RESPONSE TO WORKING GROUP AND PUBLIC COMMENTS ON THE SITE C CLEAN ENERGY PROJECT ENVIRONMENTAL IMPACT STATEMENT

Technical Memo

DEMAND-SIDE MANAGEMENT

MAY 8, 2013

Subject: Demand-Side Management

Purpose

A number of comments received during the Comment Period raise the question of whether BC Hydro could pursue additional Demand Side Management (**DSM**) to delay or avoid the need for the Project. The purpose of this Technical Memo is to summarize the level of DSM that is reflected in the evaluation of need, and the treatment of additional DSM as a potential alternative to the Project.

Project Need: BC Hydro's DSM Target

Section 5.2 of the EIS describes the analysis of the need for the Project. As described in the Technical Memo on Project Need, the need for the Project is established based on demand from BC Hydro's residential, commercial and industrial customers. Once the load forecast is established, BC Hydro develops energy and capacity load-resource balances (**LRBs**) to determine if there is a gap between customer demand and expected resources. This results in the energy and capacity LRBs set out in tables 5.6 and 5.7 of the EIS. The topic of how to meet the gap between demand and resources after taking into account the current DSM target is addressed in the Technical Memo on Alternatives.

One of the components of the energy and capacity LRBs is the level of future DSM savings that BC Hydro believes are achievable and cost-effective. DSM is BC Hydro's preferred resource and as a result it is the first resource looked at to address the gaps depicted in tables 5.6 and 5.7 of the EIS.

BC Hydro DSM Target

The current DSM target is 7,800 gigawatt hours per year (**GWh/year**) of energy savings, which is expected to also deliver 1,400 megawatts (**MW**) of capacity savings by F2021. A description of BC Hydro's current DSM savings target, together with the reasons for choosing the DSM target, are found in section 5.2.2.2 of the EIS.

Subsection 2(b) of the B.C. *Clean Energy Act* provides that it is a "British Columbia's energy objective" to "take demand-side measures and to conserve energy, including the objective of [BC Hydro] reducing its expected increase in demand for electricity by the year 2020 by at least 66% …". BC Hydro's current DSM target of 7,800 GWh/year exceeds the *Clean Energy Act*'s target of "at least 66%"; the current DSM target would reduce BC Hydro's forecasted demand for energy by 78% in F2021.

The current DSM target is a significant step up from DSM targets BC Hydro pursued prior to 2009. The forecast average annual energy growth rate for the BC Hydro system without liquefied natural gas (**LNG**) is 2.2% between F2012 to F2022 (refer to table 5.1 of the EIS). With the implementation of the DSM target, BC Hydro forecasts annual energy system demand growth of about 0.8% per year (again without LNG).

The current DSM target is comprehensive; it "includes a broad range of codes and standards, rate structures, and programs that provide BC Hydro customers in virtually all market segments with an opportunity to participate" (EIS, p. 5-13). The current DSM target is aggressive. For example, without

further DSM there is a need for new energy resources in F2017 (table 5.6), but with the implementation of BC Hydro's current DSM target, the need for new energy resources is pushed out by 7 years to F2024 (table 5.8). In other words, with BC Hydro's current DSM target, there will be no need for new energy resources for a 7 year period, and a reduced need for energy new resources after that timeframe.

DSM Delivery Risk

BC Hydro must balance DSM's relatively low cost and environmental benefits against DSM delivery risk (the risk that forecasted DSM energy and capacity savings do not materialize). BC Hydro believes that the DSM target strikes the appropriate balance between these factors. Information concerning DSM delivery risk is found in section 5.2.3 of the EIS.

BC Hydro has a legislated service obligation under the B.C. *Utilities Commission Act* (refer to p. 5-3 of the EIS), and the consequences of DSM not delivering the anticipated capacity savings in particular are significant. While generally external markets can be counted on to supply some amount of energy across the year with associated costs, it may not be possible to secure capacity from the external market during winter peaks for one or more of the following reasons:

(1) the illiquid (thinly-traded) nature of the market for capacity

(2) insufficient transmission capacity

(3) the U.S. market not having a surplus to sell

Consistent with good utility practice and prior British Columbia Utilities Commission (**BCUC**) decisions, BC Hydro develops Contingency Resource Plans because the consequences of not being able to meet customer demand at the peak load could be severe. Refer to table 5.12 and pages 5-20 and 5-21 of the EIS for a description of BC Hydro's Contingency Resource Plans.

The BCUC is the regulator that reviews expenditures associated with the current DSM target, and has the authority under section 44.2 of the *Utilities Commission Act* to approve, reject, approve in part or reject in part these expenditures.

Past performance with respect to meeting past DSM targets is not likely to be indicative of the delivery risk associated with the current DSM target because the current DSM target is a significant step up from DSM targets BC Hydro set before 2009. Given BC Hydro's reliance on the current DSM target to deliver 1,400 MW of dependable capacity savings in about an eight year timeframe, there is a greater adverse consequence if the response to DSM programs and other initiatives is less than anticipated, as compared to a scenario where the response is greater than anticipated.

DSM Options Considered in the EIS

The need for the Project is based on among other things BC Hydro's current DSM target; refer to section 5.2.2.2 and tables 5.8 and 5.9 of the EIS. In the EIS there are four alternatives to the current DSM target - DSM Options 1, 3, 4 and 5. The alternatives described in the EIS are generally equivalent to the DSM Options 1, 3, 4 and 5 as described in BC Hydro's 2010 Resource Options Report, and included in BC Hydro's draft Integrated Resource Plan of May 2012. Differences are generally due to a

change from presenting savings with a different base year for calculation of savings. Please note that for the purposes of the EIS the options described in Section 5.2.2.2 of the EIS update and replace the DSM options described in the 2010 Resource Options Report**.**

The alternative DSM options considered in the EIS are as follows:

- DSM Option 1 is described at pages 5-19 and 5-20 of the EIS. The savings associated with DSM Option 1 are lower than the current DSM target – 7,500 GWh/year of energy savings and 1,200 MW of capacity savings by F2021
- DSM Option 3 is described at page 5-20 of the EIS, and is expected to deliver 9,200 GWh/year of energy savings and 1,400 MW of dependable capacity savings in F2021. DSM Option 3 is addressed below
- DSM Options 4 and 5 are described at section 5.4.2.3 of the EIS. DSM Option 4 targets 9,500 GWh/year of energy savings and 1,500 MW of dependable capacity savings by F2021; the corresponding figures for DSM Option 5 are 9,600 GWh/year of energy savings and 1,600 MW of dependable capacity savings by F2021. DSM Options 4 and 5 are described in further detail below

Potential DSM Alternatives to the Project: DSM Option 3

The EIS concludes on page 5-20 that DSM Option 3 *on its own* is not an alternative to the Project because if BC Hydro were to implement DSM Option 3 instead of the current DSM target, the effect would be to: (1) defer the need for energy set out in table 5.8 for five years; and (2) not defer the need for capacity set out in table 5.9. DSM Option 3 must be combined with supply side resources to meet the need for the Project and to be considered an alternative. The supply side resources would be composed of resources similar to the portfolios described in Section 5.5.4.1 of the EIS.

Potential DSM Alternatives to the Project

The EIS review of potential alternatives to address the energy and capacity gaps shown in tables 5.8 and 5.9 of the EIS after implementation of the current DSM target (and after implementation of Revelstoke Unit 6, a BC Hydro Resource Smart generation project described in the EIS at page 5-14) is found in sections 5.4 and 5.5 of the EIS.

BC Hydro does not rely on resources that are not viable in its portfolio analysis. Therefore, the first step in the EIS review of potential alternative resources is to determine if the particular resource is viable or not.

BC Hydro identified and analyzed two categories of potential DSM options in sections 5.4.2.3 and 5.4.2.4 of the EIS:

- The first category consists of DSM Options 4 and 5 which entail levels of DSM beyond the current DSM target, and which like the current DSM target are anticipated to deliver both energy and capacity
- The second category are DSM options specifically designed to deliver dependable capacity savings during BC Hydro's peak load periods, and are addressed at the end of this memo

DSM Options 4 and 5

Section 5.4.2.3 of the EIS provides the GWh/year and MW of anticipated savings (which are also set out above in this memo) as well as the uncertainties associated with DSM Options 4 and 5. DSM Option 5 is the most aggressive potential DSM option BC Hydro has identified. The effect of DSM Option 5 would be to essentially reverse load growth over about a 20 year period such that there would be no need for new energy resources until F2031.

BC Hydro is of the view that DSM Options 4 and 5 are not viable alternatives to the Project for the reasons set out in section 5.4.2.3, specifically:

- DSM Options 4 and 5 present government and customer acceptance issues arising from BC Hydro's reliance on aggressive and untested tactics. Implementing either DSM Option 4 or DSM Option 5 would require the "mobilization of the full suite of DSM tools" applied in combination with a number of tools employed by governments and other entities. For example, as described at page 5-35 of the EIS, DSM Option 5 would require
- BC Hydro rate structures with aggressive pricing that with the exception of smaller residential customers, would expose all BC Hydro customers to either efficiency-based rates and/or "to marginal cost price signals"
- Provincial and Federal Government codes and standards; "significant government intervention and regulation" at all levels of society; industry buy-in to facility energy efficiency certification undertaken by government(s) if industry wants access to embedded cost Heritage hydroelectricity, which in turn may require re-opening the Heritage Contract; buildings must be net-zero consumers of electricity; smaller and more efficient housing and building footprints, etc.
- DSM Options 4 and 5 entail significant delivery risk, especially with respect to capacity savings, and could jeopardize BC Hydro's ability to serve its customers

For these reasons, it is not prudent for BC Hydro to rely on either DSM Option 4 or Option 5 to address the energy and capacity gaps shown in tables 5.8 and 5.9 of the EIS.

DSM Capacity Initiatives

The second category of potential DSM alternatives to the Project are DSM capacity initiatives, which are described in Section 5.4.2.4. In contrast to the current DSM target and DSM Options 3, 4 and 5, the DSM capacity initiatives - industrial customer load curtailment and capacity programs - specifically target capacity savings. On their own, these DSM capacity initiatives are not an alternative to the Project, and would need to be combined with additional supply-side options to meet the identified need.

As described on page 5-36 of the EIS, BC Hydro had a load curtailment offer in place from 2007 to 2010 to seek demand reduction options from large industrial customers during the winter (November to February) as an operational resource option in the event of short term capacity constraints. The load curtailment options are associated with operational opportunities in customer's existing industrial processes given operational capacity and market conditions. There are restrictions on how much advance notice is required, how long the periods of curtailment can last, how frequent and how many curtailment requests are acceptable each winter, and how many years the customers are willing to

commit. As a result, of the roughly 400 MW of capacity contracted, there was approximately 56 MW available for F2012 and F2013.

For a capacity option to be considered for long term planning it must be dependable. Given the restrictions imposed on the load curtailment options contracted, they are not considered dependable. For industrial load curtailment to be available as a long term planning option, it would require customer capital investment in infrastructure to allow for interruption of operation as and when required.

BC Hydro concludes that the DSM capacity initiatives are not viable alternatives to the Project for the reasons set out in section 5.4.2.4. Industrial customer load curtailment programs that entail a long-term commitment by the industrial customer to interrupt operations as and when required and DSM capacity programs are BC Hydro's first major exploration of these types of potential DSM initiatives, and as a result experience will need to be gained to increase the certainty of the anticipated capacity savings.

Summary

DSM is BC Hydro's preferred resource and as a result it is the first resource looked at to address gaps between customer demand and available supply. The need for the Project is based on BC Hydro's comprehensive and aggressive DSM target, which is expected to defer the need for additional resources by seven years.

BC Hydro reviewed additional DSM options that provided additional energy and capacity savings as part of the analysis of alternatives to determine the appropriate balance between DSM's relatively low cost and environmental benefits against the risk that forecasted DSM energy and capacity savings do not materialize. The additional DSM options present government and customer acceptance issues, and entailed a significant level of delivery risk. As a result, BC Hydro concluded that the current DSM target was appropriate.

Related Comments / Information Requests:

This technical memo provides information related to the following Information Requests:

pub_0438-021	pub_0478-002	pub_0478-003	pub_0478-004	pub_0535-002
pub_0574-001	pub_0605-014	pub_0605-016	pub_0605-024	pub_0605-033
pub_0605-034	pub_0605-035	pub_0641-001	pub_0855-001	pub_0862-001
pub_0863-001	pub_0965-001	pub_0999-001	ab_0001-033	ab_0001-055
ab_0001-056	ab_0001-061	ab_0001-082	ab_0001-084	ab_0001-086
ab_0001-087	ab_0001-088	ab_0001-089	ab_0001-091	ab_0001-119
ab_0001-142	ab_0005-013			