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1.0 Acronyms

BCH ............BC Hydro
BCUC ..........British Columbia Utilities Commission
CPR ..........Conservation Potential Review
DSM ..........Demand-Side Management
GHG ..........Greenhouse Gas
IEP ..........Integrated Electricity Plan
IPPs ..........Independent Power Producers
JIESC .........Joint Industry Electrical Steering Committee
LTAP ..........Long-Term Acquisition Plan
OIC ............Order in Council
UEC ..........Unit Energy Cost

2.0 Background

BC Hydro is currently undertaking the development of the 2008 LTAP.
The event held on March 5th was organized by BC Hydro’s Energy Planning group and brought together intervenors and other parties interested in the 2008 LTAP. This event was the second session for intervenor engagement and focused on a description of key LTAP inputs including resource options update for demand-side management and Site C, the electricity and gas price forecast, and the greenhouse gas offset price forecast. An introduction of the risk framework to be used in conjunction with the portfolio analysis was also presented.

3.0 Attendance

In attendance at this session were 30 individuals (names are not disclosed due to privacy policy) that included members of various intervenor groups. This session was sponsored by BC Hydro and representation on BC Hydro’s behalf included:

- Anne Wilson, Stakeholder Engagement, Energy Planning (Coordinator)
- Cam Matheson, Director, Energy Planning (Presenter)
- Michael Savidant, Commercial Manager, Site C Project (Presenter)
- John Duffy, Manager, DSM Policy and Strategy (Presenter)
- David Ince, Manager, Market Forecasting (Presenter)
- Patrice Rother, Manager, Environmental Strategy (Presenter)
- Basil Stumborg, Senior Business Strategy Advisor (Presenter)
- Randy Reimann, Manager, Resource Planning (Presenter)

4.0 Meeting Purpose

- To provide a description to key LTAP inputs
- To provide an introduction to the risk framework to be used for the LTAP analysis
- To solicit comments and views to the LTAP inputs and risk framework
5.0 Presentation Overview

Anne Wilson introduced the speakers for this session and described the process of collecting comments and workshop documentation. Presentations began with Cam Matheson who provided the background and context for the 2008 LTAP, which included considerations resulting from the BCUC Decision on the 2006 IEP/LTAP and the 2007 Energy Plan. Michael Savidant and John Duffy provided updates on the Site C project and Demand-Side Management Plan, respectively. David Ince provided a description of the gas and electricity price forecast and Patrice Rother provided a description of the Greenhouse Gas Offset Price Forecast which will be used for the 2008 LTAP analysis. Basil Stumborg introduced the risk framework and a description of how it will bring insight to the LTAP analysis. Randy Reimann provided closing remarks for the day.

The presentation and reading materials provided for this session are available on the 2008 LTAP Intervenor Workshops webpage.

6.0 Summary of Discussions

The following section provides a summary of discussions held during or after each presentation.

6.1 Overall LTAP Context and Workshop Components

(Cam Matheson, BC Hydro presenter)

During this presentation, workshop participants expressed interest in the state of the load forecast and how recent economic developments and advancement of new technology such as electric cars can impact future load growth in the Province. Risk and uncertainties associated with future developments in major industrial sectors were also discussed in relation to long-term resource planning.

- DIRECTION OF LOAD FORECAST: The state of the load forecast and load-resource balance are still undergoing internal management review and approval, and are expected to be reviewed at the April workshop. Generally the forecast growth in industrial load has reduced, but the magnitude is still under review.

- INDUSTRIAL LOAD UNCERTAINTIES: Uncertainty in mine developments and the forestry sectors are major issues that will be considered in the load forecast.

- ELECTRIC CARS: At this time there is not enough hard evidence regarding plug-in hybrid vehicle use to consider it as a major driver for future demand although some impact can be expected. If plug-in vehicles become a substantial volume and used at peak times (for example, after work), this can exacerbate an already tight capacity scenario.

- SHORT-TERM vs. LONG-TERM TRENDS: Planning in support of a long-term acquisition plan will need to consider the long-term view rather than reacting only to short-term events should as mill closures. A major consideration is to distinguish between regular economic cycles from more fundamental changes.

6.2 Resource Options Update - Site C

(Michael Savidant, BC Hydro presenter)

Most of the discussions following this presentation were related to the cost for the Site C project. Participants were interested in how recent changes by government such as the water rental rate increase and the introduction of deemed equity in the Heritage Special Direction HC2 would impact costs. Other issues such as project life, depreciation, and other large hydro options were discussed.
• **COST IMPACT DUE TO MANDATED CHANGES:** Since the Stage 1 project cost estimates were established there have been two Orders in Council (OIC) issued, an increase in water rentals and an equity definition change with respect to the Heritage Special Direction HC2 that could impact BC Hydro’s cost for Site C. One participant suggested that the total impact could be a cost increase of about $24/MWh. It is expected that cost estimates for Site C will be updated at the end of Stage 2 to account for new information, including announcements like these OICs. During the consultation stage redesign considerations are anticipated and freezing the costs at one point may be preferable to regular cost changes. Based on participant input, BC Hydro will be examining the need to update Stage 1 cost estimates prior to Stage 2.

• **PROJECT LIFE:** Participants noted that BC Hydro’s assumptions for project life appear different for large and small hydro projects. The assumed operating life for large hydro (Site C) of 100 years versus that for small hydro at 40 years may provide an unfair advantage for large hydro projects. BC Hydro noted that actual rate of asset depreciation will vary depending on the component under consideration. However, in general, the financial analysis for Site C is based on 70 years service life. It is also important to make a distinction between contract life and project life when comparing projects. BC Hydro will consider this input.

• **OTHER LARGE HYDRO PROJECTS:** In response to input received during the resource options update, BC Hydro has considered other large hydro projects in addition to Site C. Twelve large hydro projects were previously examined. Some of these projects are now prohibited by law from development, leaving nine potential projects still available for consideration. Initial examination indicates that the in-service dates for these projects would be later than Site C. BC Hydro is putting together high level costs estimates for each of these projects and summary will be provided in the LTAP.

### 6.3 Resource Options Update - Demand-Side Management

*(John Duffy, BC Hydro presenter)*

Considerable discussions were generated from this presentation including discussions on the rationale for including specific initiatives such as rate structures, codes and standards, and voltage optimization as part of the Demand-Side Management (DSM) program. Participants were interested in the low cost and high volume of the DSM program as compared to information from the ROU and the impact of the current DSM on the supply-demand gap.

• **RATE STRUCTURE AND CODE:** One participant suggested that changes in rate structures and codes and standards should not be included in the DSM plan but should rather be reflected as operating costs and not capital. BC Hydro indicated that rates, codes, and programs are three main tools for the plan, and all three are needed to be successful. The costs to implement rate changes are typically relatively low. The cost to implement codes and standards are borne by the government. The question of operating vs. capital cost treatment is largely a cost recovery issue and not a DSM issue.

Discussions also related to the association between rate structures intended to encourage conservation and their associated impact to revenue, possibly resulting in a drop in the Non-Participant Test benefit-cost ratio for the DSM initiative. This impact will be further discussed in the LTAP.

In follow-up discussions, BC Hydro indicated that some costs associated with the DSM plan for the purpose of LTAP analysis would not be recovered as DSM costs but rather as costs under other functions within BC Hydro. For example, the cost to implement rate changes would be recovered as operating costs under Customer Care while the cost to
implement voltage optimization would be recovered as capital costs for substations under Field Operations.

- COST and VOLUME of DSM: Participants noted that the DSM energy costs provided were generally lower than the ranges provided by the Conservation Potential Review (CPR) and that the volume of low cost DSM appears higher than the CPR. BC Hydro clarified that the CPR and the DSM plans represent “different DSM mixes”. CPR looks at everything possible while the DSM plan targets the most cost effective opportunities with the tools available. In addition, rate structures and codes/standards are planned to come in sooner in the DSM plan which leads to greater savings in the later years. It was clarified that the DSM energy cost of $36/MWh represents the All Ratepayers Cost, which is the net sum of utility cost and DSM participants’ costs. The utility cost will be a fraction of that number.

- VOLTAGE OPTIMIZATION: A description of the voltage optimization program was requested. BC Hydro noted that meters would be installed at substations to monitor and allow the fine-tuning of voltage levels resulting in lower voltages while still meeting industry standards. One participant commented that this program does not require a change in customer behaviour and therefore should be considered Resource Smart project rather than a DSM program.

- SUPPLY-DEMAND GAP: One participant suggested that given DSM numbers in the order of 10,000 GWh by 2020, and the load growing at about 1,000 GWh per year, translates to a gap of about 2000 GWh. BC Hydro noted that deliverability risk for the high level of DSM must also be considered and that an update of the demand-supply gap will be provided during the next workshop.

6.4 Electricity and Gas Price Forecast
(Dave Ince, BC Hydro presenter)

Several participants acknowledged the substantial technical analysis supporting the forecast. Participants were interested in the details of how scenarios were developed and how the price forecast is or is not reflective of the electricity demand patterns in the province:

- SCENARIOS: Participants asked a range of questions regarding how scenarios were constructed and what input assumptions were used. It was clarified that BC Hydro adopted 3 internally-consistent scenarios developed by Global Energy for the California Energy Commission. These have recently been thoroughly reviewed through regulatory hearings in California. The high gas case is a significant improvement, and was developed based on stakeholder feedback received in the 2006 IEP.

- PRICE SHAPE AND VOLATILITY: The 3X12 pricing table was presented, which provides the relative regional market value of electricity in different times of year and times of the day. This pricing table is for Mid-Columbia, based on equal hourly weightings. One participant commented that the seasonal price profile does not appear to adequately reflect the more extreme load profile for BC, and questioned whether a specific made-in-BC price table would be more relevant.

- US and ALBERTA MARKETS: It was mentioned that Alberta is a ‘thin’ market, meaning that it is small, relatively isolated (transmission intertie limitations) and the pricing (Pool Price) is relatively volatile. In addition, as considerably more trading occurs between BC and the US, it is preferable to use the Pacific Northwest market as a market reference.
One participant questioned the economics of self-sufficiency given the apparently lower price forecast compared to incremental domestic supply. This issue will be examined in the LTAP.

6.5 Greenhouse Gas Offset Price Forecast
(Patrice Rother, BC Hydro presenter)

Much of the interest for participants was related to the GHG offset system to be adopted by the province. Many questions were raised during the presentation on anticipated Provincial policy on how a cap and trade system would work or what would qualify to be used as offsets.

- GHG OFFSET POLICY: A participant commented that based on the 2007 Energy Plan existing facilities does not require offset until 2016 and whether a facility would have an existing allowance and how that would be handled in the offset system. BC Hydro commented that the rules for the proposed Western Climate Initiative cap and trade system have not been finalised; existing facilities may have allowances and that may be sufficient, or they may also need to go to the market to purchase offsets. It is important to note that the rules and protocols for an offset system in BC are still under development.

- OFFSET DISCUSSIONS: Forest sequestration has been examined as a possibility for offsets in some of the referenced models; however the offset system for BC is still in the planning stages and more information will come later. The Province is considering the rules for what an offset system might look like, and BC Hydro is waiting to hear the result of that discussion. It is assumed that emission reductions which are regulated to take place are not typically considered to be offsets.

The recently announced carbon tax is currently assumed to be incremental to GHG offsets. It was recognized that the tax could increase cost of generation depending on final implementation of any cap and trade system.

It is also unknown whether green attributes that BC Hydro has purchased could be considered as offsets in the future. There may be vintage year rules for such implementation.

6.6 Risk Framework – An Introduction
(Basil Stumborg, BC Hydro presenter)

Much of the discussion regarding the risk framework centred on the construction, components and interpretation of the probability tree. Participants were interested in how trade or market impacts were incorporated, how high risk/low probability scenarios can be isolated for analysis, and a desire for testing unconstrained portfolios.

- TRADE ISSUES: Trade benefits would be captured in the portfolio analysis (i.e. the value of trade will appear in the portfolio analysis for a particular scenario tested). One participant expressed desire to explore opportunities to optimize the system for trade revenue. It was observed that two issues are at play, one is to optimize the system for trade benefits; and the other is to undertake economic advancement of resources to take advantage of trade opportunities.

- VALUE ASSIGNMENT: There was a question as to where values come into the decision framework. BC Hydro responded that one of the key features of this decision framework is to provide a probability assessment that differentiates between subjective probability judgments and value judgements. This provides more transparency when it comes to applying values to the decision.
• RISK AND PROBABILITIES: One participant commented that the major risk is in the demand and not in the dollars spent and that risk analysis would provide insight into various levels of DSM spending.

BC Hydro clarified that the current risk model is not a dynamic model and therefore does not automatically adjust based on iterative results. However, all assigned probabilities can be seen and the intention is to be transparent.

• UNCONSTRAINED TESTING: One participant asked whether BC Hydro is going to test portfolios that will show the full cost of the energy plan policies. BC Hydro will only be testing portfolios that fall within a legislated mandate. For example, BCH will not run a portfolio that will not meet Special Direction 10 (self sufficiency). As a rule, law with be observed while targets will be tested.

6.7 Summary Comments
Randy Reimann provided closing remarks thanking people for their attendance and participation. Some follow-up items were mentioned such as Site C cost increases, DSM cost recovery and project life of small hydro and other IPPs. People were reminded that Workshop #2 is tentatively planned for the 3rd week in April (regulatory schedules still need to be checked). At Workshop #2, the following will be reviewed: load forecast, load resource gap, and the risk framework. The final workshop will occur sometime in May to review the draft application.
7.0 ADDENDUM: Written Comments

At the workshop, BC Hydro distributed a comment form for participants interested in submitting written comments at the end of the day. The following comments were received.

<table>
<thead>
<tr>
<th>Resource Options Update</th>
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<tbody>
<tr>
<td>7.1 Site C, Mica Units 5 &amp; 6, and Revelstoke Unit 6 should move forward quickly.</td>
</tr>
<tr>
<td>7.2 DSM may have questionable and uncertainty factors in the probable outcome. Is this funding better spent on generation and transmission?</td>
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<table>
<thead>
<tr>
<th>Gas and Electricity Price Forecast</th>
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<tbody>
<tr>
<td>7.3 Regarding low gas price forecast and projected effects on reducing natural gas development: Does the projection/model take into account the carbon intensity of fuel source? It is possible that in a GHG constrained world, natural gas (combined cycle gas turbine) would be part of the solution for coal-dependent US jurisdictions particularly with renewable portfolio standard constraints, thus making ongoing investment worthwhile for natural gas producers.</td>
</tr>
<tr>
<td>7.4 Would like to see a stand alone versus interconnected price curves including the BC Hydro cost of generation or Mid-C (Mid-Columbia) Bonneville Power Administration costs to B.C. border.</td>
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<table>
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<tr>
<th>GHG Offset Price Forecast</th>
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<tr>
<td>7.5 Interesting and informative, but what is the GHG emission per tonne by fuel type with and without sequestration?</td>
</tr>
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<thead>
<tr>
<th>Risk Framework</th>
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<tbody>
<tr>
<td>7.6 Would transmission capacity not qualify as a key driver of uncertainty? (Especially as to export/revenues for Powerex?)</td>
</tr>
<tr>
<td>7.7 Should be a backward propagation &quot;AI&quot; model that will deliver the goals sought.</td>
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