Credit (F\$18)	\$ (66) million
D	Surplus Energy Sales (F\$18)	\$ (1,473) million
E	Total Rate Impact (B+C+D)	\$ 2,852 million
F	Volume (F18)	98,993
G	UEC (F\$18) (B/F)	\$ 44.35 per MWh

Finding: The Panel confirms that the paragraph below Table 40 should read: “The comparison in the tables above show that the cost to ratepayers Illustrative Alternative Portfolio has a lower UEC than Site C (~~\$31.64~~30.67/MWh compared to \$44.35/MWh) but a cost to ratepayers slightly higher (~~\$3.234~~\$3.147 billion compared to ~~\$3.188~~ \$2.852 billion for Site C).”

Corrected Table 41: Sensitivity Analysis of Illustrative Alternative Portfolio (p. 168)**Illustrative Alternative Portfolio Base Case Rate Impact: \$4,918 million**

Input Variable	Low Value	Difference from Base Case	High Value	Difference from Base Case	Low Value	Base Case	High Value
Load	3,271	\$ (1,647)	5,537	619	Low LF	Med LF	High LF
Termination costs	4,106	\$ (812)	5,306	388	\$750 M	\$1,800 M	\$2,300 M
Financing costs	4,618	\$ (300)	5,120	202	BCH Financing for wind-geo, 3.4%	IPP Financing for wind-geo, 6.4%	IPP Financing for wind-geo, 8.4%
Termination costs amortization	4,745	\$ (173)	5,134	216	70 years	30 year	10 years
Wind costs	4,860	\$ (58)	5,115	197	Base case less 5.9% (CanWEA/CEAB C F104-3)	A-22 Assumption No. 13	Base case plus 20%
Geothermal costs	4,862	\$ (56)	5,025	107	CanGEA (F66-4)	NREL flash	NREL binary
Market price of surplus	4,881	\$ (37)	4,949	31	BC Hydro RRA	Panel Mid C	Panel Mid C ABBLow

Finding: The Panel confirms that the paragraph below Table 41 should read: “For example, if the Load is changed to Low instead of Medium, the cost to ratepayers would be reduced by ~~\$1.558~~\$1.647 billion from \$4.918 billion to ~~\$3.360~~\$3.271 billion, while all the other inputs remained as defined in the Base Case. This estimate of ~~\$3.360~~\$3.271 billion is higher than the Illustrative Alternative Portfolio result of ~~\$3.234~~\$3.147 billion as the base case in the table above uses IPP financing costs rather than BC Hydro financing costs. However, this analysis serves to illustrate how sensitive the PV cost to ratepayers analysis is to changes in key input assumptions.”

Corrected Figure 28: Illustrative Alternative Portfolio Cost to ratepayers Sensitivity (p. 169)

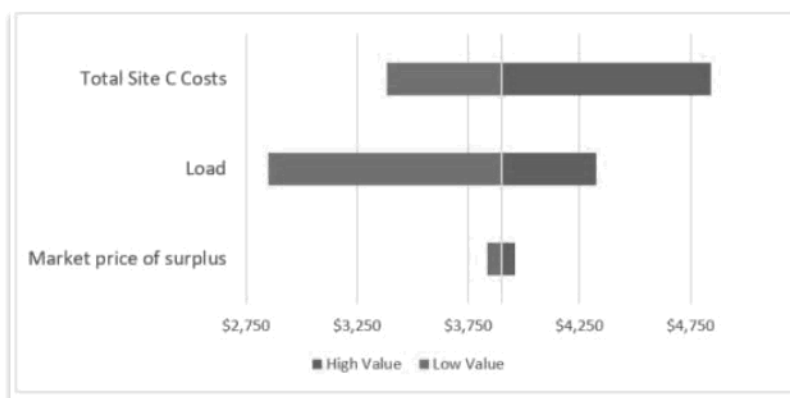
Finding: The Panel confirms that there is no change to its finding: “As can be seen in the graph above, the inputs and assumptions that have the greatest impact on the cost to ratepayers in the Illustrative Alternative Portfolio are the magnitude of the load and Site C termination costs. These are followed by the assumption regarding the financing of IPP projects and the length of the amortization period for the Site C termination

costs. The wind and geothermal energy capital and O&M costs, as well as the market price of surplus energy have the least impact on the results.”

Corrected Table 42: Sensitivity Analysis of Site C (p. 169)

Site C							
Base Case Rate Impact		\$ 3,901 million					
Input Variable	Low Value	Difference from Base Case	High Value	Difference from Base Case	Low Value	Base Case	High Value
Total Site C costs	\$ 3,383	\$ (518)	\$ 4,842	\$ 941	\$8,900 M	\$10,000 M	\$12,000 M
Load	\$ 2,852	\$ (1,049)	\$ 4,325	\$ 424	Low LF	Med LF	High LF
Market price of surplus	\$ 3,835	\$ (66)	\$ 3,962	\$ 61	BC Hydro RRA	Panel Mid C	Panel Mid C ABBLow

Corrected Figure 29: Site C Cost to ratepayers Sensitivity (p. 169)



Finding: The Panel confirms there is no change to its finding that: “For Site C, the inputs and assumptions that have the greatest impact on rates are the Site C total costs and the magnitude of the load. As with the Illustrative Alternative Portfolio, the market price of surplus energy has much less impact on the costs to ratepayers.”

Corrected Table 43: Summary of Sample Scenarios (p. 170)

Scenarios	Rate Impact (\$'m)			Unit energy cost (\$/MWh)	
	A. Revised Illustrative Alternative Portfolio ⁸	B. Site C ⁹	Difference (A - B)	Revised Illustrative Alternative Portfolio	Site C
Commission Assumptions ¹⁰	\$3,234\$3,147	\$3,188\$2,852	\$46\$295	\$32\$31	\$44
Scenarios¹¹					
Medium load forecast	\$4,618	\$3,969\$3,901	\$649\$717	\$34	\$44
Medium load forecast + \$12 billion Site C cost	\$4,618	\$4,129\$4,842	\$489(\$224)	\$34	\$54
Low load forecast, \$12 billion Site C cost	\$3,234\$3,147	\$4,129\$3,793	(\$895)(\$646)	\$32\$31	\$54
Low load forecast + higher wind-geothermal financing	\$3,360\$3,271	\$3,188\$2,852	\$172\$419	\$33\$32	\$44
High load forecast	\$5,121	\$4,325	\$796	\$31	\$44
High load forecast, \$12 billion Site C cost	\$5,121	\$5,266	(\$145)	\$31	\$54

Finding: The Panel confirms that there is no change to the paragraph introducing the sensitivity analysis: “A summary of some sample scenarios is shown below.”

Corrected Figure 32: Cost of Site C to Ratepayers of a Zero-Load Growth (p. 172)

Output		
A	Sunk Costs (F\$18)	\$ 2,100 million
B	Site C Cost to Complete (F\$18)	\$ 4,391 million
C	Flexibility Credit (F\$18)	\$ (66) million
D	Surplus Energy Sales (F\$18)	\$ (3,861) million
E	Total Rate Impact (B+C+D)	\$ 464 million
F	Volume (F18)	98,993
G	UEC (F\$18) (B/F)	\$ 44.35 per MWh

⁸ Revised Illustrative Alternative Portfolio cost plus Site C termination costs minus exports revenues.

⁹ Site C cost to complete less flexibility credit and export revenues.

¹⁰ Low Load Forecast, Panel Mid C market electricity price forecast, Site C total costs of \$10 billion, \$1.8 billion in termination costs amortized over 30 years, and BC Hydro financing for all resources in the Revised Illustrative Alternative Portfolio.

¹¹ The five scenarios presented in this table start with using the “Commission Assumptions” and modifying one or two variables as described therein.

Finding: The Panel confirms that there is no change to the finding that “This illustrates that under current market value assumptions, not all of the costs of Site C would be recovered and that the surplus energy is therefore being sold “below cost.” However, if ratepayers need Site C energy, but don’t need it immediately, as with the low load forecast scenario and higher, surplus sales actually lower the cost to ratepayers of Site C.”

Input	
Nominal discount factor in %	6.00%
Economic life in years	70
Inflation in %	2.00%
% debt	100.00%
BCH Debt rate in %	3.43%
IPP Financing rate in %	6.40%
Financing option	IPP rate Select the option in the drop down menu
Equity rate in %	8.75%
Term costs in F\$2018 as at Dec 31, 2017	\$ 1,800 million
Termination costs amortization period	30
Market Price of Surplus	Panel Select the option in the drop down menu
Geothermal Costs	Medium Select the option in the drop down menu
Wind Costs	Medium Select the option in the drop down menu

Output: Low LF - Alternative Portfolio	
A Site C Termination Cost (F\$18)	\$ 1,395 million
B Alternative Portfolio Cost (F\$18)	\$ 2,663 million
C Surplus Energy Sale (F\$18)	\$ (788) million
D Total Rate Impact (A+B+C)	\$ 3,271 million
E Alt. Portfolio Volume (F18)	82,784
F UEC (F\$18) (B/E)	\$ 32.17 per MWh

Output: Med LF - Alternative Portfolio	
A Site C Termination Cost (F\$18)	\$ 1,395 million
B Alternative Portfolio Cost (F\$18)	\$ 3,766 million
C Surplus Energy Sale (F\$18)	\$ (243) million
D Total Rate Impact (A+B+C)	\$ 4,918 million
E Alt. Portfolio Volume (F18)	102,293
F UEC (F\$18) (B/E)	\$ 36.81 per MWh

Output: High LF - Alternative Portfolio	
A Site C Termination Cost (F\$18)	\$ 1,395 million
B Alternative Portfolio Cost (F\$18)	\$ 4,150 million
C Surplus Energy Sale (F\$18)	\$ (9) million
D Total Rate Impact (A+B+C)	\$ 5,537 million
E Alt. Portfolio Volume (F18)	119,557
F UEC (F\$18) (B/E)	\$ 34.71 per MWh

Alternative Portfolio		
Base Case Rate Impact	\$ 4,918 million	
Sensitivities		
Market price of surplus	Low Value	High Value
Geothermal costs	\$ 4,881	\$ 4,949
Wind costs	\$ 4,862	\$ 5,025
Term costs Amortization	\$ 4,860	\$ 5,115
Financing costs	\$ 4,745	\$ 5,134
Termination costs	\$ 4,618	\$ 5,120
Load	\$ 4,106	\$ 5,306
	\$ 3,271	\$ 5,537

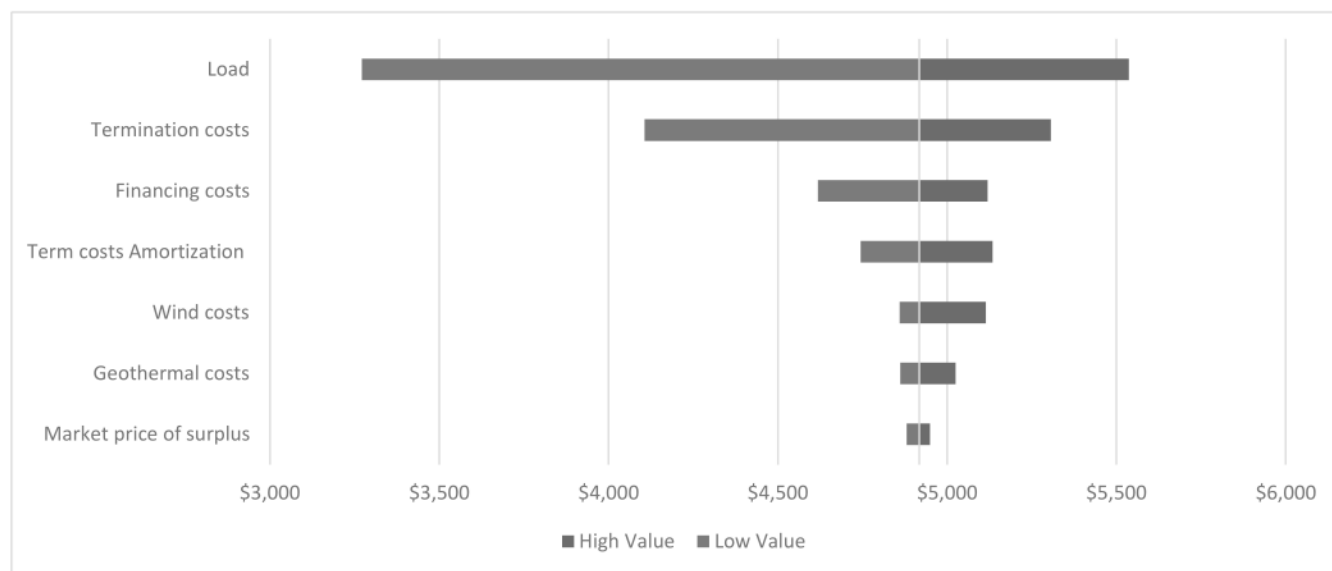
Do not delete. The values in this table are linked to the sensitivity analysis on the 'Tornado' tab.

Alternative Portfolio
Base Case Rate Impact

\$ 4,918 million

Input Variable	Low Value	Difference from Base Case	High Value	Difference from Base Case	Low Value	Base Case	High Value
Load	3,271	\$ (1,647)	5,537	619	Low LF	Med LF	High LF
Termination costs	4,106	\$ (812)	5,306	388	\$750 M	\$1,800 M	\$2,300 M
Financing costs	4,618	\$ (300)	5,120	202	BCH Financing for wind-geo, 3.4%	IPP Financing for wind-geo, 6.4%	IPP Financing for wind-geo, 8.4%
Termination costs amortization	4,745	\$ (173)	5,134	216	70 years	30 year	10 years
Wind costs	4,860	\$ (58)	5,115	197	Base case less 5.9% (CanWEA/CEAB C F104-3)	A-22 Assumption No. 13	Base case plus 20%
Geothermal costs	4,862	\$ (56)	5,025	107	CanGEA (F66-4)	NREL flash	NREL binary
Market price of surplus	4,881	\$ (37)	4,949	31	BC Hydro RRA	Panel Mid C	Panel Mid C ABBLow

Revised Illustrative Alternative Portfolio Rate Impact Sensitivity



Energy and Capacity Gap

BCH high load forecast

Energy Gap after planned resources (GWh)

Year	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041
Surplus / deficit (inc. Site C)	-6012	-3641	-3506	-4231	-5328	-6482	-7776	-8872	-10089	-11032	-12060	-13047	-14547					
Site C	366	3892	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286
Gap to fill	-366	-3892	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286

Capacity Gap after planned resources(MW)

Year	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041
Surplus / deficit (inc. Site C)	-1536	-1339	-1409	-1172	-1455	-1721	-2014	-1917	-2177	-2445	-2711	-2871	-3190					
Site C (adjusted for the 14% of supply requiring reserves)	0	820	985	985	985	985	985	985	985	985	985	985	985	985	985	985	985	985
Gap to fill	0	-820	-985	-985	-985	-985	-985	-985	-985	-985	-985	-985	-985	-985	-985	-985	-985	-985

BCH expected load forecast

Energy Gap after planned resources (GWh)

Year	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041
Surplus / deficit (inc. Site C)	991	3735	4257	3695	2926	2154	1328	506	-417	-1093	-1840	-2410	-3560					
Site C	366	3892	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286
Gap to fill	0	-157	-1029	-1591	-2360	-3132	-3958	-4780	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286	-5286

Capacity Gap after planned resources(MW)

Year	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041
Surplus / deficit (inc. Site C)	-236	27	23	289	70	-124	-330	-182	-389	-603	-808	-903	-1169					
Site C (adjusted for the 14% of supply requiring reserves)	0	820	985	985	985	985	985	985	985	985	985	985	985	985	985	985	985	985
Gap to fill	0	-794	-961	-696	-915	-985	-985	-985	-985	-985	-985	-985	-985	-985	-985	-985	-985	-985

BCH low load forecast

Energy Gap after planned resources (GWh)

Year	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041
Surplus / deficit (inc. Site C)	6030	9076	9893	9540	9017	8506	7946	7350	6766	6346	5779	5262	4241					
Site C	366	3892	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286
Gap to fill	0	0	0	0	0	0	0	0	0	0	0	0	-24	-1045	-1845	-2645	-3445	-4245

Assumes ramp up at 800GWh/year

Capacity Gap after planned resources(MW)

Year	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041
Surplus / deficit (inc. Site C)	675	995	1046	1354	1188	1048	897	1093	953	796	629	595	394					
Site C (adjusted for the 14% of supply requiring reserves)	0	820	985	985	985	985	985	985	985	985	985	985	985	985	985	985	985	985
Gap to fill	0	0	0	0	0	0	-88	0	-32	-189	-356	-390	-591	-791	-985	-985	-985	-985

Assumes ramp up at 200MW/year

Low LF: Portfolio

Key

Exported energy is in green

Energy/capacity gap is in red

New resources are in blue

Pink fill indicates where load growth eliminates surplus concern

Energy Gap after planned resources (GWh)

Year	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041	F 2042	F 2043	
Gap to fill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	1,045	1,845	2,645	3,445	4,245	5,045	5,286	5,286
DSM	152	289	471	794	1,136	1,435	1,735	2,051	2,280	2,436	2,565	2,696	2,824	2,986	3,096	3,242	3,259	3,505	3,602	3,540	3,600	3,694	3,736	3,728	3,701	
Surplus/Gap	152	289	471	794	1,136	1,435	1,735	2,051	2,280	2,436	2,565	2,696	2,824	2,986	3,096	3,242	3,235	2,460	1,757	895	155	551	1,309	1,558	1,585	
Wind - PC 18																					1	2	3	4		
Wind - PC48																					0	524	524	524	524	
Surplus/Gap																				155	1	2	3	4		
Wind - PC 20																						538	538	538	538	
Surplus/Gap																						511	247	496	523	
Wind - PC 20																							1	2	3	
Surplus/Gap																							594	594	594	
																							347	98	71	
Amount of portfolio er	152	289	471	794	1,136	1,435	1,735	2,051	2,280	2,436	2,565	2,696	2,824	2,986	3,096	3,242	3,259	3,505	3,602	3,540	3,600	4,756	5,392	5,384	5,357	

Capacity Gap after planned resources (MW)

Year	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041	F 2042	F 2043
Gap to fill	0	0	0	0	0	0	0	0	0	0	0	88	0	32	189	356	390	591	791	985	985	985	985	985	985
DSM	31	51	79	124	169	208	245	285	312	330	343	353	361	370	372	379	374	403	417	415	432	454	468	477	484
Surplus/Gap	31	51	79	124	169	208	245	285	312	330	343	265	361	338	183	23	16	188	373	570	553	531	517	508	501
Wind - PC 18																					0	36	36	36	36
Wind - PC48																						39	39	39	39
Wind - PC 20																							41	41	41
Total Supply																					0	75	116	116	116
14% of Supply Requiring Reserves																					0	-11	-16	-16	-16
Net capacity gap	31	51	79	124	169	208	245	285	312	330	343	265	361	338	183	23	16	188	373	570	553	467	417	408	401
Program DSM							0	20	40	130	170	190	200	210	210	210	210	210	210	210	210	210	210	210	210
Optional TOU							0	0	10	20	50	70	100	120	150	200	250	300	350	400	400	400	400	410	420
Surplus/Gap	31	51	79	124	169	208	245	305	362	480	563	525	661	668	543	433	444	322	187	40	57	143	193	212	229
Industrial Curtail																					0	0			
Surplus/Gap																									

Low LF: Supporting data

Capitalized	Invest. Year	MW	\$/kW	New Cost (\$'m)			
DSM							
DSM (energy)	F2019 - onward						
DSM (capacity programs)	F2025 - onward						
DSM (Optional TOU)	F2025 - onward						
Initial wind builds							
Wind - PC 18	F2040	138	\$1,895	\$262	Adder Trans/Road	\$37	\$298
Wind - PC 48	F2040	150	\$1,893	\$284		\$33	\$317
Wind - PC 20	F2041	156	\$1,888	\$295		\$47	\$342
Wind refurbishment							
Wind - PC 18	F2065	138	\$1,825	\$252	Refurb discount		0.3
Wind - PC 48	F2065	150	\$1,825	\$274			\$176
Wind - PC 20	F2066	156	\$1,825	\$285			\$199
Wind (new build)							
Wind - PC 18	F2090	138	\$1,825	\$252	Adder Trans/Road	\$37	\$289
Wind - PC 48	F2090	150	\$1,825	\$274		\$33	\$307
Wind - PC 20	F2091	156	\$1,825	\$285		\$47	\$332
Fixed O&M							
DSM (Ind. Curtailment)	Invest. Year	MW	\$/kW-year	Cost (\$'m)			
	F2039	0	\$75	\$0			
	F2040	0	\$75	\$0			
Initial wind builds							
Wind - PC 18	Invest. Year	MW	\$/kW-year	Cost (\$'m)	Adder Trans/road		Total (\$'m)
Wind - PC 48	F2040	138	\$60	\$8	\$1		\$9
Wind - PC 20	F2040	150	\$60	\$9	\$1		\$10
Wind - PC 20	F2041	156	\$60	\$9	\$1		\$11
Wind refurbishment/rebuild							
Wind - PC 18	F2065	138	\$54	\$8	\$1		\$8
Wind - PC 48	F2065	150	\$54	\$8	\$1		\$9
Wind - PC 20	F2066	156	\$54	\$8	\$1		\$10
Wind Integration							
Wind - PC 18	Invest. Year	GWh/year	Culm. GWh	\$/MWh	Culm Cost (\$'m)		
Wind - PC 48	F2040	524	524	\$1.00	\$1		
Wind - PC 48	F2040	538	1062	\$1.00	\$3		
Wind - PC 20	F2041	594	1656	\$1.00	\$4		
Surplus sales							
Energy			\$/MWh	\$/kW year			
Capacity			Panel	\$50			

Low LF: Cost (2018 \$'m)

	Life/amort (years)	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031
CAPITAL														
DSM - energy	15		\$6	\$77	\$91	\$104	\$106	\$108	\$114	\$123	\$122	\$97	\$87	\$83
DSM - cap programs	15								\$0	\$8	\$11	\$13	\$15	\$6
DSM - TOU	15								\$5	\$7	\$17	\$13	\$15	\$4
DSM Total			\$6	\$77	\$91	\$104	\$106	\$108	\$119	\$138	\$150	\$123	\$116	\$93
Wind	25													
O&M														
Ind. Load curtail														
Wind fixed O&M														
Wind Integration														
Total O&M			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Surplus energy revenue			-\$4	-\$7	-\$13	-\$22	-\$32	-\$42	-\$52	-\$64	-\$73	-\$78	-\$84	-\$91
ENERGY ADJUSTMENT														
	GWh	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031
DSM		152	289	471	794	1,136	1,435	1,735	2,051	2,280	2,436	2,565	2,696	2,824
Wind														
Less exported		-152	-289	-471	-794	-1,136	-1,435	-1,735	-2,051	-2,280	-2,436	-2,565	-2,696	-2,824
Total GWh		0	0	0	0	0	0	0	0	0	0	0	0	0
Site C Energy		0	0	0	0	0	366	3892	5286	5286	5286	5286	5286	5286
% of costs related to Site C/exported		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
CAPACITY CREDIT														
Capacity gap after Site C (MW)	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus
Surplus Capacity	MW	31	51	79	124	169	208	245	305	362	480	563	525	661
Value		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Estimated value of capacity (in \$/kW-year) that is in excess of Site C capacity and used for domestic load . No value assumed for capacity in excess of requirements.

F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041	F 2042	F 2043	F 2044	F 2045	F 2046	F 2047	F 2048	F 2049	F 2050	F 2051	F 2052	F 2053	F 2054	F 2055	F 2056	F 2057	F 2058
\$84	\$73	\$58	\$49	\$59	\$59	\$62	\$75	\$77	\$78	\$79	\$81	\$82	\$83	\$81	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80
\$7	\$7	\$7	\$7	\$14	\$14	\$15	\$16	\$8	\$8	\$8	\$8	\$8	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9
\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3
\$94	\$83	\$68	\$59	\$76	\$76	\$80	\$94	\$88	\$89	\$90	\$92	\$93	\$95	\$93	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92
							\$0	\$615		\$342																
							\$0	\$0																		
							\$0	\$19	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30
							\$1	\$3	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1	\$22	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34
-\$106	-\$112	-\$121	-\$113	-\$76	-\$50	-\$16	-\$8	-\$1	-\$6																	
F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041	F 2042	F 2043	F 2044	F 2045	F 2046	F 2047	F 2048	F 2049	F 2050	F 2051	F 2052	F 2053	F 2054	F 2055	F 2056	F 2057	F 2058
2,986	3,096	3,242	3,259	3,505	3,602	3,540	3,600	3,694	3,736	3,728	3,701	3,738	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825
							0	1,062	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656
-2,986	-3,096	-3,242	-2,962	-1,964	-1,261	-399	-183	-15	-136																	
0	0	0	297	1,541	2,341	3,141	3,941	4,741	5,256	5,384	5,357	5,394	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481
5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286
100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98%	99%	98%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%
Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Deficit	Deficit	Deficit	Deficit	Deficit	Deficit															
668	543	433	444	322	0	0	0	0	193	208	226	246	260	260	260	260	260	260	260	260	260	260	260	260	260	260
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10	\$10	\$11	\$12	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13

F 2059	F 2060	F 2061	F 2062	F 2063	F 2064	F 2065	F 2066	F 2067	F 2068	F 2069	F 2070	F 2071	F 2072	F 2073	F 2074	F 2075	F 2076	F 2077	F 2078	F 2079	F 2080	F 2081	F 2082	F 2083	F 2084	F 2085
\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80
\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9
\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3
\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92
					\$0	\$368	\$199																			

\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$28	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27
\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4
\$34	\$34	\$34	\$34	\$34	\$34	\$32	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31

F 2059	F 2060	F 2061	F 2062	F 2063	F 2064	F 2065	F 2066	F 2067	F 2068	F 2069	F 2070	F 2071	F 2072	F 2073	F 2074	F 2075	F 2076	F 2077	F 2078	F 2079	F 2080	F 2081	F 2082	F 2083	F 2084	F 2085
3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825
1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656
5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481
5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286
96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%

260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260
\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13

F 2086	F 2087	F 2088	F 2089	F 2090	F 2091	F 2092	F 2093	F 2094
\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80
\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9
\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3
\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92
			\$0	\$595	\$332			

\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27	\$27
\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4
\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31	\$31

F 2086	F 2087	F 2088	F 2089	F 2090	F 2091	F 2092	F 2093	F 2094
3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825
1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656	1,656
5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481	5,481
5286	5286	5286	5286	5286	5286	5286	5286	5286
96%	96%	96%	96%	96%	96%	96%	96%	96%

260	260	260	260	260	260	260	260	260
\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13

Detailed Description										Key Assumptions										Key Parameters									
1. Service Area										2. Service Type										3. Service Level									
4. Service Location										5. Service Time										6. Service Cost									
7. Service Volume										8. Service Frequency										9. Service Duration									
10. Service Complexity										11. Service Risk										12. Service Impact									
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760. Service Scope										761. Service Scope										762. Service Scope									

Alternative Portfolio Cost of Service Calculation

Financial Assumptions

	nominal	real
WACC	6%	3.9%
Inflation	2.0%	
Economic life (wind)	25 years	
Economic life (DSM)	15 years	
	rate	financed
Financing rate (%)	6.40%	100%
Equity	8.75%	0%
Term costs in F\$2018 as at D	1,800	million
Years to spread term costs	30	(1 to 75 years)

Output

NPV Cost Wind (F\$18)	532	million
NPV Volume	82,784	

Year	F 2018	F 2019	F 2020	F 2021	F 2022	F 2023	F 2024	F 2025	F 2026	F 2027	F 2028
Year from 2018	0	1	2	3	4	5	6	7	8	9	10
Discount Factor (nominal)	1.00	0.94	0.89	0.84	0.79	0.75	0.70	0.67	0.63	0.59	0.56
Discount Factor (real)	1.00	0.96	0.93	0.89	0.86	0.83	0.79	0.76	0.74	0.71	0.68
F2018 Inflation Factor	1.00	1.02	1.04	1.06	1.08	1.10	1.13	1.15	1.17	1.20	1.22

Capital Calculations

Wind - PC 18 and PC 48

Start of Period Value
End of Period Value
Base Depreciation

Wind - PC 20

Start of Period Value
End of Period Value
Base Depreciation

Total Depreciation

Total Average Value	-	-	-	-	-	-	-	-	-	-	-
Deemed Equity	-	-	-	-	-	-	-	-	-	-	-
Effective Debt	-	-	-	-	-	-	-	-	-	-	-

Capital Costs

Depreciation	-	-	-	-	-	-	-	-	-	-	-
Return on Equity	-	-	-	-	-	-	-	-	-	-	-
Interest on Debt	-	-	-	-	-	-	-	-	-	-	-
Total Capital Charges	-	-	-	-	-	-	-	-	-	-	-

Total Generation Cost of Service (assuming only amount of build used to replace Site C is included)

-	-	-	-	-	-	-	-	-	-	-	-
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F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041	F 2042	F 2043	F 2044	F 2045	F 2046	F 2047	F 2048
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
0.53	0.50	0.47	0.44	0.42	0.39	0.37	0.35	0.33	0.31	0.29	0.28	0.26	0.25	0.23	0.22	0.21	0.20	0.18	0.17
0.65	0.63	0.61	0.58	0.56	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.40	0.38	0.37	0.35	0.34	0.33	0.32
1.24	1.27	1.29	1.32	1.35	1.37	1.40	1.43	1.46	1.49	1.52	1.55	1.58	1.61	1.64	1.67	1.71	1.74	1.78	1.81
										-	-	-	-	-	-	-	-	-	-
										-	-	-	-	-	-	-	-	-	-
										-	-	-	-	-	-	-	-	-	-
												932	895	858	820	783	746	709	671
												895	858	820	783	746	709	671	634
												37	37	37	37	37	37	37	37
												528	507	486	465	444	423	402	380
												507	486	465	444	423	402	380	359
												21	21	21	21	21	21	21	21
-	-	-	-	-	-	-	-	-	-	-	37.29	58.43	58.43	58.43	58.43	58.43	58.43	58.43	58.43
-	-	-	-	-	-	-	-	-	-	-	914	1,394	1,336	1,277	1,219	1,160	1,102	1,044	985
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	914	1,394	1,336	1,277	1,219	1,160	1,102	1,044	985
-	-	-	-	-	-	-	-	-	-	-	37	58	58	58	58	58	58	58	58
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	58	89	85	82	78	74	71	67	63
-	-	-	-	-	-	-	-	-	-	-	96	148	144	140	136	133	129	125	121
-	-	-	-	-	-	-	-	-	-	-	96	148	141	138	134	128	124	121	117

F 2049	F 2050	F 2051	F 2052	F 2053	F 2054	F 2055	F 2056	F 2057	F 2058	F 2059	F 2060	F 2061	F 2062	F 2063	F 2064	F 2065	F 2066	F 2067	F 2068
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
0.16	0.15	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.10	0.09	0.09	0.08	0.08	0.07	0.07	0.06	0.06	0.06	0.05
0.30	0.29	0.28	0.27	0.26	0.25	0.24	0.23	0.22	0.21	0.21	0.20	0.19	0.18	0.18	0.17	0.16	0.16	0.15	0.15
1.85	1.88	1.92	1.96	2.00	2.04	2.08	2.12	2.16	2.21	2.25	2.30	2.34	2.39	2.44	2.49	2.54	2.59	2.64	2.69
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
597	559	522	485	448	410	373	336	298	261	224	186	149	112	75	37	915	878	842	805
559	522	485	448	410	373	336	298	261	224	186	149	112	75	37	0	878	842	805	769
37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
359	338	317	296	275	254	232	211	190	169	148	127	106	85	63	42	21	506	485	465
338	317	296	275	254	232	211	190	169	148	127	106	85	63	42	21	0	485	465	445
21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	20	20
58.43	58.43	58.43	58.43	58.43	58.43	58.43	58.43	58.43	58.43	58.43	58.43	58.43	58.43	58.43	58.43	57.73	56.82	56.82	56.82
927	868	810	751	693	635	576	518	459	401	342	284	226	167	109	50	907	1,355	1,299	1,242
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
927	868	810	751	693	635	576	518	459	401	342	284	226	167	109	50	907	1,355	1,299	1,242
58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	57	57	57
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	56	52	48	44	41	37	33	29	26	22	18	14	11	7	3	58	87	83	79
118	114	110	107	103	99	95	92	88	84	80	77	73	69	65	62	116	144	140	136
114	110	106	103	99	96	92	88	85	81	77	74	70	67	63	59	112	138	135	131

F 2069	F 2070	F 2071	F 2072	F 2073	F 2074	F 2075	F 2076	F 2077	F 2078	F 2079	F 2080	F 2081	F 2082	F 2083	F 2084	F 2085	F 2086	F 2087	F 2088
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02
0.14	0.14	0.13	0.13	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.09	0.09	0.09	0.08	0.08	0.08	0.07	0.07	0.07
2.75	2.80	2.86	2.91	2.97	3.03	3.09	3.15	3.22	3.28	3.35	3.41	3.48	3.55	3.62	3.69	3.77	3.84	3.92	4.00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
769	732	695	659	622	586	549	512	476	439	403	366	329	293	256	220	183	146	110	73
732	695	659	622	586	549	512	476	439	403	366	329	293	256	220	183	146	110	73	37
37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
445	425	404	384	364	344	324	303	283	263	243	222	202	182	162	142	121	101	81	61
425	404	384	364	344	324	303	283	263	243	222	202	182	162	142	121	101	81	61	40
20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82	56.82
1,185	1,128	1,071	1,015	958	901	844	787	730	674	617	560	503	446	390	333	276	219	162	105
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,185	1,128	1,071	1,015	958	901	844	787	730	674	617	560	503	446	390	333	276	219	162	105
57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
76	72	69	65	61	58	54	50	47	43	39	36	32	29	25	21	18	14	10	7
133	129	125	122	118	114	111	107	104	100	96	93	89	85	82	78	74	71	67	64
128	124	121	117	114	110	107	103	100	96	93	89	86	82	79	75	72	68	65	61

F 2089	F 2090	F 2091	F 2092	F 2093	F 2094																	
71	72	73	74	75	76																	
0.02	0.02	0.01	0.01	0.01	0.01																	
0.07	0.06	0.06	0.06	0.06	0.05																	
4.08	4.16	4.24	4.33	4.42	4.50																	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
37	2,429	2,332	2,234	2,137	2,040	1,943	1,846	1,749	1,652	1,554	1,457	1,360	1,263	1,166	1,069	971	874	777	680	583	486	
(0)	2,332	2,234	2,137	2,040	1,943	1,846	1,749	1,652	1,554	1,457	1,360	1,263	1,166	1,069	971	874	777	680	583	486	389	
37	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	
40	20	1,381	1,326	1,271	1,215	1,160	1,105	1,050	994	939	884	829	773	718	663	608	552	497	442	387	331	
20	(0)	1,326	1,271	1,215	1,160	1,105	1,050	994	939	884	829	773	718	663	608	552	497	442	387	331	276	
20	20	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	
56.82	117.37	152.39	152.39	152.39	152.39																	
49	2,390	3,636	3,484	3,332	3,179																	
-	-	-	-	-	-																	
49	2,390	3,636	3,484	3,332	3,179																	
57	117	152	152	152	152																	
-	-	-	-	-	-																	
3	153	233	223	213	203																	
60	270	385	375	366	356																	
58	261	371	362	353	343																	

-	-	-		
-	-	-		
-	-	-		
389	291	194	97	
291	194	97	0	
97	97	97	97	
276	221	166	110	55
221	166	110	55	0
55	55	55	55	55

Medium LF: Portfolio

Key

Exported energy is in green

Energy/capacity gap is in red

New resources are in blue

Pink fill indicates where load growth eliminates surplus concern

Energy Gap after planned resources (GWh)

Year	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040
Gap to fill						0	157	1,029	1,591	2,360	3,132	3,958	4,780	5,286	5,286	5,286	5,286	5,286	5,286	5,286	5,286	5,286
Portfolio																						
DSM	152	289	471	794	1,136	1,435	1,735	2,051	2,280	2,436	2,565	2,696	2,824	2,986	3,096	3,242	3,259	3,505	3,602	3,540	3,600	3,694
Surplus/Gap	152	289	471	794	1,136	1,435	1,578	1,023	689	77	567	1,262	1,956	2,300	2,190	2,044	2,027	1,781	1,684	1,746	1,686	1,592
Geo - Canoe Reach							483	483	483	483	483	483	483	483	483	483	483	483	483	483	483	483
Geo - Lakelse Lake							191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191
Wind - PC 18											524	524	524	524	524	524	524	524	524	524	524	524
Wind - PC14												570	570	570	570	570	570	570	570	570	570	570
Surplus/Gap													188	532	422	276	259	13	84	22	82	176
Wind - PC 20													594	594	594	594	594	594	594	594	594	594
Surplus/Gap																						
Amount of portfolio er	152	289	471	794	1,136	1,435	2,409	2,725	2,954	3,110	3,763	4,464	5,186	5,348	5,458	5,604	5,621	5,867	5,964	5,902	5,962	6,056
TOTAL SURPLUS/GAP	152	289	471	794	1,136	1,435	2,252	1,697	1,363	751	631	506	406	62	172	318	335	581	678	616	676	770

Capacity Gap after planned resources (MW)

Year	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	
Gap to fill							0	794	961	696	915	985	985	985	985	985	985	985	985	985	985	985	
Portfolio																							
DSM	31	51	79	124	169	208	245	285	312	330	343	353	361	370	372	379	374	403	417	415	432	454	
Surplus/Gap	31	51	79	124	169	208	548	676	384	585	642	632	624	615	613	606	611	582	567	570	553	531	
Geo - Canoe Reach							58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	
Geo - Lakelse Lake							23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	
Wind - PC 18											36	36	36	36	36	36	36	36	36	36	36	36	
Wind - PC14												37	37	37	37	37	37	37	37	37	37	37	
Wind - PC 20													41	41	41	41	41	41	41	41	41	41	
Total Supply							81	81	81	81	117	154	195	195	195	195	195	195	195	195	195	195	
14% of Supply Requiring Reserves							-11	-11	-11	-11	-16	-22	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	
Net capacity gap	31	51	79	124	169	208	479	606	314	516	577	572	570	561	559	552	557	528	514	516	499	477	
DSM																							
Program DSM	0	20	40	130	170	190	200	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	
Optional TOU	0	0	10	20	50	70	100	120	150	200	250	300	350	400	400	400	400	410	420	430	430	430	
Surplus/Gap	31	71	129	274	389	468	179	276	46	106	117	62	10	49	51	58	53	92	116	124	141	163	
Industrial Curtail							179	276		106	117	62	10										
Surplus/Gap							0	0		0	0	0	0										

Med LF: Supporting data

Capitalized	Invest. Year	MW	\$/kW	New Cost (\$'m)			
DSM							
DSM (energy)	F2019 - onward						
DSM (capacity programs)	F2019 - onward						
DSM (Optional TOU)	F2019 - onward						
Geothermal							
Canoe Reach	F2025	58	\$6,424	\$373			
Lakelse Lake	F2025	23	\$6,424	\$148			
Geothermal refurbishment			Refurb discount	0.3			
Canoe Reach	F2050 & F207	58	\$6,012	\$349	\$244		
Lakelse Lake	F2050 & F207	23	\$6,012	\$138	\$97		
Wind							
Initial wind builds				Adder	Trans/road	Total (\$'m)	
Wind - PC 18	F2029	138	\$1,928	\$266	\$37	\$303	
Wind - PC 14	F2030	144	\$1,903	\$274	\$56	\$330	
Wind - PC 20	F2031	156	\$1,904	\$297	\$47	\$344	
Wind refurbishment							
				Refurb discount	0.3		
Wind - PC 14	F2055	144	\$1,825	\$263	\$184		
Wind - PC 20	F2056	156	\$1,825	\$285	\$199		
Wind (new build)					Adder	Trans/road	Total (\$'m)
Wind - PC 14	F2080	144	\$1,825	\$263	\$56	\$319	
Wind - PC 20	F2081	156	\$1,825	\$285	\$47	\$332	
Fixed O&M							
Invest. Year	MW	\$/kW-year	Cost (\$'m)				
DSM (Ind. Curtailment)	F2025	179	\$75	\$13			
	F2026	276	\$75	\$21			
	F2027	0	\$75	\$0			
	F2028	106	\$75	\$8			
	F2029	117	\$75	\$9			
	F2030	62	\$75	\$5			
	F2031	10	\$75	\$1			
Invest. Year	MW	\$/kW-year	Cost (\$'m)	Trans/road	Total (\$'m)		
Wind - PC 18	F2029	138	\$66	\$9	\$	1	\$10
Wind - PC 14	F2030	144	\$66	\$9	\$	1	\$11
Wind - PC 20	F2031	156	\$65	\$10	\$	1	\$11
Total		438		\$0			
Wind refurbishment							
Invest. Year	MW	\$/kW-year	Cost (\$'m)				
Wind - PC 14	F2055	144	\$54	\$8	\$	1	\$9
Wind - PC 20	F2056	156	\$54	\$8	\$	1	\$10
Wind (new build)							
Wind - PC 14	F2080	144	\$54	\$8	\$	1	\$9
Wind - PC 20	F2081	156	\$54	\$8	\$	1	\$10
Wind Integration							
Invest. Year	Total GWh/year	Total \$/MWh	Cost (\$'m)				
Wind - PC 18	F2029	524	\$1.00	\$1			
Above plus PC 14	F2030	570	\$1.00	\$1			
Above plus PC 20	F2031	594	\$1.00	\$1			
Geothermal							
Canoe Reach-Lakelse Lake	F2025	81	\$186	\$15			
Surplus sales							
Energy			\$/MWh	\$/kW year			
Capacity			Panel				
				\$50			

Med LF: Cost (2018 \$'m)

	Life/amort (years)	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041	F 2042	F 2043	
CAPITAL																											
DSM - energy	15	\$6	\$77	\$91	\$104	\$106	\$108	\$114	\$123	\$122	\$97	\$87	\$83	\$82	\$84	\$73	\$58	\$49	\$59	\$59	\$62	\$75	\$77	\$78	\$79	\$81	
DSM - cap programs	15	\$0	\$8	\$11	\$13	\$15	\$6	\$6	\$7	\$7	\$7	\$7	\$14	\$14	\$15	\$16	\$8	\$8	\$8	\$8	\$8	\$9	\$9	\$9	\$9	\$9	
DSM - TOU	15	\$5	\$7	\$17	\$13	\$15	\$4	\$4	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	
DSM Total		\$11	\$92	\$119	\$130	\$135	\$118	\$125	\$133	\$132	\$107	\$97	\$100	\$99	\$102	\$92	\$69	\$60	\$70	\$70	\$73	\$87	\$89	\$90	\$91	\$93	
Wind	25											\$303	\$330	\$344													
Geothermal	25							\$520																			
O&M																											
Ind. Load curtail								\$13	\$21	\$0	\$8	\$9	\$5	\$1													
Wind fixed O&M												\$10	\$21	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	
Wind Integration												\$1	\$1	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	
Geothermal fixed O&M								\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	
Total O&M		\$0	\$0	\$0	\$0	\$0	\$0	\$29	\$36	\$15	\$23	\$34	\$42	\$50	\$49	\$49	\$49	\$49	\$49	\$49	\$49	\$49	\$49	\$49	\$49	\$49	
Surplus energy revenue		-\$4	-\$7	-\$13	-\$22	-\$32	-\$42	-\$64	-\$48	-\$38	-\$18	-\$14	-\$10	-\$6													
ENERGY ADJUSTMENT																											
	GWh	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041	F 2042	F 2043	
DSM		152	289	471	794	1,136	1,435	1,735	2,051	2,280	2,436	2,565	2,696	2,824	2,986	3,096	3,242	3,259	3,505	3,602	3,540	3,600	3,694	3,736	3,728	3,701	
Wind												524	1094	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	
Geothermal								674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	
Less exported		-152	-289	-471	-794	-1136	-1435	-2125	-1552	-1202	-572	-436	-295	-178													
Total GWh		0	0	0	0	0	0	284	1,173	1,752	2,538	3,327	4,169	5,008	5,348	5,458	5,604	5,621	5,867	5,964	5,902	5,962	6,056	6,098	6,090	6,063	
Site C Energy		0	0	0	0	0	366	3892	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	
% of costs related to Site C/exported		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	97%	94%	94%	90%	89%	90%	89%	87%	87%	87%	87%	
CAPACITY CREDIT																											
Capacity gap after Site C (MW)		Surplus	Surplus	Surplus	Surplus	96	236	Surplus	Surplus	Surplus	Surplus	124	330	182	389	Deficit 600MW+ for all years following F2032											
Surplus Capacity	MW	31	71	129	274	389	468	0	0	0	0	0	0	0	48	49	54	50	83	103	111	125	142	154	162	168	
Value	50					\$5	\$12								\$2	\$2	\$3	\$2	\$4	\$5	\$6	\$6	\$7	\$8	\$8	\$8	

Estimated value of capacity (in \$/kW-year) that is in excess of Site C capacity and used for domestic load . No value assumed for capacity in excess of requirements.

F 2083	F 2084	F 2085	F 2086	F 2087	F 2088	F 2089	F 2090	F 2091	F 2092	F 2093	F 2094
\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80
\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9
\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3
\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92

\$19	\$19	\$19	\$19	\$19	\$19	\$19	\$19	\$19	\$19	\$19	\$19
\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1
\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15
\$35	\$35	\$35	\$35	\$35	\$35	\$35	\$35	\$35	\$35	\$35	\$35

F 2083	F 2084	F 2085	F 2086	F 2087	F 2088	F 2089	F 2090	F 2091	F 2092	F 2093	F 2094
3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825
1164	1164	1164	1164	1164	1164	1164	1164	1164	1164	1164	1164
674	674	674	674	674	674	674	674	674	674	674	674
5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663
5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286
93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%

214	214	214	214	214	214	214	214	214	214	214	214
\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11

Alternative Portfolio Cost of Service Calculation

Financial Assumptions

	nominal	real
WACC	6%	3.9%
Inflation	2.0%	
Economic life (wind)	25 years	
Economic life (DSM)	15 years	
Economic life (Geothermal)	25 years	
	rate	financed
Financing rate	6.40%	100%
Equity	8.75%	0%
Term costs in F\$2018 as at D	1,800	million
Years to spread term costs	30	(1 to 75 years)

Output		
NPV Cost Wind-Geo (F\$18)	1,284	million
NPV Volume	102,293	

Year	F 2018	F 2019	F 2020	F 2021	F 2022	F 2023	F 2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031
Year from 2013	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Discount Factor (nominal)	1.00	0.94	0.89	0.84	0.79	0.75	0.70	0.67	0.63	0.59	0.56	0.53	0.50	0.47
Discount Factor (real)	1.00	0.96	0.93	0.89	0.86	0.83	0.79	0.76	0.74	0.71	0.68	0.65	0.63	0.61
F2018 Inflation Factor	1.00	1.02	1.04	1.06	1.08	1.10	1.13	1.15	1.17	1.20	1.22	1.24	1.27	1.29

Capital Calculations

Start of Period Value												-	-	-	-
End of Period Value												-	-	-	-
Base Depreciation												-	-	-	-

Wind - PC 18

Start of Period Value													369	355	340
End of Period Value													355	340	325
Base Depreciation													15	15	15

Wind - PC 14

Start of Period Value														410	394
End of Period Value														394	377
Base Depreciation														16	16

Wind - PC 20

Start of Period Value															437
End of Period Value															419
Base Depreciation															17

Geothermal

Start of Period Value								585.98	562.54	539.10	515.66	492.22	468.78	445.34
End of Period Value								562.54	539.10	515.66	492.22	468.78	445.34	421.90
Base Depreciation								23.44	23.44	23.44	23.44	23.44	23.44	23.44

Total Depreciation			-	-	-	-	-	23	23	23	23	38	55	72
Total Average Value			-	-	-	-	-	574	551	527	504	842	1,206	1,579
Deemed Equity			-	-	-	-	-	-	-	-	-	-	-	-
Effective Debt			-	-	-	-	-	574	551	527	504	842	1,206	1,579

Capital Costs

Depreciation			-	-	-	-	-	23	23	23	23	38	55	72
Return on Equity			-	-	-	-	-	-	-	-	-	-	-	-
Interest on Debt			-	-	-	-	-	37	35	34	32	54	77	101
Total Capital Charges			-	-	-	-	-	60	59	57	56	92	132	173

Total Generation Cost of Service (assuming only amount of build used to replace Site C is included)		-	-	-	-	-	-	60	59	57	56	92	132	173
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F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041	F 2042	F 2043	F 2044	F 2045	F 2046	F 2047	F 2048	F 2049	F 2050	F 2051	F 2052	F 2053	F 2054
14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
0.44	0.42	0.39	0.37	0.35	0.33	0.31	0.29	0.28	0.26	0.25	0.23	0.22	0.21	0.20	0.18	0.17	0.16	0.15	0.15	0.14	0.13	0.12
0.58	0.56	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.40	0.38	0.37	0.35	0.34	0.33	0.32	0.30	0.29	0.28	0.27	0.26	0.25
1.32	1.35	1.37	1.40	1.43	1.46	1.49	1.52	1.55	1.58	1.61	1.64	1.67	1.71	1.74	1.78	1.81	1.85	1.88	1.92	1.96	2.00	2.04
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
325	310	295	281	266	251	236	222	207	192	177	162	148	133	118	103	89	74	59	44	30	15	
310	295	281	266	251	236	222	207	192	177	162	148	133	118	103	89	74	59	44	30	15	0	-
15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	-
377	361	345	328	312	295	279	263	246	230	213	197	181	164	148	131	115	98	82	66	49	33	16
361	345	328	312	295	279	263	246	230	213	197	181	164	148	131	115	98	82	66	49	33	16	(0)
16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
419	402	384	367	349	332	314	297	279	262	244	227	210	192	175	157	140	122	105	87	70	52	35
402	384	367	349	332	314	297	279	262	244	227	210	192	175	157	140	122	105	87	70	52	35	17
17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
421.90	398.46	375.03	351.59	328.15	304.71	281.27	257.83	234.39	210.95	187.51	164.07	140.63	117.20	93.76	70.32	46.88	23.44	629.81	604.62	579.43	554.23	529.04
398.46	375.03	351.59	328.15	304.71	281.27	257.83	234.39	210.95	187.51	164.07	140.63	117.20	93.76	70.32	46.88	23.44	0.00	604.62	579.43	554.23	529.04	503.85
23.44	23.44	23.44	23.44	23.44	23.44	23.44	23.44	23.44	23.44	23.44	23.44	23.44	23.44	23.44	23.44	23.44	23.44	25.19	25.19	25.19	25.19	25.19
72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	74	74	74	74	59
1,507	1,435	1,363	1,291	1,219	1,147	1,075	1,003	931	859	787	714	642	570	498	426	354	282	839	765	691	617	551
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,507	1,435	1,363	1,291	1,219	1,147	1,075	1,003	931	859	787	714	642	570	498	426	354	282	839	765	691	617	551
72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	74	74	74	74	59
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
96	92	87	83	78	73	69	64	60	55	50	46	41	36	32	27	23	18	54	49	44	40	35
169	164	159	155	150	145	141	136	132	127	122	118	113	109	104	99	95	90	128	123	118	113	94
167	159	150	145	135	129	126	121	115	110	106	103	98	93	89	85	81	77	109	105	101	97	88

F 2055	F 2056	F 2057	F 2058	F 2059	F 2060	F 2061	F 2062	F 2063	F 2064	F 2065	F 2066	F 2067	F 2068	F 2069	F 2070	F 2071	F 2072	F 2073	F 2074	F 2075	F 2076	F 2077
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
0.12	0.11	0.10	0.10	0.09	0.09	0.08	0.08	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03
0.24	0.23	0.22	0.21	0.21	0.20	0.19	0.18	0.18	0.17	0.16	0.16	0.15	0.15	0.14	0.14	0.13	0.13	0.12	0.12	0.11	0.11	0.10
2.08	2.12	2.16	2.21	2.25	2.30	2.34	2.39	2.44	2.49	2.54	2.59	2.64	2.69	2.75	2.80	2.86	2.91	2.97	3.03	3.09	3.15	3.22
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
375	360	345	330	315	300	285	270	255	240	225	210	195	180	165	150	135	120	105	90	75	60	45
360	345	330	315	300	285	270	255	240	225	210	195	180	165	150	135	120	105	90	75	60	45	30
15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
17	415	398	382	365	348	332	315	299	282	265	249	232	216	199	182	166	149	133	116	100	83	66
(0)	398	382	365	348	332	315	299	282	265	249	232	216	199	182	166	149	133	116	100	83	66	50
17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
503.85	478.66	453.46	428.27	403.08	377.89	352.69	327.50	302.31	277.12	251.92	226.73	201.54	176.35	151.15	125.96	100.77	75.58	50.38	25.19	1,476.11	1,417.06	1,358.02
478.66	453.46	428.27	403.08	377.89	352.69	327.50	302.31	277.12	251.92	226.73	201.54	176.35	151.15	125.96	100.77	75.58	50.38	25.19	-	1,417.06	1,358.02	1,298.97
25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19	59.04	59.04	59.04
58	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	91	91	91
868	1,225	1,168	1,112	1,055	998	941	884	828	771	714	657	601	544	487	430	373	317	260	203	1,605	1,515	1,424
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
868	1,225	1,168	1,112	1,055	998	941	884	828	771	714	657	601	544	487	430	373	317	260	203	1,605	1,515	1,424
58	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	91	91	91
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	78	75	71	68	64	60	57	53	49	46	42	38	35	31	28	24	20	17	13	103	97	91
113	135	132	128	124	121	117	113	110	106	102	99	95	92	88	84	81	77	73	70	193	188	182
106	126	123	119	116	113	109	106	102	99	96	92	89	85	82	79	75	72	69	65	181	175	170

F 2078	F 2079	F 2080	F 2081	F 2082	F 2083	F 2084	F 2085	F 2086	F 2087	F 2088	F 2089	F 2090	F 2091	F 2092	F 2093	F 2094								
60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76								
0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01								
0.10	0.10	0.09	0.09	0.09	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05								
3.28	3.35	3.41	3.48	3.55	3.62	3.69	3.77	3.84	3.92	4.00	4.08	4.16	4.24	4.33	4.42	4.50								
-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
30	15	1,067	1,024	982	939	896	854	811	768	726	683	640	598	555	512	470	427	384	341	299	256	213	171	
15	0	1,024	982	939	896	854	811	768	726	683	640	598	555	512	470	427	384	341	299	256	213	171	128	
15	15	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	
50	33	17	1,133	1,088	1,042	997	952	906	861	816	770	725	680	634	589	544	499	453	408	363	317	272	227	
33	17	0	1,088	1,042	997	952	906	861	816	770	725	680	634	589	544	499	453	408	363	317	272	227	181	
17	17	17	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
1,298.97	1,239.93	1,180.88	1,121.84	1,062.80	1,003.75	944.71	885.66	826.62	767.57	708.53	649.49	590.44	531.40	472.35	413.31	354.27								
1,239.93	1,180.88	1,121.84	1,062.80	1,003.75	944.71	885.66	826.62	767.57	708.53	649.49	590.44	531.40	472.35	413.31	354.27	295.22								
59.04	59.04	59.04	59.04	59.04	59.04	59.04	59.04	59.04	59.04	59.04	59.04	59.04	59.04	59.04	59.04	59.04								
91	91	118	147	147	147	147	147	147	147	147	147	147	147	147	147	147								
1,333	1,243	2,205	3,206	3,059	2,912	2,765	2,617	2,470	2,323	2,176	2,029	1,882	1,735	1,588	1,441	1,294								
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
1,333	1,243	2,205	3,206	3,059	2,912	2,765	2,617	2,470	2,323	2,176	2,029	1,882	1,735	1,588	1,441	1,294								
91	91	118	147	147	147	147	147	147	147	147	147	147	147	147	147	147								
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
85	80	141	205	196	186	177	168	158	149	139	130	120	111	102	92	83								
176	170	259	352	343	333	324	315	305	296	286	277	268	258	249	239	230								
164	159	242	329	320	311	302	294	285	276	267	258	250	241	232	223	215								

-	-		
-	-		
-	-		
128	85	43	
85	43	-	
43	43	43	
181	136	91	45
136	91	45	(0)
45	45	45	45

High LF: Portfolio

Key
Exported energy is in green
Energy/capacity gap is in red
New resources are in blue

Energy Gap after planned resources (GWh)

Year	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040
Gap prior to Site C	-70	1250	-661	-3248	-6224	-6012	-3641	-3506	-4231	-5328	-6482	-7776	-8872	-10089	-11032	-12060	-13047	-14547				
Gap to fill						366	3,892	5,286	5,286	5,286	5,286	5,286	5,286	5,286	5,286	5,286	5,286	5,286	5,286	5,286	5,286	5,286
Portfolio																						
DSM	152	289	471	794	1,136	1,435	1,735	2,051	2,280	2,436	2,565	2,696	2,824	2,986	3,096	3,242	3,259	3,505	3,602	3,540	3,600	3,694
Surplus/Gap	82	289	471	794	1,136	1,069	2,157	3,235	3,006	2,850	2,721	2,590	2,462	2,300	2,190	2,044	2,027	1,781	1,684	1,746	1,686	1,592
Geo - Canoe Reach							483	483	483	483	483	483	483	483	483	483	483	483	483	483	483	483
Geo - Lakelse Lake							191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191
							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Wind - PC 14							570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
Wind - PC 10							1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119
Wind - PC 18								524	524	524	524	524	524	524	524	524	524	524	524	524	524	524
Wind - PC 48								538	538	538	538	538	538	538	538	538	538	538	538	538	538	538
Surplus/Gap	82	289	471	794	1,136	1,069	206	190	419	575	704	835	963	1,125	1,235	1,381	1,398	1,644	1,741	1,679	1,739	1,833
Amount of portfolio er	152	289	471	794	1,136	1,435	4,098	5,476	5,705	5,861	5,990	6,121	6,249	6,411	6,521	6,667	6,684	6,930	7,027	6,965	7,025	7,119

Capacity Gap after planned resources (MW)

Year	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040
Gap prior to Site C	118	-105	-403	-737	-1013	-1334																
Gap to fill						0	820	985	985	985	985	985	985	985	985	985	985	985	985	985	985	985
Portfolio																						
DSM	31	51	79	124	169	208	245	285	312	330	343	353	361	370	372	379	374	403	417	415	432	454
Surplus/Gap	31	51	79	124	169	208	575	699	673	655	642	632	624	615	613	606	611	582	567	570	553	531
Geo - Canoe Reach							58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
Geo - Lakelse Lake							23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Wind - PC 14							37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Wind - PC10							77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Wind - PC 18								36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Wind - PC48								39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Total Supply							195	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
14% of Supply Requiring Reserves							-27	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38
Surplus/Gap							407	467	441	423	410	400	392	383	381	374	378	350	335	337	321	299
DSM																						
Program DSM	0	20	40	130	170	190	200	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
Optional TOU	0	0	10	20	50	70	100	120	150	200	250	300	350	400	400	400	400	410	420	430	430	430
Surplus/Gap	31	71	129	274	389	468	107	137	81	13	50	110	168	227	229	236	232	270	295	303	319	341
Industrial Curtail							107	137	81	13												
Surplus/Gap							0	0	0	0												

High LF: Supporting data

Capitalized	Invest. Year	MW	\$/kW	New Cost (\$'m)	Refurb cost (\$m)
<u>DSM</u>					
DSM (energy)	F2019 - onward				
DSM (capacity programs)	F2019 - onward				
DSM (Optional TOU)	F2019 - onward				
<u>Geothermal</u>					
Canoe Reach	F2025	58	\$6,424	\$373	
Lakelse Lake	F2025	23	\$6,424	\$148	
Geothermal refurbishment				Refurb discount	0.3
Canoe Reach	F2050 & F207	58	\$6,012	\$349	\$244
Lakelse Lake	F2050 & F207	23	\$6,012	\$138	\$97
Initial wind builds				Trans/road	Total (\$'m)
Wind - PC 10	F2025	297	\$2,026	\$602	\$54 \$656
Wind - PC 14	F2025	144	\$2,026	\$292	\$56 \$348
Wind - PC 10, PC 14	F2025	441	\$2,026	\$893	\$110 \$1,004
Wind - PC 18	F2026	138	\$2,004	\$277	\$37 \$313
Wind - PC 48	F2026	150	\$2,004	\$301	\$33 \$334
Wind - PC 18, PC 48	F2026	288	\$2,004	\$577	\$70 \$647
				Refurb discount	0.3
Wind refurbishment					
Wind - PC 18, PC 48	F2051	288	\$1,825	\$526	\$368
Wind (new build)				Trans/road	Total (\$'m)
Wind - PC 18, PC 48	F2076	288	\$1,825	\$526	\$70 \$595
<u>Fixed O&M</u>					
DSM (Ind. Curtailment)	F2025	107	\$75	\$8	
	F2026	137	\$75	\$10	
	F2027	81	\$75	\$6	
	F2028	13	\$75	\$1	
Initial wind builds				Trans/road	Total (\$'m)
Wind - PC 10, PC 14	F2025	441	\$67	\$30	\$ 3 \$32
Wind - PC 18, PC 48	F2026	288	\$67	\$19	\$ 2 \$21
Wind refurbishment				Trans/road	Total (\$'m)
Wind - PC 18, PC 48	F2051	288	\$54	\$16	\$ 2 \$17
Wind (new build)				Trans/road	Total (\$'m)
Wind - PC 18, PC 48	F2076	288	\$54	\$16	\$ 2 \$17
<u>Wind Integration</u>					
Invest. Year	GWh/yr	\$/MWh	Cost (\$'m)		
Wind - PC 10, PC 14	F2025	1689	\$1.00	\$2	
Wind - PC 18, PC 48	F2026	1062	\$1.00	\$1	
Wind - PC 18, PC 48	F2051, F2076	1062	\$1.00	\$1	
<u>Geothermal</u>					
Canoe Reach-Lakelse Lake	F2025	81	\$186	\$15	
<u>Surplus sales</u>					
Energy		\$/MWh	\$/kW-year		
Capacity		Panel		\$50	

High LF: Cost (2018 \$'m)

	Life/amort (years)	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	
CAPITAL																			
DSM - energy	15	\$6	\$77	\$91	\$104	\$106	\$108		\$114	\$123	\$122	\$97	\$87	\$83	\$82	\$84	\$73	\$58	\$49
DSM - cap programs	15	\$0	\$8	\$11	\$13	\$15	\$6		\$6	\$7	\$7	\$7	\$7	\$14	\$14	\$15	\$16	\$8	\$8
DSM - TOU	15	\$5	\$7	\$17	\$13	\$15	\$4		\$4	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3
DSM Total		\$11	\$92	\$119	\$130	\$135	\$118		\$125	\$133	\$132	\$107	\$97	\$100	\$99	\$102	\$92	\$69	\$60
Geothermal	25								\$520										
Wind	25								\$1,004	\$647									
O&M																			
Ind. Load curtail									\$8	\$10	\$6	\$1							
Wind fixed O&M									1	2	3	4	5	6	7	8	9	10	11
Wind - PC 10, PC 14									\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32
Wind - PC 18, PC 48										\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$21
Wind Integration																			
Wind - PC 10, PC 14									\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2
Wind - PC 18, PC 48										\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1
Geothermal fixed O&M									\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15
Total O&M		\$0	\$0						\$57	\$82	\$77	\$72	\$71	\$71	\$71	\$71	\$71	\$71	\$71
Surplus energy revenue		-\$2	-\$7																
ENERGY ADJUSTMENT		F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	
GWh																			
DSM		152	289	471	794	1,136	1,435		1,735	2,051	2,280	2,436	2,565	2,696	2,824	2,986	3,096	3,242	3,259
Wind									1689	2751	2751	2751	2751	2751	2751	2751	2751	2751	2751
Geothermal									674	674	674	674	674	674	674	674	674	674	674
Less exported		-82	-289																
Total GWh		70	0	471	794	1,136	1,435		4,098	5,476	5,705	5,861	5,990	6,121	6,249	6,411	6,521	6,667	6,684
Site C Energy		0	0	0	0	0	366		3892	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286
% of costs related to Site C/exported		0%	100%	0%	0%	0%	26%		95%	97%	93%	90%	88%	86%	85%	82%	81%	79%	79%
CAPACITY CREDIT																			
Capacity gap after Site C		Deficit for all years following F2018																	
Surplus Capacity	MW	0	71	0	0	0	119		0	0	0	0	0	95	142	187	186	187	183
Value	↗ 50	\$0	\$4	\$0	\$0	\$0	\$6		\$0	\$0	\$0	\$0	\$0	\$5	\$7	\$9	\$9	\$9	\$9

Estimated value of capacity (in \$/kW-year) that is in excess of Site C capacity and used for domestic load . No value assumed for capacity in excess of requirements.

F 2036	F 2037	F 2038	F 2039	F 2040	F 2041	F 2042	F 2043	F 2044	F 2045	F 2046	F 2047	F 2048	F 2049	F 2050	F 2051	F 2052	F 2053	F 2054	F 2055	F 2056	F 2057	F 2058	F 2059	F 2060	F 2061	F 2062	F 2063	F 2064	F 2065	F 2066
\$59	\$59	\$62	\$75	\$77	\$78	\$79	\$81	\$82	\$83	\$81	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80
\$8	\$8	\$8	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9
\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3
\$70	\$70	\$73	\$87	\$89	\$90	\$91	\$93	\$94	\$95	\$93	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92
															\$341															
															\$368															

12	13	14	15	16	17	18	19	20	21	22	23	24	25	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32	\$32																		
\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	
\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2																		
\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	
\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	
\$71	\$71	\$71	\$71	\$71	\$71	\$71	\$71	\$71	\$71	\$71	\$71	\$71	\$71	\$37	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	

F 2036	F 2037	F 2038	F 2039	F 2040	F 2041	F 2042	F 2043	F 2044	F 2045	F 2046	F 2047	F 2048	F 2049	F 2050	F 2051	F 2052	F 2053	F 2054	F 2055	F 2056	F 2057	F 2058	F 2059	F 2060	F 2061	F 2062	F 2063	F 2064	F 2065	F 2066
3,505	3,602	3,540	3,600	3,694	3,736	3,728	3,701	3,738	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825
2751	2751	2751	2751	2751	2751	2751	2751	2751	2751	2751	2751	2751	2751	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062
674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674
6,930	7,027	6,965	7,025	7,119	7,161	7,153	7,126	7,163	7,250	7,250	7,250	7,250	7,250	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561
5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286
76%	75%	76%	75%	74%	74%	74%	74%	74%	73%	73%	73%	73%	73%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

206	222	230	240	254	263	270	276	283	293	293	293	293	293	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
\$10	\$11	\$11	\$12	\$13	\$13	\$13	\$14	\$14	\$15	\$15	\$15	\$15	\$15	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14

F 2067	F 2068	F 2069	F 2070	F 2071	F 2072	F 2073	F 2074	F 2075	F 2076	F 2077	F 2078	F 2079	F 2080	F 2081	F 2082	F 2083	F 2084	F 2085	F 2086	F 2087	F 2088	F 2089	F 2090	F 2091	F 2092	F 2093	F 2094
\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80
\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9	\$9
\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3
\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92	\$92
\$487																											
\$595																											

18	19	20	21	22	23	24	25	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17	\$17
\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1
\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15
\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34	\$34

F 2067	F 2068	F 2069	F 2070	F 2071	F 2072	F 2073	F 2074	F 2075	F 2076	F 2077	F 2078	F 2079	F 2080	F 2081	F 2082	F 2083	F 2084	F 2085	F 2086	F 2087	F 2088	F 2089	F 2090	F 2091	F 2092	F 2093	F 2094
3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825	3,825
1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062	1062
674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674	674
5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561
5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286	5286
95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14

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Alternative Portfolio Cost of Service Calculation

Financial Assumptions

	nominal	real
WACC	6%	3.9%
Inflation	2.0%	
Economic life (wind)	25 years	
Economic life (DSM)	15 years	
Economic life (Geothermal)	25 years	
	rate	financed
Financing rate	6.40%	100%
Equity	8.75%	0%
Term costs in F\$2018 as at D	1,800	million
Years to spread term costs	30	(1 to 75 years)

Output		
NPV Cost (F\$18)	1,770	million
NPV Volume	119,557	

Year	F 2018	F 2019	F 2020	F 2021	F 2022	F 2023	F 2024	F 2025	F 2026	F 2027
Year from 2013	0	1	2	3	4	5	6	7	8	9
Discount Factor (nominal)	1.00	0.94	0.89	0.84	0.79	0.75	0.70	0.67	0.63	0.59
Discount Factor (real)	1.00	0.96	0.93	0.89	0.86	0.83	0.79	0.76	0.74	0.71
F2018 Inflation Factor	1.00	1.02	1.04	1.06	1.08	1.10	1.13	1.15	1.17	1.20

Capital Calculations

Wind - PC 10, PC 14										
Start of Period Value								1,130	1,085	1,040
End of Period Value								1,085	1,040	995
Base Depreciation								45	45	45

Wind - PC 18, PC 48										
Start of Period Value									743	713
End of Period Value									713	684
Base Depreciation									30	30

Geothermal										
Start of Period Value								586	563	539
End of Period Value								563	539	516
Base Depreciation								23	23	23

Total Depreciation			-	-	-	-	-	68.65	98.38	98.38
Total Average Value			-	-	-	-	-	1,682	2,342	2,243
Deemed Equity			-	-	-	-	-	-	-	-
Effective Debt			-	-	-	-	-	1,682	2,342	2,243

Capital Costs										
Depreciation			-	-	-	-	-	69	98	98
Return on Equity			-	-	-	-	-	-	-	-
Interest on Debt			-	-	-	-	-	108	150	144
Total Capital Charges			-	-	-	-	-	176	248	242

Total Generation Cost of Service (assuming only amount of build used to replace Site C is included)			-	-	-	-	-	167	240	224
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F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041	F 2042	F 2043	F 2044	F 2045	F 2046
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
0.56	0.53	0.50	0.47	0.44	0.42	0.39	0.37	0.35	0.33	0.31	0.29	0.28	0.26	0.25	0.23	0.22	0.21	0.20
0.68	0.65	0.63	0.61	0.58	0.56	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.40	0.38	0.37	0.35	0.34
1.22	1.24	1.27	1.29	1.32	1.35	1.37	1.40	1.43	1.46	1.49	1.52	1.55	1.58	1.61	1.64	1.67	1.71	1.74
995	949	904	859	814	769	723	678	633	588	543	497	452	407	362	316	271	226	181
949	904	859	814	769	723	678	633	588	543	497	452	407	362	316	271	226	181	136
45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
684	654	624	595	565	535	505	476	446	416	386	357	327	297	268	238	208	178	149
654	624	595	565	535	505	476	446	416	386	357	327	297	268	238	208	178	149	119
30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
516	492	469	445	422	398	375	352	328	305	281	258	234	211	188	164	141	117	94
492	469	445	422	398	375	352	328	305	281	258	234	211	188	164	141	117	94	70
23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38	98.38
2,145	2,046	1,948	1,850	1,751	1,653	1,555	1,456	1,358	1,259	1,161	1,063	964	866	768	669	571	472	374
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,145	2,046	1,948	1,850	1,751	1,653	1,555	1,456	1,358	1,259	1,161	1,063	964	866	768	669	571	472	374
98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
137	131	125	118	112	106	99	93	87	81	74	68	62	55	49	43	37	30	24
236	229	223	217	210	204	198	192	185	179	173	166	160	154	147	141	135	129	122
213	202	193	183	174	166	157	152	141	135	131	125	119	114	109	105	100	94	89

F 2047	F 2048	F 2049	F 2050	F 2051	F 2052	F 2053	F 2054	F 2055	F 2056	F 2057	F 2058	F 2059	F 2060	F 2061	F 2062	F 2063	F 2064	F 2065
29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
0.18	0.17	0.16	0.15	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.10	0.09	0.09	0.08	0.08	0.07	0.07	0.06
0.33	0.32	0.30	0.29	0.28	0.27	0.26	0.25	0.24	0.23	0.22	0.21	0.21	0.20	0.19	0.18	0.18	0.17	0.16
1.78	1.81	1.85	1.88	1.92	1.96	2.00	2.04	2.08	2.12	2.16	2.21	2.25	2.30	2.34	2.39	2.44	2.49	2.54
136	90	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90	45	(0)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	45	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
119	89	59	30	693	666	638	610	582	555	527	499	472	444	416	388	361	333	305
89	59	30	0	666	638	610	582	555	527	499	472	444	416	388	361	333	305	277
30	30	30	30	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
70	47	23	630	605	579	554	529	504	479	453	428	403	378	353	328	302	277	252
47	23	0	605	579	554	529	504	479	453	428	403	378	353	328	302	277	252	227
23	23	23	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
98.38	98.38	98.38	54.92	52.93	52.93	52.93	52.93	52.93	52.93	52.93	52.93	52.93	52.93	52.93	52.93	52.93	52.93	52.93
276	177	79	632	1,272	1,219	1,166	1,113	1,060	1,007	954	901	848	795	742	689	636	583	531
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
276	177	79	632	1,272	1,219	1,166	1,113	1,060	1,007	954	901	848	795	742	689	636	583	531
98	98	98	55	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	11	5	40	81	78	75	71	68	64	61	58	54	51	48	44	41	37	34
116	110	103	95	134	131	128	124	121	117	114	111	107	104	100	97	94	90	87
85	80	75	91	128	124	121	118	115	112	108	105	102	99	95	92	89	86	83

F 2066	F 2067	F 2068	F 2069	F 2070	F 2071	F 2072	F 2073	F 2074	F 2075	F 2076	F 2077	F 2078	F 2079	F 2080	F 2081	F 2082	F 2083	F 2084
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02
0.16	0.15	0.15	0.14	0.14	0.13	0.13	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.09	0.09	0.09	0.08	0.08
2.59	2.64	2.69	2.75	2.80	2.86	2.91	2.97	3.03	3.09	3.15	3.22	3.28	3.35	3.41	3.48	3.55	3.62	3.69
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
277	250	222	194	166	139	111	83	55	28	1,841	1,767	1,693	1,620	1,546	1,473	1,399	1,325	1,252
250	222	194	166	139	111	83	55	28	(0)	1,767	1,693	1,620	1,546	1,473	1,399	1,325	1,252	1,178
28	28	28	28	28	28	28	28	28	28	74	74	74	74	74	74	74	74	74
227	202	176	151	126	101	76	50	25	1476	1,417	1,358	1,299	1,240	1,181	1,122	1,063	1,004	945
202	176	151	126	101	76	50	25	-	1,417	1,358	1,299	1,240	1,181	1,122	1,063	1,004	945	886
25	25	25	25	25	25	25	25	25	59	59	59	59	59	59	59	59	59	59
52.93	52.93	52.93	52.93	52.93	52.93	52.93	52.93	52.93	86.78	132.67	132.67	132.67	132.67	132.67	132.67	132.67	132.67	132.67
478	425	372	319	266	213	160	107	54	1,460	3,191	3,059	2,926	2,793	2,661	2,528	2,395	2,263	2,130
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
478	425	372	319	266	213	160	107	54	1,460	3,191	3,059	2,926	2,793	2,661	2,528	2,395	2,263	2,130
53	53	53	53	53	53	53	53	53	87	133	133	133	133	133	133	133	133	133
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	27	24	20	17	14	10	7	3	93	204	196	187	179	170	162	153	145	136
83	80	77	73	70	67	63	60	56	180	337	328	320	311	303	294	286	277	269
79	76	73	70	66	63	60	57	54	171	320	312	304	296	288	280	272	264	256

F 2085	F 2086	F 2087	F 2088	F 2089	F 2090	F 2091	F 2092	F 2093	F 2094						
67	68	69	70	71	72	73	74	75	76						
0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01						
0.08	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05						
3.77	3.84	3.92	4.00	4.08	4.16	4.24	4.33	4.42	4.50						
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,178	1,104	1,031	957	884	810	736	663	589	515						
1,104	1,031	957	884	810	736	663	589	515	442						
74	74	74	74	74	74	74	74	74	74						
886	827	768	709	649	590	531	472	413	354						
827	768	709	649	590	531	472	413	354	295						
59	59	59	59	59	59	59	59	59	59						
132.67	132.67	132.67	132.67	132.67	132.67	132.67	132.67	132.67	132.67						
1,997	1,865	1,732	1,599	1,467	1,334	1,201	1,069	936	803						
-	-	-	-	-	-	-	-	-	-						
1,997	1,865	1,732	1,599	1,467	1,334	1,201	1,069	936	803						
133	133	133	133	133	133	133	133	133	133						
-	-	-	-	-	-	-	-	-	-						
128	119	111	102	94	85	77	68	60	51						
261	252	244	235	227	218	210	201	193	184						
248	240	231	223	215	207	199	191	183	175						

Geothermal CAPEX		Low	Medium	High
	F2025	\$ 5,150	\$6,424	7687
	F2050 & F2075	\$ 5,150	\$6,012	7194

Drop down menu for Mid C Forecast

ABBLow
Panel
BCH RRA

Geothermal O&M	all years	\$ 186	\$ 186	\$ 218
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Drop down menu for geothermal costs

Low
Medium
High

Wind CAPEX		Low	Medium	High
	F2025	\$ 1,906	\$2,026	\$2,431
	F2026	\$ 1,886	\$2,004	\$2,405
	F2029	\$ 1,815	\$1,928	\$2,314
	F2030	\$ 1,790	\$1,903	\$2,283
	F2031	\$ 1,792	\$1,904	\$2,285
	F2039	\$ 1,784	\$1,895	\$2,275
	F2040	\$ 1,781	\$1,893	\$2,271
	F2041	\$ 1,777	\$1,888	\$2,266
	F2051	\$ 1,717	\$1,825	\$2,190
	F2055	\$ 1,717	\$1,825	\$2,190
	F2056	\$ 1,717	\$1,825	\$2,190
	F2064	\$ 1,717	\$1,825	\$2,190
	F2065	\$ 1,717	\$1,825	\$2,190
	F2066	\$ 1,717	\$1,825	\$2,190
	F2076	\$ 1,717	\$1,825	\$2,190
	F2080	\$ 1,717	\$1,825	\$2,190
	F2080	\$ 1,717	\$1,825	\$2,190
	F2089	\$ 1,717	\$1,825	\$2,190
	F2090	\$ 1,717	\$1,825	\$2,190
	F2091	\$ 1,717	\$1,825	\$2,190

Drop down menu for wind costs

Low
Medium
High

Drop down menu for financing option

BCH rate
IPP rate

Do not delete this worksheet as it is needed for the sensitivity analysis around Mid C forecast, wind and geothermal costs, and financing for wind-geo projects

Wind O&M		Low	Medium	High
	F2025	\$ 63	\$67	\$ 81
	F2026	\$ 63	\$67	\$ 81
	F2029	\$ 62	\$66	\$ 79
	F2030	\$ 62	\$66	\$ 79
	F2031	\$ 61	\$65	\$ 77
	F2039	\$ 57	\$60	\$ 72
	F2040	\$ 57	\$60	\$ 72
	F2041	\$ 57	\$60	\$ 72
	F2051	\$ 51	\$54	\$ 65
	F2055	\$ 51	\$54	\$ 65
	F2056	\$ 51	\$54	\$ 65
	F2064	\$ 51	\$54	\$ 65
	F2065	\$ 51	\$54	\$ 65
	F2066	\$ 51	\$54	\$ 65
	F2076	\$ 51	\$54	\$ 65
	F2080	\$ 51	\$54	\$ 65
	F2081	\$ 51	\$54	\$ 65
	F2089	\$ 51	\$54	\$ 65
	F2090	\$ 51	\$54	\$ 65
	F2091	\$ 51	\$54	\$ 65

	F2019	F2020	F2021	F2022	F2023	F2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039	F 2040	F 2041
(2) Panel ABBLow Market Price of Surplus	\$ 21.46	\$ 22.33	\$ 24.08	\$ 24.95	\$ 25.82	\$ 25.82	\$ 25.82	\$ 26.70	\$ 26.70	\$ 27.57	\$ 28.44	\$ 29.32	\$ 29.32	\$ 29.32	\$ 30.19	\$ 31.06	\$ 31.94	\$ 32.81	\$ 32.81	\$ 33.68	\$ 32.81	\$ 32.81	\$ 32.81
(1) Panel Market Price of Surplus	\$ 23.20	\$ 24.95	\$ 26.70	\$ 27.57	\$ 28.44	\$ 29.32	\$ 30.19	\$ 31.06	\$ 31.94	\$ 31.94	\$ 32.81	\$ 33.68	\$ 34.56	\$ 35.43	\$ 36.30	\$ 37.17	\$ 38.05	\$ 38.92	\$ 39.79	\$ 40.67	\$ 41.54	\$ 42.41	\$ 43.26
(3) BCH RRA Market Price of Surplus	\$ 25.67	\$ 28.29	\$ 30.46	\$ 31.81	\$ 32.99	\$ 33.53	\$ 34.43	\$ 35.52	\$ 36.42	\$ 37.24	\$ 38.77	\$ 40.40	\$ 41.94	\$ 42.84	\$ 43.70	\$ 44.57	\$ 45.46	\$ 46.37	\$ 47.30	\$ 48.24	\$ 49.21	\$ 50.19	\$ 51.20

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Withheld pursuant to/removed as

s.12;s.13

MacLaren, Les EMPR:EX

From: MacLaren, Les EMPR:EX
Sent: Wednesday, October 25, 2017 8:25 AM
To: Johnny Strilaeff
Cc: Rowe, Katherine EMPR:EX
Subject: Peace River Trust

Hi Johnny. This article puts CBT on the radar. We can discuss on our call. Note my new office phone number below.

A Peace River trust could offset Site C impact

Vancouver Sun

Wednesday, October 25, 2017

Page A11

By Marvin Shaffer & John Richards

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s.16;s.13

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s.12;s.13

ADVICE TO MINISTER

CONFIDENTIAL ISSUE NOTE

Ministry of Energy, Mines and Petroleum
Resources

Date: July 10, 2017

Updated: August 28, 2017

Minister Responsible: Hon. Michelle Mungall

ALBERTA INTERTIE

ADVICE AND RECOMMENDED RESPONSE:

- Alberta is already a key trading partner for B.C. so there is definitely potential for B.C. to export clean, renewable, reliable electricity to help Alberta meet its clean energy targets and reduce its carbon footprint.
- Expanding the electricity transmission connections between Alberta and B.C. (restoring the capability of our existing intertie and possibly new intertie) would increase the ability for B.C. to provide flexible, dependable clean electricity and capacity to Alberta, which would also help backstop the development of variable wind generation in Alberta and support the phase-out of coal.
- Depending how much of B.C.'s clean electricity was supplied and what it displaced – coal or gas-fired power generation, or oil sands extraction or processing – between three million and six million tonnes of greenhouse gas emissions could be avoided annually.
- Expanded electricity transmission capacity between Alberta and B.C. would enhance BC Hydro's ability to purchase, shape and trade electricity. If external resources are permitted to participate, the capacity market under development in Alberta could provide an additional opportunity to sell B.C. power.
- BC is working with Natural Resources Canada, and the Provinces of Alberta, Saskatchewan and Manitoba as part of the Regional Electricity Cooperation and Strategic Infrastructure Initiative (RECSI).
- RECSI will model clean energy infrastructure projects in the west and rank the projects based on their ability to avoid or reduce GHG emissions. Improved connections between B.C and Alberta are part of the study.

ADVICE TO MINISTER

- **The Federal government is very interested in this type of infrastructure that can support the Pan Canadian Framework on Clean Growth and Climate Change signed by First Ministers.**
- **Federal Budget 2017 allocated \$9.2 billion over 11 years to support Green Infrastructure. Infrastructure Canada will provide funding for projects through bilateral agreements with the provinces and territories on a base plus per capita amount. Agreements are expected to be in place by March 2018.**

KEY FACTS REGARDING THE ISSUE:

The Alberta Climate Leadership Plan, announced in the fall of 2015, includes a policy decision to phase out coal-fired power generation by 2030, replacing it with gas-fired and renewable power. This means that by 2030, renewable power would account for 30% of generation in Alberta.

In order to achieve this target, Alberta needs to add about 5,000 MW of new wind or other renewable power (they have 1,500 MW of wind today).

Adding more wind presents a system operations challenge for Alberta. They will need to back up intermittent renewable resources like wind with a source of firm, dependable capacity. That's where BC Hydro comes in with dependable, flexible capacity resources that are provided by large-storage hydropower. Importing electricity from B.C. may be more cost effective for Alberta than building new natural gas generation facilities to back up their wind resources.

Increased electricity exports to Alberta would provide a market for B.C.'s clean, renewable hydroelectricity and enhance BC Hydro's ability to purchase, shape, and trade power.

The two provinces and the federal government, through NRCan-led RECSI are studying the GHG benefits of restoring and expanding the electricity transmission connections (interties) between Alberta and British Columbia to facilitate expanded trade in clean electricity.

The B.C. Green Party's platform for the May 2017 election included the commitment to support the transition to low carbon fuels and materials by "working with neighbouring jurisdictions to expedite the phase out of thermal electricity generation. This requires the construction of a transmission line to Alberta and the ability to export excess green power from BC to back out coal-fired generation in Alberta (support for expanding Alberta intertie)."

Background:

B.C. is already exporting electricity to Alberta so there is definitely potential for B.C. to help Alberta meet its clean energy targets. Between F2011 – F2015 Powerex exported between about 500 and 2,500 gigawatt hours per year to Alberta.

However, there are currently some constraints on the transmission connections between B.C. and Alberta:

- Most of the electricity is exported through the interconnection in the Crowsnest Pass.
- There is a second much smaller interconnection between BC Hydro's Fort Nelson generation and Alberta.

ADVICE TO MINISTER

- In total, there is 1,200 megawatts of transfer capacity into Alberta. However, at this time, it's limited to about 600 megawatts due to constraints on the Alberta side.

A new connection in the north would go from Fort St. John or Hudson's Hope to either Edmonton or Fort McMurray. The distance is approximately 600-700 km.

A new intertie with Alberta along the southern route, or a new northern route, would add 1,000 to 1,200 megawatts of transfer capability. The costs of a new intertie would be in the range of \$1 billion.

Government would need to consult like any other project: a 500-kV line would trigger an environmental assessment in B.C., and an intertie would trigger the Canadian Environmental Assessment Act federally.

B.C. continues discussions with the federal government on shared funding options to provide the necessary capital to develop the required infrastructure needed for upstream electrification in the northeast. In December 2016 the federal government identified co-funding of new transmission lines and other infrastructure in B.C. as part of the Pan-Canadian Framework, though details have not been finalized.

In Budget 2017, the Federal Government announced \$9.2 billion for Green Infrastructure, which will be allocated to provinces and territories by Infrastructure Canada over the next 11 years through bilateral agreements. Funding will be provided on a base plus per-capita basis.

Manitoba Alternative:

A January 2016 MOU between Manitoba and Alberta commits to "further co-operation on the shared goals of greenhouse gas emissions reductions, energy efficiency, and renewable energy development including hydroelectricity."

Linking Manitoba to Alberta would be challenging and expensive. B.C. and Alberta are part of the Western Interconnection. Saskatchewan and Manitoba are part of the Eastern Interconnection. The tie between Alberta and Saskatchewan is what is called a back-to-back DC connection, where power at one frequency is converted to direct current then back to alternating current at a slightly different frequency. The tie is expensive, has high losses and is rated at 150 MW (B.C.'s tie with AB at its rated capability is 1,200MW west to east and 1,000 east to west). Manitoba would be better off selling power to Saskatchewan to lower the carbon intensity of the Saskatchewan power system.

Also, getting power from Manitoba to Alberta would require a long-distance high voltage direct current line. Manitoba currently has such a line under construction called the Bipole III Project. Initially budgeted at \$3.3 billion, there are reports the 1,400 km line is \$1.3 billion over budget. Incoming Manitoba Premier Brian Pallister has been quoted that he wants to "pull the plug" on the project, and the Manitoba Conservative Election Platform states that the Bipole III Project will be sent to the Public Utilities Board for a proper review, which the former government apparently bypassed.

2009 Study:

The issue of further interconnecting the British Columbia and Alberta power grid has been studied a number of times over the years. The most recent study undertaken by BC Hydro – actually it was BC Transmission Corp. (BCTC) which was merged back into BC Hydro in 2010 – and the Alberta Electric System Operator (AESO) was in 2009.

At that time, they studied two alternatives for a second high-voltage transmission line – one in the south through the Crowsnest Pass, or one in the north from B.C.'s Peace River generation – with costs in the range of \$700 million to \$850 million. Just with inflation, those costs would be in the range of \$1 billion today.

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The study focused solely on the economics of an intertie. It did not look at capacity ownership or the sharing of benefits and costs.

The economic analysis was based on a limited set of direct benefits. The study concludes: "When considering only these direct benefits, the analysis indicates that there may not be a compelling economic case for the additional intertie..."

The study acknowledged the overall system impacts and market benefits: "However, the potential overall system impacts and market benefits to both provinces of a new intertie are considered to be very significant. This includes system reliability, generation adequacy, market efficiency and system access. The value of these other market and system benefits, which can reasonably be anticipated from a new intertie, have not been estimated or included in the economic analysis completed for this Report, and their inclusion in the analysis would likely significantly improve the economics of a new intertie."

AESO concluded: "From an AESO perspective, an additional intertie may improve future reliability and supply adequacy, particularly in the 2015 timeframe when Alberta is expected to require significant peaking capacity."

BCTC concluded: "...an additional intertie would provide potential trading benefits to all users of the intertie and enhanced opportunities to improve the utilization of resources on a regional basis."

British Columbia and Alberta took no further steps to proceed with this potential additional transmission connection.

Communications Contact:	Colin Grewar	250-952-0650
Program Area Contact:	Amy Sopinka	250-952-6390
BC Hydro Contact:	Chris Sandve	604-623-3776
File Created:	Feb. 9, 2017	
File Updated:	June 30, 2017/Aug. 28, 2017	

Chief of Staff @ Carr's office not aware

Matt Williamson

QUESTION AND ANSWERS
SITE C REVIEW – FINAL REPORT
Oct. 24, 2017

Ministry of Energy and Mines

- We initiated the BCUC review of Site C to ensure we make the right decision for B.C. families and keep BC Hydro rates affordable.
- The review has accomplished what we'd hoped – the BCUC has provided clear answers to some of the key questions on the economic viability of Site C and the consequences associated with completing, terminating or suspending the project.
- The BCUC's findings are based on written and oral submissions from more than 600 people and organizations and thousands of pages of information on the project provided to the BCUC and made available to the public.
- The level of participation shows just how important the issue of Site C is to everyone, and supports our decision to send the project to the BCUC for a long-overdue independent review.
- I want to thank the BCUC, BC Hydro and everyone else who has participated for their contributions and for completing the review under extremely demanding timelines.
- Now it is our turn, as your government, to consider the BCUC's report and other issues that are outside the scope of the review and make a decision on whether or not Site C is in the best interests of B.C. families and businesses.
- I don't want to pre-judge that decision in anyway, so I will not be commenting on the specific findings in the final report at this time, but I would encourage everyone to go to the BCUC website and read it.

If asked about timing of final decision:

- This will be an extremely difficult decision – we inherited a project that was advanced by the previous government without proper regulatory oversight and that is now more than two years into construction, employs more than 2,000 people and on which about \$2 billion has already been spent.
- We are going to take the time we need to exercise due diligence and make a decision on Site C that is in the best interests of British Columbians and will keep rates affordable.
- As part of our decision-making process, this month the Minister of Indigenous Relations and I will be meeting with Treaty 8 First Nations impacted by the project. We will also be taking other First Nation interests expressed during the Site C review and other processes into account.
- Given the complexity of the issues involved and the significant and long-term ramifications for our province this is not a decision we are going to rush – we anticipate a decision by the end of the year.

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Communications Strategy – Executive Overview Site C

Executive Overview

This document will serve as the communications strategy guiding the provincial government as it considers, makes and announces its decision regarding the future of Site C.

The communications strategy is based on the premise that there are three separate but interrelated communications phases relating to the Site C decision. It also brings into play related issues outside the scope of Site C.

- Phase 1: Pre-Report: Mid October – ~~November 8 (TBC)~~ *Nov 1*
- Phase 2: Review & Consult: ~~November 8 – Pre-Decision~~
- Phase 3: Decision Day – Forward

Each phase will bring its own set of issues and stakeholder outreach, which will need to be proactively managed and require briefings with key decision makers and influencers in government, including cabinet and non-elected officials and government caucus, while also adhering to the confidence and supply agreement with the Green Caucus.

Each of the three phases is summarized below, with a recommended issues-based strategic approach, communications tactics and collateral products.

Communications Matrix

Phase 1: Pre-Report: Mid October – November 1

Events/Issues:

- October 11: BC Hydro makes its formal submission to BCUC
- October 14: BC Hydro appears before the BCUC

EVENT/ISSUE: BC Hydro submission to and appearance before BCUC will generate further debate on the future of the Site C project among both supporters and opponents			
Strategic Approach	Tactics	Collateral products	Key Message
Reinforce the importance of BCUC process	Maintain status quo messaging, with the Minister of Energy, Mines and Petroleum Resources continuing to serve as the lead spokesperson	Key Messages Issues Note	The Site C review is working as it should – giving the BCUC, Government, and all British Columbians the information and answers we need to make the right decision on the project and keep BC Hydro rates affordable.

EVENT/ISSUE: Expectation of a quick decision from government as November 1 deadline approaches			
Strategic Approach	Tactics	Collateral products	Key Message
Refocus on the fact that government will need time to review the BCUC report and consult with First Nations before deciding on Site C	In the period leading to November x, proactive media outreach by Minister of Energy, Mines and Petroleum Resources foreshadows that government will need time to review the BCUC report, meaning decision on Site C will not occur immediately or in the days following receipt of report	Info Bulletin Oct. 30 or 31 Key Messages Q&As	Once the BCUC has delivered its final report Government will take the time we need to properly review the BCUC's findings and other issues that were outside the scope of the review, and engage further with First Nations. We anticipate a decision before the end of the year.

Phase 2 Review & Consult November 1 – Pre-Decision and laying the ground for a decision

Events

- November 1: BCUC completes Site C report, forwards to government and posts to BCUC website (TBC)
- Government reviews report
- Government consults with First Nations
- Public opinion polling occurs
- Stakeholders publicly advocate for government to make the “right decision” on Site C: namely one which aligns with the stakeholders’ vested interest
- Government lays the ground for a decision

EVENT/ISSUE: Receipt of report will heighten expectations for a quick, timely decision on Site C			
Strategic Approach	Tactics	Collateral products	Key Message
Government will need time to review the BCUC report and consult with First Nations before deciding on Site C	Minister issues statement thanking BCUC for its work, details next steps, including timeline for decision, First Nation consultation and notes that construction will continue during this period. Minister does follow up media Cabinet and government caucus provided with Site C history, status, and situational overview (Timing TBD)	News Release Nov. 1 Key Messages Q&As Issues note Site C presentation materials	Government will now take the time we need to properly review the BCUC's findings and other issues that were outside the scope of the review, and engage further with First Nations. We anticipate a decision before the end of the year.

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Site C Report Critical Path
(receipt to decision announcement)

Timing	Event	Notes
October 30: Time TBC	Media Advisory	Foreshadow: BCUC final report expected to be released Nov 1; government begins its internal review at that time; as noted by Minister Michele Mungall (MMM) earlier, a cabinet decision is expected by year end.
October 31: 1:30-3:00 p.m.	MMM receives embargoed copy of BCUC final report on Site C	Embargoed copy provided to MMM, who is also briefed by the BCUC Chair. NOTE: determine from the Chair what time on the 1 st the BCUC will make the report public. Possibly negotiable.
October 31: 4:00-5:00 p.m.	Briefing of Cabinet by MMM and EMPR officials	Site C 101: High-level overview of Site C Project, history, status, situational overview, and general implications of both potential options
October 31: 7:00-8:00 p.m.	Briefing of government caucus by MMM and EMPR officials	Presentation: Site C 101
November 1: time to TBC	Briefing of Green Party by EMPR, CASA officials	Site C 101 NOTE: Scheduling TBC
November 1: time TBD	BCUC issues Site C final report ; posted to BCUC website	Official release of report
November 1: time TBC	MMM provides statement acknowledging receipt of report and outlines next steps	Thank BCUC, acknowledge receipt, and outline next steps; reiterate broad time frame for government's decision on Site C (by end of year). NOTE: given the Minister's lack of availability for much of the day, alternate spokesperson needs to be identified for scrum purposes.
November 1: Time TBC	Message sheet provided to caucus	Key messages, issue framework, stakeholder guidance.
November 2: Time TBC	Initial briefing of special cabinet meeting by MMM and EMPR officials	Covering contents and conclusions of BCUC final report on Site C
Date and Time TBD	Briefing of Government caucus on Site C final report	Covering contents and conclusions of BCUC final report on Site C
November 1 onward	Government polling in the field	Results presented to Cabinet on November 22
November 1 onward	Review and assessment of report by EMPR and FIN staff	As required

November 1 onward	Development of next steps (broad energy and regional EcDev strategic options), including with BC Hydro	To integrate with, or be alternative to, depending on Cabinet Site C decision
November 1 onward	Development of full communications plan	Will anticipate both Yes & No options. Developed in concert with BC Hydro coms.
November 14/15 (?)	Consultation with First Nations in Northeastern BC by MMM and Minister Fraser	Fulfills commitment made by government to consult with First Nations before making decision on Site C
November 22	Detailed briefing of Cabinet on Site C Report by Ministry of Energy, Mines and Petroleum Resources officials	Provides framework for government to make its decision
November 29	Potential Cabinet decision date	Possibility only
Date and Time TBD	Government announces decision on Site C	<ul style="list-style-type: none"> • PJH (with MMM and Minister Heyman TBC) • Time and location TBD • Recommended: Concurrent technical briefing for invited stakeholders (budget-style lock-up); media given access to stakeholders post-announcement

STATEMENT

For Immediate Release
[Release Number]
[Date]

Ministry of Energy, Mines and Petroleum
Resources

BCUC releases final report on Site C review

VICTORIA – Minister of Energy, Mines and Petroleum Resources Michelle Mungall has issued the following statement on the final report of the Site C review that was released today by the B.C. Utilities Commission (BCUC):

“Our government initiated the BCUC review of Site C to ensure we make the right decision for B.C. families and keep BC Hydro rates affordable in the long-term.

“The review has accomplished what we’d hoped – the BCUC has provided clear answers to some of the key questions on the economic viability of Site C and the consequences associated with completing, terminating or suspending the project.

“The BCUC’s findings are based on written and oral submissions from more than 600 people and organizations and thousands of pages of information on the project provided to the BCUC and made available to the public.

“The level of participation shows just how important the issue of Site C is to everyone and supports our decision to send the project to the BCUC for a long-overdue independent review.

“I want to thank the BCUC, BC Hydro and everyone else who has participated for their contributions and for completing the review under extremely demanding timelines.

“Now it is our turn, as your government, to consider the BCUC’s findings and other issues that are outside the scope of the review and make a decision on whether or not Site C is in the best interests of British Columbians.

“I don’t want to pre-judge that decision in anyway, so I will not be commenting on the specific findings in the final report at this time, but I would encourage everyone to go to the BCUC website and read it.

“This will be an extremely difficult decision – we inherited a project that was advanced by the previous government without proper regulatory oversight and that is now more than two years into construction, employs more than 2,000 people and on which about \$2 billion has already been spent.

“We are going to take the time we need to exercise due diligence and make a decision on Site C that will be in the best interests of B.C. families, businesses and our economy.

"As part of our decision-making process, this month the Minister of Indigenous Relations and I will be meeting with Treaty 8 First Nations impacted by the project. We will also be taking other First Nation interests expressed during the Site C review and other processes into account.

"Given the complexity of the issues involved and the significant and long-term ramifications for our province this is not a decision we are going to rush. We anticipate a decision by the end of the year."

Learn More:

To view the BCUC's final report on the Site C review, visit: <http://www.sitecinquiry.com/>

Contact:

Suntanu Dalal

Media Relations

Ministry of Energy, Mines and Petroleum Resources

Ph. 250 952- 0628

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	<p>Green Party caucus provided with Site C history, status, and situational overview (Timing TBD)</p> <p>Cabinet receives briefing on BCUC Site Final Report (Timing TBD)</p>		
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EVENT/ISSUE: Construction continues during the period that government is reviewing BCUC report			
Strategic Approach	Tactics	Collateral products	Key Message
Consistent with the government's approach to allow work to continue while review and decision on future of Site C is made. Also, less construction as winter approaches	As per above, with additional stakeholder outreach as required	<p>News Release</p> <p>Key Messages</p> <p>Q&As</p> <p>Digital??</p> <p>Issues note</p>	Construction is slowing down with winter approaching but there are still over 2,000 people working at Site C and we don't think it is fair to those workers and their families to stop construction while we are still deciding whether or not to continue with the project.

EVENT/ISSUE: Questions around the need for consultation with First Nations			
Strategic Approach	Tactics	Collateral products	Key Message
Aligns with government's commitment to UNDRIP	<p>As per above</p> <p>Government, through Ministers Mungall and Fraser, meets with First Nations Nov. 14 in Fort St. John</p>	<p>News Release</p> <p>Key Messages</p> <p>Q&As</p> <p>Issues note</p> <p>Presentation materials for meeting with First Nations</p>	<p>Further engagement with Treaty 8 First Nations impacted by the Site C project reflects our commitment to transform our relationship with Indigenous peoples and is one way we are bringing the principles of the UN Declaration on the Rights of Indigenous Peoples into action.</p>

EVENT/ISSUE: If polling becomes public			
Strategic Approach	Tactics	Collateral products	Key Message
Part of the overall due diligence process and listening to and consulting with British Columbians	<p>Reactive media relations should the issue of opinion polling become public</p>	<p>Key Messages</p> <p>Issues note</p>	<p>Our Government is listening to British Columbians and making decisions that put people first – polling is part of our due diligence as we work towards a decision on Site C that is in the best interests of British Columbians.</p>

EVENT/ISSUE: Laying the groundwork for a decision			
Strategic Approach	Tactics	Collateral products	Key Message
Begin to build support for the decision	Select media engagement & stakeholder outreach	Key messages	Our Government continues to engage with stakeholders and First Nations as we work towards a decision on Site C that will ultimately keep rates low while ensuring British Columbians have access to clean, renewable, reliable and cost-effective electricity to power their lives and businesses into the future.

Phase 3 Decision Day – Onwards

Events:

- Government decides on Site C
- Stakeholder reaction

EVENT/ISSUE: Regardless of the decision, there will be concerns/complaints raised by those who oppose the decision			
Strategic Approach	Tactics	Collateral products	Key Message
Difficult decision to make, a complex issue but one based on a comprehensive and fulsome review of the Site C project. This decision was made due to the fact that this was the only realistic option for government based on the current state of the project and the situation which it inherited	Integrated public affairs approach Focused on internal and external stakeholder relations, earned media, technical briefings digital engagement, and 3 rd party validation	Communications strategy (attached) Key messages News releases Q&As Issues Note Presentation materials: video PowerPoint, others Digital materials Polling	Our decision on Site C is in the best long-term interests of British Columbians and is the only realistic option based on the current state of construction and a thorough review of costs, the demand for power and feasible alternatives.

**Communications Strategy
Announcing Site C Decision**

Issue

Announcing a decision regarding the future of Site C.

Core Concept

To create understanding and support for the decision regarding the future of Site C while addressing the resulting issues arising from the decision.

Central Opportunity

To position the decision on Site C as the best/only option under the circumstances which the project began, and one that the government needed to make given where the project is coupled with the due diligence undertaken by the current government. This will require working with supportive stakeholders both pre and post the decision, with the goal of generating supporting and validation of the decision.

Central Challenge

While Site C may not be a top of mind issue for British Columbians (TBC), it is one that stakeholders, be they supporters or opponents of the project, have strong opinions on. Regardless of the decision on Site C, stakeholders who oppose the decision will likely be very vocal in voicing their displeasure with the decision, with the goal of making the Site C decision an issue of greater public debate and discussion.

Issues

Timing

- Once the BCUC submits its report on Site C to government, there will be heightened expectation among some that government should make a quick if not immediate decision. Government will need to be proactive in making sure that there is strong understanding that additional due diligence will be required once the report is received as well establishing a realistic time frame of when a decision will be made and announced.

Stakeholder reaction

- Ratepayers
- Industry
- Alternative energy industry: wind, solar, geothermal
- International investors, including LNG proponents
- Environmentalists
- First Nations
- Labour
- Regional
- Opinion leaders/influencers

Economic Strategy

- Any decision will be assessed in the context of the government's economic priorities and new economic strategy. For instance, if the decision is not to go ahead or to defer/delay, in the absence of an economic strategy, the decision will be portrayed as a government that just says no to everything.

- If the decision is to say yes, then it may be viewed as the government focusing on economic priorities in terms of attracting large industrial projects with affordable clean energy at the expense of the environment and shutting the door on other types of energy projects.

Financial implications

- Any decision will have financial implications in terms of the costs of proceeding versus the costs of cancellation or deferral.

Site C and Kinder Morgan

- Linkage of selling clean power to Alberta through extension of transmission lines vis-à-vis previous administration's tacit support for Kinder Morgan.

Urban/rural split

- Any decision could highlight the differences between rural BC and the lower mainland. For example, a no decision could reinforce the notion of the government being urban based. A yes decision could be seen as an attempt to woo rural voters.

First Nations

- First Nations primary objections to Site C have been infringement on treaty rights, lack of consent, and impacts to gravesites.
- Some First Nation view Site C as a barrier to alternative energy projects, which they are partners in by law under the Clean Energy Act. A decision to go forward with Site C will likely result in these First Nations voicing their displeasure.

Climate change strategy

- Some (ie: Marc Jaccard) argue that Site C is necessary to supply increased demand as a result of significant electrification to meet the province's greenhouse gas reduction targets. "Most mid- and small-sized vehicles will be electric. Most buildings will be well insulated and heated by electric resistance or electric heat-pumps, either individually or via district heating systems. And many low temperature industrial applications will be electric".
- The counter argument (ie: Robert McCullough) is that alternative energy sources can supply the energy needed for significantly increased electrification. "Renewables have declined in price so dramatically that Site C — even considering already sunk costs and the expenses of termination — can no longer compete".

Strategic Objectives

- Ensuring that decision is seen as one forced upon the government given that the government inherited the project coupled with the manner in which the original Site C decision was conceived, moved forward and advanced to this point
- Ensuring that the decision is seen as the right one in the best long-term interests of British Columbians given the current state of construction
- Aligning with the government's mandate
- Aligning with the objectives of the BCUC Review
- Aligning with UNDRIP
- Decision is best option given other alternatives to Site C

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- Engaging with and maintaining the support of key stakeholders
- Anticipating, evaluating and proactively managing stakeholder issues

Strategic Considerations

- The decision if not properly communicated runs the risk of creating polarization between rural and urban residents, supporters and non-supporters of the project and impacting the province's investment climate

Key Stakeholders* See Appendix A for detailed list and Appendix B for stakeholder key messages

- I. Business/industry
- II. Environmental
- III. Finance
- IV. First Nations
- V. Influencers
- VI. Regional

Key Messages & Themes

Needs to dovetail and align with government's overall vision and mandate.

Key themes to include:

Rationale for decision

- Site C was inherited by the present government and was advanced to the point that the decision made by the new government was the only viable, feasible and realistic choice.

Economy

- Any decision will need to be messaged within the context of the government's economic priorities and new economic strategy.

Environment

- Any decision will need to be messaged within the context of the government's commitment to the environment and its strategy to address climate change. As well, messaging will be needed regarding the environmental impacts of decision.

Financial

- Financial cost of the decision

First Nations

- UNDRIP Commitment

Strategy

The approach will be focused on proactive media relations, coupled with an aggressive stakeholder engagement strategy, that puts an emphasis on ensuring that the decision is one that was essentially thrust upon the government.

Tactics TBD

Media Relations

- News Conference
- Technical briefings

Stakeholder Engagement

- Internal
- External

Digital Media

- TBD

Polling

- Pre and post announcement

Others

- TBD

Recommended collateral products:

- Event Plan
- News Release(s)
- Key messages/Narrative
- Q&A
- MLA package
- Letters to stakeholders
- Fact sheets/Background
- Presentation deck
- Infographics
- Digital products
- Issues tracking matrix
- Post announcement polling

Next Steps

1. Approval on direction and approach
2. Preparation of collateral materials

Critical path/work plan: TBD

Task	Timing	Responsibility	Status

Appendix A – List of Key Stakeholders:

I. Business/Industry:

- Clean Energy Association of BC (CEBC)
- Allied Hydro Council of BC (AHC) (including the BC Building Trades)
- Independent Contractors and Businesses Association (ICBA)
- Peace Energy Renewable Energy Cooperative
- Canadian Geothermal Energy Association (CanGEA)
- Association of Major Power Customers of BC (AMPC)
- Commercial Energy Consumers Association of British Columbia (CEC)
- Canadian Wind Energy Association (CanWEA)
- Mining Association of BC (MABC)
- Canadian Association of Petroleum Producers (CAPP)
- Pulp and Paper Coalition
- Christian Labour Association of Canada
- Independent Contractors and Business Association
- WorkSafeBC
- Employment Standards Branch
- BC Chamber of Commerce
- Greater Vancouver Board of Trade
- Kleana Power Corporation
- West Coast Energy Inc.
- InterraPlan Inc.

II. Environmental:

- BC Sustainable Energy Association (BCSEA)
- Peace Valley Landowner Association (PVLA) and Peace Valley Environment Association (PVEA)
(Represented by energy analyst Robert McCullough and lawyer Rob Botterell)
- The Wilderness Committee
- Peace River Environmental Society (Alberta)
- Yellowstone to Yukon Conservation Initiative
- Heritage Waterkeepers Society
- David Suzuki Foundation
- Sierra Club BC (represented by ecojustice)

III. Finance:

IV. First Nations:

- Treaty 8 First Nations with Tripartite Land Agreements:
 - McLeod Lake First Nations – Chief Harley Chingee
 - Halfway River First Nation – Chief Darlene Hunter
 - Doig River First Nation – Chief Trevor Makadahay

- Saulteau First Nations – Chief Ken Cameron
- Treaty 8 First Nations with no agreements:
 - Fort Nelson First Nation – Chief Harrison Dickie
 - Blueberry River First Nations – Chief Marin Yahey Sr
 - Prophet River First Nation – Chief Lynette Tsakoza
 - West Moberly First Nations – Chief Roland Willson
- Non-Treaty B.C. First Nations:
 - Kwadacha First Nation
 - Tsay Keh Dene First Nation
- Other Aboriginal groups consulted by BC Hydro:
 - Athabasca Chipewyan First Nation (Alberta)
 - Beaver First Nation (Alberta)
 - Dene Tha' First Nation (Alberta) (reached benefits agreement with BC Hydro)
 - Duncan's First Nation (Alberta)
 - Horse Lake First Nation (Alberta)
 - Little Red River Cree Nation (Alberta)
 - Mikisew Cree First Nation (Alberta)
 - Smith's Landing First Nation (Alberta)
 - Sturgeon Lake Cree Nation (Alberta)
 - Sturgeon Lake Cree Nation (Alberta)
 - Woodland Cree First Nation (Alberta)
 - Deninu K'ue First Nation (N.W.T.)
 - Salt River First Nation (N.W.T.)
 - Kelly Lake Cree Nation (KLCN) – not recognized as an Aboriginal group.
- Indigenous associations:
 - Union of BC Indian Chiefs – Grand Chief Stewart Phillip
 - First Nations Summit – Grand Chief Ed John
 - BC Assembly of First Nations – Regional Chief Terry Teegee
 - Assembly of First Nations – Chief Perry Bellegarde
- Nanwakolas Society
- Amnesty International – Alex Neve, Secretary General of Amnesty International Canada
- UN Committee on the Elimination of Racial Discrimination – Alexei Avtonomov, Rapporteur
- UN Human Rights, Office of the High Commissioner - Victoria Tauli Corpuz, Special Rapporteur on the rights of indigenous peoples
- Métis Nation British Columbia (as directed by the CEA Agency)
- Kelly Lake Métis Settlement Society (as directed by the CEA Agency)
- Métis Nation of Alberta - Region VI
- Paddle Prairie Métis
- Settlement Society, Fort Chipewyan Métis Local 125
- Northwest Territory Métis Nation

V. Influencers:

- BCOAPO *et al.* (BC Old Age Pensioners Organization, Active Support Against Poverty, Council of Senior Citizens' Organizations of BC, Together Against Poverty Society, and the Tenant Resource and Advisory Centre, known collectively in regulatory processes as BCOAPO *et al.* representing the interests of low and fixed income residential ratepayers)
- BC Utilities Commission (BCUC)

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- British Columbians
- Former B.C. Hydro president Marc Eliesen
- Raymond James Analyst, Frederic Bastien
- B.C. Women's Institute
- BC Green Party
- Province of Alberta

VI. Regional:

- Municipalities:
 - City of Fort St. John (benefits agreement with BC Hydro)
 - City of Chetwynd (benefits agreement with BC Hydro)
 - Town of Peace River
 - Dawson Creek
 - District of Hudson's Hope (benefits agreement with BC Hydro)
 - District of Taylor (benefits agreement with BC Hydro)
 - Peace River Regional District (benefits agreement with BC Hydro)
 - Former Fort St. John mayor Steve Thorlakson
 - Fort St. John Chamber of Commerce president Tony Zabinski
- School Divisions:
 - Peace River North SD 60,
 - Peace River South SD 59,
 - Fort Nelson SD 81,
 - First Nations Chalo School
- Fort St. John Child Development Centre
- Hudson's Hope Historical Society
- North Peace Rod and Gun Club
- St. Peter's Church (Pender and Saturna Islands)

Appendix B – Stakeholder Key Messages

I. Business/Industry:

Ministry of Jobs, Trade and Technology:

Complete Project:

- People need good paying jobs and the chance to get ahead. We're building a better B.C., with good jobs and a strong, sustainable and innovative economy that puts people first.
- The completion of Site C will provide good paying jobs to the people of B.C. to support their families.
- In fact, Site C will create approximately 33,000 jobs through all stages of development and construction. (according to a BC Hydro report).
- In August, it employed more than 2,300 workers and more than 80% were from B.C., including apprentices, Aboriginal and female workers.
- In addition, Site C construction will result in an increase of \$3.2 billion to provincial GDP, including a \$130 million increase in regional GDP during construction (according to BC Hydro report).
- The electricity generated by Site C will support future growth of economic sectors across the province, sectors like forestry, mining and manufacturing, and at the same time supporting BC to be a preferred location for new tech opportunities such as data centres.
- The employment opportunities and economic benefits of Site C will boost our rural communities in the Peace River region, and the province's economy.

Terminate Project:

- Our government is committed to building a sustainable economy and creating good jobs for British Columbians in every corner of the province.
- As BC Hydro described in its filings to the BCUC Site C review, due to geotechnical and construction challenges the project budget has already increased by \$610 million, from \$8.335 billion to \$8.945 billion.
- Instead of focusing on one sector to create jobs, we're working to strengthen traditional industries like forestry and mining, while supporting small business, tourism, agriculture, manufacturing, technology and innovation.
- We're investing a record \$14.6 billion in capital investment to build schools, roads, and transit infrastructure across the province to create even more good jobs.
- We're forming an Emerging Economy Task Force to find "made-in-B.C. solutions" and encourage innovative, sustainable industries to build a 21st century economy and we're creating an Innovation Commission to boost B.C.'s tech sector.

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- We're cutting taxes for small business from 2.5% to 2.0% and establishing the Small Business Task Force, which will help us understand the needs of small businesses so we can create the best policies and priorities help them thrive.

Ministry of Energy, Mines and Petroleum Resources

Clean Energy Association of BC (CEBC)

Peace Energy Renewable Cooperative

Canadian Wind Energy Association (CanWEA)

(All support terminating the project, favoring a portfolio of alternative energy sources to meet demand).

Complete Project:

- After review, the BCUC found that compared to a portfolio of alternative sources of generation Site C remains the most cost effective source of firm, renewable and clean electricity.
- As such, proceeding with Site C will help to keep rates low and affordable for British Columbia families.
- Although the cost of energy from alternative resources such as wind and solar is dropping, the electricity produced by Site C has greater value because it is firm, dependable power that can be stored and dispatched when and where needed throughout the system.
- The cost of connecting a portfolio of distributed renewable energy projects (which are often located in more remote locations) to the transmission grid also increases the cost of electricity from alternative sources.
- Renewable power projects can help us take action on climate change while providing jobs for British Columbians, and will continue to play an important in BC Hydro's current and future supply of electricity.
- Site C will provide the back-up capacity needed in BC Hydro's system to integrate intermittent renewable sources like wind, solar and run-of-river as needed in the future.

Terminate Project:

- Our decision to terminate the Site C project means BC Hydro will be looking to renewable energy projects to help meet the demand for power while keeping rates affordable for British Columbia families.
- We understand the importance of support from local communities and First Nations to ensure the success of smaller scale renewable energy projects and look forward to bringing a new approach to create good clean jobs in BC as we develop a roadmap for the future of B.C. energy.

Canadian Geothermal Energy Association (CanGEA)

(Supports terminating the project in favor of developing geothermal resources)

Complete Project:

- After review, the BCUC found that compared to a portfolio of alternative sources of generation Site C remains the most cost effective source of firm, renewable and clean electricity.
- Geothermal was included in some of the alternative portfolio models presented to the BCUC.
- We believe geothermal energy still has a role to play in B.C.'s future energy system, especially as it is a source of dependable capacity that is there all the time compared to intermittent sources like wind or solar.
- Recent changes to the regulatory framework for geothermal will streamline application processes for drilling permits and reduce costs for companies pursuing exploration activities, spurring further exploration of B.C.'s geothermal potential.

Terminate Project:

- Our decision to terminate the Site C project means BC Hydro will be looking to renewable energy projects to help meet the demand for power while keeping rates affordable for British Columbia families.
- Geothermal energy has a role to play in meeting our future energy needs, especially as it is a source of dependable capacity that is there all the time compared to intermittent sources like wind or solar.
- Recent changes to the regulatory framework for geothermal will streamline application processes for drilling permits and reduce costs for companies pursuing exploration activities, spurring further exploration of B.C.'s geothermal potential.

Allied Hydro Council of British Columbia (AHC)

Independent Contractors and Businesses Association (ICBA)

(Support completing the project and protecting current workers and future jobs).

Complete the Project:

- Government's decision to complete the Site C will support over 2,000 union and non-union workers currently employed on the project and many thousands more jobs in the future.
- Of the total workers on Site C, over 80% have typically been from British Columbia in BC Hydro's quarterly reports.
- These are well-paying jobs in an area of the province that has been hard hit by a slowdown in the resource sector.
- As recommended by the AHC in its submission to the review:
 - BC Hydro is working with its contractors – particularly the main civil works contractor – to improve project management and better ensure the project sticks to budget and comes in on time.
 - The Province and BC Hydro continue to explore new export power markets – B.C.'s clean and renewable electricity could help displace fossil-fuel-fired generation and reduce greenhouse gas emissions in Alberta and other markets.

Terminate the Project:

- Government's decision on the Site C project was informed by the BCUC review, including an examination of the costs of termination and the impact on workers, the project's budget, the

costs of Site C energy compared to a portfolio of alternative generation sources, BC Hydro's load forecast, and other environmental and First Nations considerations.

- Government's decision to terminate the project will regrettably mean a significant loss of jobs.
- My thoughts are with Site C workers and their families today.
- The impact on workers weighed heavily on our Government, but our mandate and priority as Government is to do what we believe is best for all British Columbians.
- Based on the best evidence in front of us today we have determined that this project is not in the public interest.
- We're in this situation today because the previous government decided to barge ahead with this project without proper oversight by the province's energy regulator. That was wrong, and we committed to set it right.
- Over the weeks ahead BC Hydro will engage with workers, contractors and unions to ensure workers are treated fairly and respectfully while work on Site C is wound down.
- I expect many workers will be kept on for the foreseeable future to remediate the site – but that will be up to BC Hydro and its contractors to determine.
- While jobs are being lost at Site C today, there will be jobs tomorrow – our government's commitment to jobs remains a priority:
 - We are developing a new roadmap for the future of B.C. energy that will drive innovation, expand energy and conservation programs, generate new energy responsibly and sustainably, and create lasting good jobs across the province.
 - Our government is also focussed on revitalizing our resource sectors and delivering a new capital investment plan that will build new schools, hospitals and roads while helping to create well-paying jobs.

Association of Major Power Customers of BC (AMPC)

(No firm position on whether to complete or terminate but concerned about the recovery of costs and rate impact to major power customers)

Complete the Project:

- Government's decision on the Site C project was informed by the BCUC review, including an examination of the costs of termination, the project's budget, the costs of Site C energy compared to a portfolio of alternative generation sources, BC Hydro's load forecast, and other environmental and First Nations considerations.
- In making our decision to continue with the project our priority was to ensure affordable rates for BC Hydro customers, including major industrial customers who use a lot of electricity, and who are concerned about the recovery of Site C costs.
- There will be no rate impact from Site C until the project comes into service. This ensures that the costs for Site C are paid by the ratepayers who are benefiting from the project.
- Once the project is in operation, the B.C. Utilities Commission will determine the period over which costs will be brought into rates and recovered.
- It's also important to note that Government is currently working with BC Hydro to freeze Hydro rates ahead of the next scheduled rate increase of 3% in April 2018.
- BC Hydro estimates that a rate freeze eliminating the 3% increase will save industrial customers between approximately \$133,000 and \$2.0 million per year (about \$11,100 to \$167,000 per month) depending on the customer's consumption.

Terminate the Project:

- Government's decision on the Site C project was informed by the BCUC review, including an examination of the costs of termination, the project's budget, the costs of Site C energy compared to a portfolio of alternative generation sources, BC Hydro's load forecast, and other environmental and First Nations considerations.
- In making our decision to terminate the project our priority was to ensure affordable rates for BC Hydro customers, including major industrial customers who use a lot of electricity, and who are concerned about the recovery of Site C costs.
- BC Hydro will request approval from the BCUC to recover Site C expenditures over a longer period – likely over 10 years – to allow its customers the time to absorb the impact.
- In its review, the BCUC found that BC Hydro's proposal to recover Site C expenditures over a longer period rather than a shorter period was reasonable.

Commercial Energy Consumers Association of B.C. (CEC)

(No firm position on completing or terminating the project but focussed on the consideration of risks and uncertainties related to either scenario, and future energy planning and policy for Government and BC Hydro)

Complete or Terminate Project:

- In making our decision on Site C, Government was aware of the risks and uncertainties associated with both completing and terminating the project as identified by the BCUC in its report.
- The risks and uncertainties – as outlined in the CECs submission to the review – are related to a range of issues including load forecasts, energy surplus, cost overruns, environmental impacts, and the costs of alternative energy.
- Our assessment of those risks – along with other environmental and First Nations considerations – informed our decision on the project.
- Government also acknowledges that in addition to our decision on the Site C project, the development of good quality integrated resource planning for affordable energy is critical going forward as we work together with BC Hydro and the BCUC to keep Hydro rates affordable.
- As part of our plan to freeze Hydro rates we will conduct a comprehensive review of BC Hydro.

Pulp and Paper Coalition

(No firm position on completing or terminating the project. Under termination there may be opportunities for the pulp and paper sector to provide more biomass power as part of a portfolio of alternative energy sources, but pulp mills are also large consumers of power and are very concerned with power costs and competitiveness).

Complete Project:

- Biomass power produced from wood waste at pulp and paper operations will remain an important part of BC Hydro's energy portfolio, and it's a good product for BC Hydro.
- Biomass has the advantage of being a firm and dependable source of power that is always available as opposed to intermittent sources of energy like wind and solar.

- We recognize that biomass projects are an important source of revenue for pulp and paper mills around the province that are supplying power to BC Hydro under electricity purchase agreements.
- However, we need to balance this against our commitment to British Columbians to keep rates as low as possible.
- BC Hydro is reviewing electricity purchase agreements for biomass power and other IPP projects that are due to expire, and plan any renewal of those contracts at lower prices recognizing that these projects have typically recovered their initial capital costs over the term of the original contract.
- BC Hydro will continue to work with the pulp and paper sector to address the impact of lower revenues from biomass power.
- In addition, in 2014, BC Hydro introduced a program to help pulp and paper producers reduce their electricity costs. Under the program, BC Hydro provides a financial incentive of up to 75% of the project cost to support investments in more energy efficient equipment.

Terminate Project:

- Our decision to terminate the Site C project means BC Hydro will be looking to renewable energy projects to help meet the demand for power while keeping rates affordable for British Columbia families.
- Biomass from wood waste at pulp and paper operations has the advantage of being a firm and dependable source of power that is always available as opposed to intermittent sources of energy like wind and solar.
- We understand the importance of support from local communities and First Nations to ensure the success of smaller scale renewable energy projects and look forward to bringing a new approach to create good clean jobs in BC as we develop a roadmap for the future of B.C. energy.

Canadian Association of Petroleum Producers (CAPP)

(No submission but would likely support completion to ensure adequate supply of energy and capacity to provide for LNG load and encourage final investments decisions from LNG proponents, and to enable construction of the Peace Region Electricity Supply (PRES) transmission line running from Site C to Chetwynd which would improve the supply and reliability of power from Site C to upstream natural gas operations in the Northeast.)

Complete Project:

- Site C provides a firm, dependable supply of affordable electricity that supports the growth of B.C.'s LNG sector.
- The electrification of the LNG sector – using electricity instead of natural gas to power compression and auxiliary plant operations – can help us reduce greenhouse gas emissions and fight climate change.
- The completion of Site C also enables BC Hydro's proposed Peace Region Electricity Supply (PRES) transmission line which is designed to bring additional clean, renewable electricity from Site C to the South Montney area, where demand is growing due to gas companies electing to use clean electricity from BC Hydro to power their facilities.

- The PRES project offers the opportunity to realize significant GHG reductions as producers choose to run their operations with electricity off the grid rather than self-generate using gas or diesel.
- Full electrification of expected new industrial loads in the Montney Basin – enabled by PRES and other transmission lines – could avoid up to 4 million tonnes of emissions per year.

Terminate Project:

- Government's decision on the Site C project was informed by the BCUC review, including an examination of the costs of termination, the project's budget, the costs of Site C energy compared to a portfolio of alternative generation sources, BC Hydro's load forecast, and other environmental and First Nations considerations.
- In making our decision to terminate the project our priority is to ensure affordable rates for BC Hydro customers.
- We are confident that with alternative sources of generation, energy savings from conservation measures, and upgrades to BC Hydro's existing facilities, BC Hydro will have ample and affordable energy and capacity to serve the needs of the oil and gas sector, including the growth of LNG production and upstream electrification, into the future.
- We will continue to work with the oil and gas sector to encourage the electrification of their upstream and LNG operations to reduce greenhouse gas emissions.

Mining Association of BC:

(No submission but as a major power customer it would likely support completion to ensure adequate supply of energy and capacity to provide for growth in the mining sector, and it would be concerned with the recovery of costs whether the project proceeds or is terminated. The association issued a media release supporting the previous government's approval of the project in December 2014).

Complete the Project:

- Site C provides a firm, dependable supply of affordable electricity that supports the growth of B.C.'s mining sector.
- Mining is one of B.C.'s largest industrial consumers of electricity and completing Site C will ensure that firm, dependable and affordable energy and capacity will be available to power B.C. mines for the future.
- There will be no rate impact from Site C until the project comes into service. This ensures that the costs for Site C are paid by the ratepayers who are benefiting from the project.
- Once the project is in operation, the B.C. Utilities Commission will determine the period over which costs will be brought into rates and recovered.
- It's also important to note that Government is currently working with BC Hydro to freeze Hydro rates ahead of the next scheduled rate increase of 3% in April 2018.
- BC Hydro estimates that a rate freeze eliminating the 3% increase will save industrial customers between approximately \$133,000 and \$2.0 million per year (about \$11,100 to \$167,000 per month) depending on the customer's consumption.

Terminate the Project:

- Government's decision on the Site C project was informed by the BCUC review, including an examination of the costs of termination, the project's budget, the costs of Site C energy compared to a portfolio of alternative generation sources, BC Hydro's load forecast, and other environmental and First Nations considerations.
- In making our decision to terminate the project our priority is to ensure affordable rates for BC Hydro customers, including major industrial customers like mines who use a lot of electricity, and who are concerned about the recovery of Site C costs.
- BC Hydro will request approval from the BCUC to recover Site C expenditures over a longer period – likely over 10 years – to allow its customers the time to absorb the impact.
- In its review, the BCUC found that BC Hydro's proposal to recover Site C expenditures over a longer period rather than a shorter period was reasonable.
- We are confident that with alternative sources of generation, energy savings from conservation measures, and upgrades to BC Hydro's existing facilities BC Hydro will have ample and affordable energy and capacity to serve the needs of B.C.'s mining sector into the future.
- BC Hydro will continue to work with the mining sector and other major power consumers to help them find energy efficiencies and implement conservation measures that can reduce consumption and cut power costs.

II. Environmental:

Peace Valley Landowner Association (PVLA) and Peace Valley Environment Association (PVEA)

(Support terminating the project. The parties retained energy economist Robert McCullough to represent their interests, who argued Site C was not necessary on the grounds that BC Hydro's load forecast were inaccurate, that a portfolio of wind and solar could meet demand and lower costs, that Site C would lead to a surplus of energy that BC Hydro would need to sell at a loss, and that similar large hydroelectric projects in other provinces had run far over budget).

Complete Project:

- After considering the advice and findings of the BCUC, and other First Nations and environmental considerations our Government has decided that it is in the best interests of B.C. families to complete the Site C project.
- I recognize how difficult it must be for landowners in the area who are directly impacted by the project to have to move from their homes and properties, but as Government we have to make difficult decisions based on the best interest of the entire province.
- Site C will help to keep rates affordable for B.C. families.
- Site C will produce the lowest GHG emissions of any of the alternatives examined.
- As a firm, reliable and flexible source of energy it can back up intermittent resources like wind and solar and enable the integration of other renewable, low-carbon energy sources.
- The Agricultural Mitigation and Compensation Plan developed for the project, which includes a \$20 million fund to support the Peace Region's agricultural industry, will help to mitigate the agricultural impact.
- BC Hydro will be reaching out to landowners directly affected by the project to discuss next steps regarding the sale of their properties and relocation options.

Regarding Robert McCullough's arguments:

- Based on the BCUC's findings and advice, we are satisfied that:
 - BC Hydro's load forecasts are reasonable and that BC Hydro will require more energy and capacity to meet growing demand.
 - Compared to a portfolio of alternative energy sources, Site C is the most cost-effective option to supply the clean, reliable, power we need.
 - BC Hydro will be able to sell any surplus power from Site C at market prices high enough to avoid incurring a significant loss that would impact ratepayers.
 - As stated by the BCUC, while large hydroelectric projects in other provinces may have run over budget, comparisons to other projects are not directly relevant to BC Hydro's work on Site C.

Terminate Project:

- As a result of our decision to terminate Site C, landowners directly affected by the project will not be forced from homes and properties – properties that in some cases have been in their families for generations.
- BC Hydro will reach out to those families and their legal counsel to discuss the agreements reached previously to purchase properties and, as required, the remediation of any lands that have been disturbed by work on the project.

BC Sustainable Energy Association (BCSEA):

(No firm position on whether to complete or terminate the project, but focussed on the review process and factors that BCUC should consider)

Complete or Terminate Project:

- Site C should have been reviewed before the project was ever approved by the previous Government.
- That did not happen, so because the project was in progress and many lives were on hold, it was necessary for us to complete a BCUC review within a very tight timeline.
- Despite the short time frame, the review provided an opportunity for everyday British Columbians and First Nations to make their voices heard, for experts, analysts and interest groups to comment and present their findings, for BC Hydro to update and present a huge volume of valuable data on the project, and for the BCUC to answer key questions on the project.
- In fact, despite the tight timelines, over 240 individuals and organizations made written submissions to the BCUC review, and more than 300 people made oral presentations at a series of community and First Nations public input sessions around the province.
- Based on the results of the review, and other environmental and First Nations considerations, Government has made an informed decision on the Site C project.
- In making this decision Government carefully weighed the BCUC's findings on the cost of alternative sources of energy, the development of new technologies to store and deliver power, the value of conservation to meet energy demand, the costs of terminating or proceeding with the project, BC Hydro load forecasts, the potential for energy surplus, and other comments and recommendations made by the BCSEA in its submissions to the review.

III. Finance:

IV. First Nations:

Ministry of Indigenous Relations and Reconciliation:

Complete Project:

- The decision to proceed with Site C is in the interest of all British Columbians.
- The Province and BC Hydro are working hard to ensure Site C provides lasting economic and social benefits for northern communities and First Nations.
- The Province and BC Hydro have been consulting with First Nations and Indigenous groups on Site C for more than a decade, and that process has been recognized by the courts as being meaningful, comprehensive and carried out in good faith.
- We are accommodating Indigenous interests through offers of land protection, land transfers, financial payments and other economic benefits.
- B.C. and BC Hydro have reached agreements with a number of Indigenous groups, including Doig River, Halfway River, McLeod Lake and Sauteau First Nations, related to the construction and operation of Site C.
- The Province and BC Hydro will continue to engage with Indigenous groups throughout the construction stage of the Site C.

Terminate Project:

- The decision to terminate with Site C is in the best interest of all British Columbians.
- Impacts of Site C on Indigenous rights and territories cannot be mitigated, and adds to the cumulative effects of resource development on Indigenous rights in northeast B.C.
- The decision reflects our commitment to transform our relationship with Indigenous peoples and is one way we are bringing the principles of the UN Declaration into action.
- The Province will be engaging with all Treaty 8 First Nations on the path forward that respects and preserves their treaty rights.

Ministry of Energy, Mines and Petroleum Resources:

First Nations with impact benefit agreements with BC Hydro:

(Would likely support completion in order to benefit from agreements. Benefit agreements have been reached with six Treaty 8 First Nations (four in B.C. and two in Alberta.)

Complete the Project:

- While Site C will have significant impacts on First Nations near the project, it is important to note that BC Hydro has already reached impact benefit agreements with some First Nations.
- Benefit agreements have been reached with six Treaty 8 First Nations which include lump sum payments, annual inflation-adjusted payments streams over a period of up to 70 years, procurement opportunities, and the transfer of provincial Crown lands and implementation of land protection measures to preserve values and areas of importance to the First Nations.
- In its presentation to the First Nations input session in Prince George the McLeod Lake Indian Band, one of the First Nations impacted by the project who has signed a series of benefit

agreements, characterized the prospect of termination or suspension as an “economic catastrophe for the community” that would “unravel [the] process of reconciliation” and the “renewed relationship” between McLeod Lake and BC Hydro, and by extension, the provincial Crown.

- It’s important to note that no lands have been transferred to First Nations related to Site C at this point. Land transfers provided through tripartite land agreements are still subject to negotiation with affected First Nations.
 - The Province will engage local governments, stakeholders and other interested members of the public on all potential land transfers or potential land management measures. Our engagement with stakeholders, local governments and the public will inform whether individual parcels will be transferred to First Nations.
- Negotiations with other Aboriginal groups affected by the project have been on-going and will continue.
- As of September 2017, approximately \$170 million in procurement opportunities for work on Site C has been committed to Aboriginal companies and partnerships, including for clearing, site preparation, security, grass seed supply, wetland mitigation, the project health clinic, substation work and environmental monitoring.
- Further procurement opportunities for Aboriginal companies are planned.

Terminate the Project:

- We are aware that our decision to terminate Site C will affect First Nations that have already signed benefit agreements with BC Hydro related to the project.
- These agreements were negotiated to mitigate significant impacts from the project on First Nations – impacts that will now be avoided or remediated.
- We believe our decision to terminate Site C will ultimately benefit First Nations that would have suffered the heaviest impacts from the project.
- BC Hydro will reach out to First Nations to negotiate a fair and reasonable settlement to withdraw the benefit agreements that will recognize and mitigate any impacts from construction that have already occurred.

V. Influencers:

BCOAP0 *et al*

(No firm position on completing or terminating the project – limit their comments to the review process and evidence that would be of assistance to the BCUC, ensuring public access to BC Hydro data on a range of issues, impact on rates, and First Nations consultation)

Complete or Terminate Project:

- Our decision on Site C is focussed on keeping BC Hydro rates low and affordable for families while ensuring we have the supply of clean, renewable and reliable electricity we will need for the future.
- In addition, our government is committed to freezing BC Hydro rates while we conduct a comprehensive review of BC Hydro to look for further efficiencies that can keep rates low.
- We are also exploring the introduction of a reduced lifeline rate to help low-and-fixed income families that are having difficulty paying their electricity bills.

Confidential Draft Advice

- BC Hydro will continue to offer conservation and efficiency programs that can help all British Columbia families reduce the electricity they consume and lower their monthly bills.

Regarding review process:

- Site C should have been reviewed before the project was ever approved by the previous Government.
- That did not happen, so given that the project was in progress and many lives were on hold, it was necessary for us to complete a BCUC review within a very tight time frame.
- Despite the short time frame, the review provided an opportunity for everyday British Columbians and First Nations to make their voices heard, for experts, analysts and interest groups to comment and present their findings, for BC Hydro to update and present a huge volume of valuable data on the project, and for the BCUC to answer key questions on the project.
- BC Hydro was fully transparent throughout the review process and provided thousands of pages of data, analysis and comment on the project that was posted publicly.
- Despite the tight timelines, over 300 individuals and organizations made written submissions to the BCUC review, and 288 people made oral presentations at a series of community and First Nations public input sessions around the province.
- After the BCUC delivered its final report on the project, our Government met with First Nations directly affected by Site C to hear their views on completing, terminating or suspending the project.
- Based on the results of that engagement, the BCUC review, and other environmental and social considerations, Government has made an informed decision on the Site C project.

B.C. Utilities Commission (BCUC)

Complete or Terminate Project:

- I want to thank the BCUC for completing a complex, comprehensive, open and transparent review of Site C within incredibly tight timelines.
- The review worked as it should – giving the BCUC, Government, and all British Columbians the information, analysis and answers we needed to make the right decision on the project.
- The BCUC's findings and advice on the economic viability of Site C in the context of current electricity supply and demand were key to Government's decision on the Site C project.
- Our decision was further informed by First Nations, environmental and other considerations that were outside the scope of the review.
- Moving forward, the BCUC will continue to provide the oversight we need to ensure British Columbians are assured of a clean, renewable, reliable and affordable supply of electricity that is sourced in a cost-effective, environmentally and socially responsible manner.

VI. Regional:

Local Governments with BC Hydro benefit agreements related to Site C

(Community benefits agreements have been reached with Chetwynd, Taylor, Fort St. John and Hudson's Hope, and a regional legacy benefit agreement was reached with Peace River Regional District.

Complete the Project:

- While Site C will have significant impacts on the people living near the project, it is important to note that BC Hydro has already reached impact benefit agreements with surrounding communities.
- Community agreements have been reached with the District of Chetwynd, District of Taylor, City of Fort St. John, and the District of Hudson's Hope, and a regional legacy benefits agreement has been reached with the Peace River Regional District.
- Under these agreements communities are receiving payments as well as benefits such as rental housing, funding for police resources and various community funds.

Terminate the Project:

- We are aware that our decision to terminate Site C will affect communities that have already signed benefit agreements with BC Hydro related to the project.
- These agreements were negotiated to mitigate significant impacts from the project on people, land and water, and communities – impacts that will now be avoided or remediated.
- We believe our decision to terminate Site C will ultimately benefit communities that would have suffered the heaviest impacts from the project.
- BC Hydro will reach out to communities to negotiate a fair and reasonable settlement to withdraw the benefit agreements that will recognize and mitigate any impacts from construction that have already occurred.

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INFORMATION NOTE

HIGHWAY 29 CACHE CREEK/BEAR FLAT ALIGNMENT

Issue

Concerns have been raised by West Moberly and Prophet River First Nations, as represented by the Nun wa Dee Stewardship Society (Nun wa dee), regarding the tender ready realignment of Highway 29 at the Cache Creek / Bear Flats segment. As such, BC Hydro is exploring the feasibility of two alternate realignment options and will begin notification to Indigenous groups and property owners regarding potential realignment next steps.

Background

- Highway 29 connects Hudson's Hope to Fort St. John and runs along the north side of the Peace River. It is the primary corridor for local residents, commuters, business, industry and emergency responders to Fort St John.
- The Cache Creek/Bear Flat segment of Highway 29 is located approximately 49 kilometres east of the Hudson's Hope town site and 31 kilometres west of Fort St. John. (See Appendix 1: Potential Realignment Options map)
- The creation of the Site C reservoir requires realignment of six segments of Highway 29 over a total distance of approximately 30 km; including at Cache Creek/Bear Flat.
- In consultation with Ministry of Transportation and Infrastructure (MoTI), a temporary detour will be implemented to support the river diversion scheduled for fall 2020. The required in-service date for the permanent realignment is spring 2023 to ensure continuous highway access after the reservoir is created and the dam is operational.
- BC Hydro has an agreement with the MoTI requiring BC Hydro design the realignment of all sections of Highway 29 in accordance to *Ministry Geometric Highway Design Standards* and to fund the realignments. MoTI has agreed to participate with BC Hydro to ensure the realignments meet their standards and to oversee the construction.
- The Environmental Assessment Office (EAO) requires, under the Environmental Assessment Certificate (the Certificate), the alignment and design of the roadway and bridge be built in accordance with the project description provided within Sections 4.3 to 4.5 of the Environmental Impact Statement (EIS). Deviating from the design description requires an amendment to the Certificate and may require technical committee assessment and Indigenous group consultation.
- The Canadian Environmental Assessment Agency's (CEAA) Federal Decision Statement does not include descriptions of the highway alignment nor design. However, the Federal Decision Statement relied on the project description provided in the EIS.
- Additionally, BC Hydro may also required to seek approvals under the other provincial and federal regulatory requirements pertaining to highway realignments involving water crossings or any in-stream works.
- BC Hydro has been working with MoTI to develop potential realignment options that meet required geometric specifications to ensure the safety of the travelling public and reduce the potential for erosion or washout over the life of the highway while minimizing impacts to Indigenous groups' and property owners' interests.
- BC Hydro has also consulted robustly with Indigenous groups on the highway realignment contained within the Environmental Impact Statement (including the realignment of the Cache

INFORMATION NOTE
HIGHWAY 29 CACHE CREEK/BEAR FLAT ALIGNMENT

Creek section) through meetings, communication forums, permitting forums, public consultation periods and the Cultural and Heritage Resource Committee.

- In late 2016/early 2017, BC Hydro acquired land and rights from eight property owners in the Cache Creek and Bear Flat area for the tender ready realignment of Highway 29, most by voluntary agreement. Land ^{s.22} and rights were expropriated from two property owners, ^{s.22}
- In summer 2017, the MoTI, under the approval of BC Hydro, tendered the realignment of the 8.5km segment of Highway 29 at Cache Creek / Bear Flats.
- During tender, the Nun wa dee filed a complaint with the EAO regarding the proximity of the western bridge approach to asserted burial areas and the western road alignment to an existing sweat lodge located on private property.

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- Subsequently MoTI cancelled the tender and BC Hydro has developed two potential realignment alternatives to in response to the concerns of Indigenous groups. They are:
 - Option 1: Modified Alignment Still within the EA Certificate Area**
 - Option 2: Modified Alignment Outside EA Certificate Area**(See Appendix 1: Potential Realignment Options Map Highway 29 Cache Creek)
- Each option was assessed based on the following estimated direct costs, mitigation of Indigenous groups' concerns, property impacts, alignment with regulatory approvals and schedule implications. (Direct cost estimates do not include MoTI oversight of construction, MoTI material supply, nor contingency but does provide a range of estimate accuracy.)

Key Impacts	Summer 2017 Tendered Alignment / Modified Bridge Design	1. Modified Alignment / Design Still within the EA Certificate Area	2. Modified Alignment Outside EA Certificate Area
Design	s.13,s.17		
Direct Cost Estimate			
Mitigation of Indigenous			

INFORMATION NOTE
HIGHWAY 29 CACHE CREEK/BEAR FLAT ALIGNMENT

Key Impacts	Summer 2017 Tendered Alignment / Modified Bridge Design	1. Modified Alignment / Design Still within the EA Certificate Area	2. Modified Alignment Outside EA Certificate Area
Groups' Concerns			
Properties			
EAO / CEEA Regulatory Approvals			
Indigenous group and Public Consultation Required			
Schedule			

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INFORMATION NOTE
HIGHWAY 29 CACHE CREEK/BEAR FLAT ALIGNMENT

Key Impacts	Summer 2017 Tendered Alignment / Modified Bridge Design	1. Modified Alignment / Design Still within the EA Certificate Area	2. Modified Alignment Outside EA Certificate Area
	s.13,s.17		
Completion Date			

Option 1: Modified Alignment Still within the EA Certificate Area

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INFORMATION NOTE**HIGHWAY 29 CACHE CREEK/BEAR FLAT ALIGNMENT****Option 2: Modified Alignment Outside EA Certificate Area**

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Additional considerations

If BC Hydro is denied permission to enter private properties for the field studies and investigations, as well as for valuation inspections, BC Hydro will rely on the powers of entry under section 9 of the *Expropriation Act* to ensure the schedule can continue to be met. These investigations are required for the purposes of determining the location of the proposed works in Cache Creek and to complete an appraisal of the land, which fit within the authority of section 9 of the *Expropriation Act*. Use of this statutory provision is not itself an expropriation; it is simply a way to ensure BC Hydro can enter onto land to complete the necessary field studies and investigations.

Given the concerns of the Nun wa dee regarding the tender ready alignment, BC Hydro intends to undertake field studies and further engineering works on the two potential alternate realignments to confirm the feasibility, design requirements and costs. This will require access to private properties as soon as possible.

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INFORMATION NOTE
HIGHWAY 29 CACHE CREEK/BEAR FLAT ALIGNMENT

Proposed Next Steps

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INFORMATION NOTE
HIGHWAY 29 CACHE CREEK/BEAR FLAT ALIGNMENT

Appendix 1: Realignment Option Map Highway 29 Cache Creek

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Site C Indigenous Relations Information and Background

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Site C

Highlights:

- The BCUC delivered its final report on the Site C review on November 1st.
- The BCUC assumed that the cost of Site C would rise to \$10 billion and that BC Hydro's low load forecast was the most realistic scenario.
- The BCUC assembled their own alternate energy portfolio based on wind power and significant demand management.
- Based on these assumptions they found that there is little difference in impact on ratepayers between proceeding with Site C or cancelling and building alternate energy.
- The BCUC notes that this could change significantly if the costs of Site C increase further up to \$12 billion (favouring alternate) or if electricity demand increases beyond the low load forecast (favouring Site C).

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Background:

- The report finds that suspending the project and restarting later would greatly increase costs and this is not a recommended option.
- The report concludes that based on an assumption of a \$10 billion cost for Site C, and the use of BC Hydro's low load forecast scenario, when compared with the BCUC's alternative energy portfolio, either option would have very similar impact on ratepayers.
- However their sensitivity analysis finds that if project costs increase to \$12 billion (as was noted was a possibility by Deloitte), it would be significantly lower cost to cancel Site C and build an alternative portfolio.
- Conversely, if electricity demand rose in line with BC Hydro's medium load forecast, it would be significantly cheaper to proceed with Site C.
- BCUC estimates that costs of terminating the project and remediating the site would be \$1.8 billion and accepts BC Hydro's estimate that \$2.2 billion will have been spent by year end.
- BCUC questions BC Hydro's load forecasts and assumptions underlying their cost estimate of alternative energy portfolios.
- The BCUC has adopted BC Hydro's low load forecast as the most realistic.
- The BCUC developed their own alternative energy portfolio for analysis based on wind power, demand-side management, and industrial load curtailment.
- During the process, BC Hydro filed new information indicating that the project was a year behind their construction schedule and will cost an additional \$610 million – bringing the total cost to \$8.95 billion according to BC Hydro
- The BCUC projects that \$10 billion is a more realistic final cost for the project.
- BCUC also indicated that there are further risks to cost and schedule that could increase final costs beyond \$10 billion.
- The panel received 620 written submissions and more than 300 people made presentations at community and First Nations public input sessions around the province.
- Ministers Mungall and Fraser will be meeting with First Nations in mid-November.