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BC's energy future: Ensuring a comprehensive assessment of Site C Dam

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Issue

The Government of British Columbia (BC) has announced that it has advanced the Site C dam project to the third stage of development. The third stage is the final consultation phase involving regulatory and environmental assessment that will take up to two years to complete. Site C will be the third dam on the Peace River, downstream from the existing WAC Bennett and Peace Canyon dams. Part of the BC government's rationale for Site C is that it will help ensure that BC can meet growing energy demands while also achieving energy self-sufficiency goals by 2016.[i] It is expected to cost at least $6 billion to build.

As of Fall 2010, BC Hydro finalized decisions about the framework for Stage 3 evaluations including the following:

1. Refining and updating the historic project design to reflect current environmental, seismic and safety guidelines.
2. Advancing environmental and socio- economic studies from baseline work to impact assessment, including measures to avoid or mitigate impacts.
3. Consulting with the public, communities, Aboriginal groups and property owners, as well as the Province of Alberta and the Northwest Territories.
4. Preparing to enter a formal environmental assessment process.

Stage 3 provides an optimal time for the BC Government and BC Hydro to identify critical gaps. This brief will examine the Stage 1 and 2 evaluations, identify gaps and make recommendations on elements to be included in Stage 3, particularly in regard to point 2. This should yield a comprehensive and transparent decision-making process in the evaluation of Site C.

Background

According to the BC government, the construction of Site C dam will help to meet growing energy demand by providing reliable electricity 24 hours a day, 365 days a year;[ii] or enough to power approximately 410,000 homes in BC a year.[iii] BC Hydro projects increased future demand that will require BC's electricity supply to grow by 20-40% over the next 20 years.[iv] A significant portion of this growth will be addressed through demand-side management in the form of conservation efforts. In addition, in 2008 the BC Utilities Commission approved the sections of the BC Hydro Long Term Acquisition Plan (LTAP) pertaining to Site C[v], citing reliability, dependability and flexibility as key characteristics of Site C's attractiveness to help meet future electricity demand[vi]. The LTAP also noted that Site C would provide a low-cost source of electricity, resulting in economic benefits to customers compared to other resource alternatives[vii].

To date, BC Hydro feasibility studies and reports conducted during Stages 1 and 2 have addressed specific areas of concern including studies relating to: 1) climate and greenhouse gas emissions of the dam[viii] [ix], 2) aboriginal consultation and engagement[x], and 3) properties and Highway 29 consultation.[xi] Greenhouse gas (GHG) analyses indicate there will be minimal GHG emissions associated with the dam once it is operational and over its operating life of 80-100 years.[xii] As of January 2011, four field studies have been undertaken in Stage 3 including baseline climate monitoring in the Peace River Valley.[xiii] While some useful information is provided[xiv], there are considerable gaps in the analysis that need to be addressed during Stage 3 for the overall assessment to be comprehensive and transparent.

Recommendations

Stage 3 needs to recognize existing informational and transparency gaps that will help build the credibility of the project under new climate policy initiatives. These gaps need to address the following issues:

1. Land-use assessment

A comprehensive land-use assessment has been identified as necessary (in previous Site C assessments) in order to evaluate the potential opportunity costs for the 2066 hectares of Classes 1 and 2[xv] agricultural land[xvi] (a significant portion of which is in the ALR) to be flooded. In a 1991 study, BC Hydro states:

> For an application to be defensible, an assessment of both the immediate and long-term impacts of the Site C development on agriculture will be needed. This should include both the direct effects (loss of farmable area to the reservoir) and indirect effects (property segmentation, potential climate effects, slumping and safe line issues, etc). This evaluation should be based not on current cropping patterns, but on land values which reflect the highest use to which the land could be put assuming agricultural management decision-making in the absence of the threat imposed by the flood reserve for a proposed dam project.[xvii]

Such an assessment has not been done. In fact, the land-use information used in these assessments is based on survey information from a 1979 report (which was intended to be updated but has not been) that suggests agricultural impacts would represent a 32% loss of prime agricultural land in the valley.[xviii] The land to be flooded by the Site C reservoir is part of a significant area of the Agricultural Land Reserve (ALR)[xix] and requires careful treatment, particularly as viable agricultural lands are likely to become even more critical to northern BC under future climate projections. As a result, an updated assessment of the land-use, ecosystem, and food security implications of Site C under a 100-year planning horizon that

explicitly includes climate change projections needs to be included.[xx] BC Hydro has indicated that no decision has been made regarding these types of assessments for Stage 3.[xxi]

2. Transparency of use and assessment of options

There is a need for further transparency in regards to a) the intended use of electricity from Site C and b) comparative studies regarding options for alternative energy sources.

a) Intended use of the electricity from Site C

Explicit reference to the use of the additional energy provided by Site C is important for at least two reasons. While Site C is being built for BC Hydro's domestic "firming and shaping" mission, increased energy export is a likely outcome of the Clean Energy Act's mission to be "a net exporter of electricity from clean or renewable resources".[xxii] As a result, it is necessary to consider and address the standards of our largest energy importer, California. California's energy standards require 33% of total state energy to come from renewable energy by 2020; renewable energy standards are defined as energy generated from sites under 30MW.[xxiii] However, within BC's current energy generation grid, it remains difficult to track and monitor the transmission of energy from site of generation to final destination or use. In future, more adequate tracking, monitoring, and reporting will be required to advance the export potential of renewable portfolio standard premiums from BC to California.

If the Site C decision is intended to meet the self-sufficiency targets by 2016, and provide "firming and shaping" in the energy grid, [xxiv] especially during lulls in domestic use, there may be alternatives that have not been adequately explored that could provide more desirable long-term opportunities for energy exports at premium prices.

b) Alternative energy options

Current available information has not alleviated concerns of the opportunity costs associated with Site C for considering long-term energy generation options, particularly under the province's clean energy mandate. There is no question that Site C is a good option for the province to meet short-term energy goals; however, the timeline for Site C to be operational is 10-12 years. Thus, a question that must be addressed is: in 12 years how likely is it that improvements in alternative energy and smart grid technologies will make distributed energy sources more attractive than Site C as a way to increase provincial resilience and to kick start a diversified green energy economy? For instance, rapid advancements in solar and wind technologies are making renewable energies more economically viable, potentially making these alternatives desirable over the same period of time. Moreover, consideration is needed for the additional value that future firming power from Site C will provide to the BC grid as more intermittently-generating renewables —particularly wind power— come on line.

While alternative energy options were identified in Stage 2[xxv], the various options were considered on a discrete, qualitative basis.[xxvi] What is needed rather is a rigorous mapping process, outlining viable and integrated small-scale renewable energy opportunities in the province, estimations of gigawatt hours (GWh) of electricity produced per year (including issues of intermittency), and the potential of an integrated, smart grid technology to provide "firming and shaping" within the system. Integrated sites such as Whistler's Fitzsimmons Creek produces 32 gigawatt hours of electricity annually, enough to power 3,200 homes each year,[xxvii] and over the long-term may contribute to long-term resilience under climate projections (e.g. increased storm events have had significant impacts on centralized generation systems).

Using alternative climate change and energy scenarios as a decision support tool would significantly enhance the multifaceted aspects of such long-term energy decisions. Caution must be used against the path dependency created by large-scale heritage infrastructure in BC, and particularly the 30-year history of Site C as an optimal energy site. Current and future alternative energy potentials must be treated as a viable and quantifiable policy alternative to Site C, particularly in regard to current energy and climate goals and the opportunities/uncertainties that alternative climate futures pose.

Conclusion

Moving forward on Site C requires a transparent and clear demonstration of a comprehensive assessment that contributes to BC's energy planning and climate change future. BC Hydro has been planning this site for three decades and has invested an estimated $100 million to date, including $41 million for the Stage 2 consultation phase (representing only 1.6% of the total project cost), including investments in substantial land acquisitions over an extended period of time (the Crown and BC Hydro currently own 4,980 hectares in the Site C flooded impact area, an equivalent of 93% of flooded land area).[xxviii] It is imperative that a comprehensive assessment that integrates the multiple criteria above be completed in Stage 3 in order to provide the robust analysis necessary to inform this $6 billion decision. This type of analysis will also provide necessary transparency and political legitimacy to the government's decision and clarity on what are currently mixed signals regarding energy planning, emissions reductions, and climate change in BC.

Further Reading

Government of British Columbia, Ministry of Energy, Mines and Petroleum, 2007. BC Energy Plan http://www.energyplan.gov.bc.ca/PDF/BC_Energy_Plan.pdf

BC Hydro, Site C Reports: Document Centre. http://www.bchydro.com/planning_regulatory/site_c/document_centre.html

BC Hydro, 'Site C Clean Energy Project: Building on the Power of BC': http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010Q2/site_c_clean_energy.Par.0001.File.Site_C_Clean_Energy_Project.pdf

Globe and Mail. April 26, 2010. 'When green isn't green enough' by Mark Hume: http://www.theglobeandmail.com/news/national/when-green-isnt-green-enough/article1546590/

Sierra Club of BC, 2010. 'Site C Decision "Misguided"': http://www.sierraclub.bc.ca/campaign-spotlights/flood-this/

David Suzuki Foundation, April 19, 2010. Press Release - Protecting the Peace: DSF statement on B.C.'s Site C project': http://www.davidsuzuki.org/media/news/2010/04/bcs-site-c-project-statement/

Sources

[i] Government of BC, Bill 17 — 2010, Clean Energy Act: http://www.leg.bc.ca/39th2nd/1st_read/gov17-1.htm

[ii] The dam is projected to add dependable clean energy capacity to the provinces stock; providing approximately 900 megawatts (MW) of capacity and about 4,600 gigawatt hours (GWh) of electricity each year.

[iii] BC Hydro, 2009. Peace River Hydro Project: Potential Source of Clean, Renewable and Reliable Power for Generations – Stage 2 Summary Report: http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010Q2/stage_2_summary_report.Par.0001.File.Stage_2_Summary_Report.pdf

[iv] BC Hydro, 2009. Peace River Hydro Project: Potential Source of Clean, Renewable and Reliable Power for Generations – Stage 2 Summary Report. http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010Q2/stage_2_summary_report.Par.0001.File.Stage_2_Summary_Report.pdf

[v] BC Hydro, 2008, Long-Term Acquisition Plan: http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/iep_ltap/2008_ltap_application.Par.0001.File.2008_ltap_application.pdf

[vi] BC Hydro, 2008, Long-Term Acquisition Plan

[vii] BC Hydro, 2008, Long-Term Acquisition Plan

[viii] Preliminary GHG Emissions Estimate from Construction Materials – Site C Hydro Project: http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010Q2/preliminary_ghg_emissions0.Par.0001.File.Preliminary_GHG_Emissions_Estimate_From_Construction_Materials_Site_C_Hydro_Project.pdf

[ix] BC Hydro 2009. Stage 2 Consultation and Technical Review (p. 92): http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010Q2/stage_2_report_-_consultation.Par.0001.File.Stage_2_Report_Consultation_and_Technical_Review.pdf

[x] Treaty 8 First Nations Report on Stage 2 Consultation: http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010Q2/treaty_8_first_nations.Par.0001.File.Treaty_8_First_Nations_Report_on_Stage_2_Consultation.pdf

[xi] BC Hydro, 2009. Stage 2 Report: Consultation and Technical Review (p. 24)

[xii] BC Hydro, 2009. Stage 2 Report: Consultation and Technical Review http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010Q2/stage_2_report_-_consultation.Par.0001.File.Stage_2_Report_Consultation_and_Technical_Review.pdf

[xiii] BC Hydro 2011. Field Studies Information Sheet. Site C Clean Energy Project. See 'Climate Monitoring in the Peace River Valley. http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010q4/january_field_study.Par.0001.File.January_Field_Study_Notice_2011.pdf

[xiv] Consultations with First Nations have raised concerns about the cumulative effects of past and current hydroelectric projects on the region, and impacts from other industries as well (e.g., oil and gas, mining).

[xv] Class 1 agriculture land has optimum potential for a full range of crops, and Class 2 land can support a wide range of crops, with some restrictions.

[xvi] BC Hydro and Power Authority, System Engineering Division, 1980, Peace Site C Project Environmental Impact Statement, Part 2A (p.7-2): http://www.bchydro.com/etc/medialib/internet/documents/policies/pdf/sitec_0903_site_c_environmental_impact_statement_part_two.Par.0001.File.sitec_0903_site_c_environmental_impact_statement_part_two.pdf

[xvii] BC Hydro, 1991, Agricultural Resources Inventory: Status of Information and Recommendations for

Further Study: http://www.bchydro.com/etc/medialib/internet/documents/info/pdf/site_c_-_agricultural.Par.0001.File.12Site_C_Agricultural_Resources_Inventory_Status.pdf

[xviii] BC Hydro and Power Authority, System Engineering Division, 1980, Peace Site C Project Environmental Impact Statement, Part 2A (p.7-2).

[xix] The ALR was enacted to stop the loss of prime agricultural land throughout the province in 1973. The Provincial government introduced BC's Land Commission Act on April 18, 1973 and through cooperative efforts with regional districts and member municipalities it protected 4.7 million hectares (5% of the province) of agricultural land by 1976. Agricultural Land Reserve: http://www.alc.gov.bc.ca

[xx] BC Hydro, December 2007. Site C Feasibility Review: Stage 1 Completion Report (p. 50) http://www.bchydro.com/etc/medialib/internet/documents/policies/pdf/site_c_site_c_feasibility_review_stage_1_completion_rep1.Par.0001.File.site_c_site_c_feasibility_review_stage_1_completion_rep1.pdf

[xxi] Personal communication. BC Hydro Site C Regulatory Unit (July 8, 2010).

[xxii] Government of BC, Bill 17 — 2010, Clean Energy Act

[xxiii] Government of California, 2006, Renewable Energy Development Plan – Appendix A Renewable Resource Development Roadmap (p.19): http://www.energy.ca.gov/2008publications/CEC-500-2008-091/CEC-500-2008-091-APA.PDF

[xxiv] Personal communication. BC Hydro Energy Planning Unit (June 25, 2010).

[xxv] BC Hydro 2009. Stage 2 Consultation and Technical Review (p. 92): http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010Q2/stage_2_report_-_consultation.Par.0001.File.Stage_2_Report_Consultation_and_Technical_Review.pdf

[xxvi]BC Hydro. 2010. Backgrounder Site C Clean Energy Project. See “Supporting the Development of Clean Energy Projects” section. http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010Q2/site_c_backgrounder.Par.0001.File.Site_C_Backgrounder_6_2_2010.pdf

[xxvii] Martin Michelle, 2010. Whistler project an example of BC’s green energy potential. BC Hydro News of the Week, September 14, 2010. http://www.bchydro.com/news/press_centre/media_updates/fitzsimmons_creek_power.html

[xxviii] Peace River Site C Hydro Project – Consultation Summary Report: http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010Q2/peace_river_site_c1.Par.0001.File.Peace_River_Site_C_Hydro_Project_-_Consultation_Summary_Report_-_Property_Owner_Consultation_on_Potential_Highway_29_Realignment_Options.pdf