Integrated Resource Plan

Public & Stakeholder Consultation:

Terms of Reference

*Updated: May 2012*
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INTRODUCTION

This Terms of Reference describes the scope and nature of the IRP Consultation to inform and consult the public and stakeholders in 2012. In recognition of the unique interests of First Nations, BC Hydro has developed a dedicated First Nations consultation program. Notwithstanding the existence of this separate consultation stream, BC Hydro invites and encourages First Nations to participate in the public and stakeholder consultation.

Update to February 2011 Public and Stakeholder Terms of Reference

Terms of Reference for public and stakeholder consultation were posted in February 2011 in advance of the first round of consultation that focused on seeking input into the development of the draft Integrated Resource Plan. Consultation was conducted in March and April 2011, and the summary report posted in May 2011. Subsequent to consultation in spring 2011, government amended the date by which the IRP must be submitted from December 2011 to December 2012 to allow adequate time to consider amendments to its self-sufficiency policy, which in turn informs the IRP. With new direction on self-sufficiency released in winter 2012, BC Hydro is resuming consultation on the IRP and has amended its consultation terms of reference accordingly. Adjustments to the final round of consultation reflect the new timeline and learning from the previous round of consultation designed to enable broader participation cost effectively.

BACKGROUND

The Integrated Resource Plan (IRP) is a long-term plan that describes how BC Hydro proposes to meet future growth in demand for electricity through energy conservation and clean energy. Underpinning the plan is the long-standing planning objective to ensure reliable, cost-effective electricity supply, as well as new objectives related to clean energy, greenhouse gas reduction and achieving electricity self-sufficiency contained in the Clean Energy Act.

The Clean Energy Act requires BC Hydro to submit an IRP to the Minister of Energy by December 2012, after which government will review the IRP and decide whether to approve it.

British Columbia’s Clean Energy Act

The 2010 Clean Energy Act establishes a long-term vision for British Columbia to become a clean energy leader, and requires energy objectives for BC Hydro in developing its IRP. The IRP is BC Hydro’s plan for achieving self-sufficiency, ensuring that 93 per cent of generation in the province comes from clean resources and reducing growth in electricity demand through conservation. As well the plan will contain an assessment of transmission options looking 30 years out.
Integrated Resource Planning

As part of the IRP process, BC Hydro analyzes potential future demand resulting from a growing population, economic development and potential electrification. In addition, BC Hydro explores future conservation plans and develops a province-wide inventory of potential energy sources including wind, wave, tidal, geothermal, natural gas, bioenergy, run-of-river hydro, large hydro (Site C), solar and others.

The IRP will include an evaluation of the need for and comparisons to the Site C Clean Energy Project, a potential third dam and hydroelectric generating station on the Peace River in northeastern B.C., and will consider it within various combinations of other energy options in the context of a long-term plan.

Approval Process

Following public and stakeholder review of the draft IRP, BC Hydro will make any final amendments based on this input, and submit its Plan on or before December 3, 2012, to the Minister of Energy for subsequent government review, after which the government will decide whether or not to approve the IRP.

IRP Development Process

- Inputs to integrated resource planning including the resource options report, the long term load forecast, and other technical information.
- Identify the gap between existing supply and forecasted electricity demand.
- What is the gap between existing resources and forecasted electricity demand?
- Public, First Nations and stakeholder consultation.
- Input into the draft plan on key planning questions.
- Analyze options to close the gap.
- What is the optimal blend of new conservation, generation and transmission resources?
- Gather public, First Nations and stakeholder consultation feedback on draft plan.
- Consider public, First Nations and stakeholder feedback and finalize the IRP.
- Submit the IRP to government of British Columbia.
CONSULTATION PROCESS

Development of the IRP occurred in three phases, with corresponding consultation objectives for each.

<table>
<thead>
<tr>
<th>IRP Development Phase</th>
<th>Consultation Objective</th>
<th>Timing of Consultation</th>
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| Technical Input and Foundation for Integrated Resource Planning | ✔ Gather input on consultation design  
✔ Gather technical information about potential resource options | Fall 2010               |
| Considering our Clean Energy Future – Assessing and Evaluating Options | ✔ Gather public, stakeholder and First Nations input into development of draft IRP      | March/April 2011       |
| Reviewing the Draft Integrated Resource Plan               | ✔ Seek public, stakeholder and First Nations feedback on the draft IRP                 | June/July 2012         |

A Technical Advisory Committee (TAC) was established in December 2010 to provide detailed technical input and feedback to assist BC Hydro in creating a thorough and well-considered Integrated Resource Plan. The Committee consists of knowledgeable participants with a significant stake, interest and experience in BC Hydro’s resource planning process. The Terms of Reference for the IRP Technical Advisory Committee are posted separately on BC Hydro’s website. The Committee meets periodically throughout the development of the IRP to review the technical inputs to the analysis, the results of the analysis, and the draft IRP. This advisory input is in addition to input provided by the public, First Nations and stakeholders through a province-wide consultation process.

The process for developing the IRP includes the following phases of public consultation and analysis:

**Technical Review and Foundation for Integrated Resource Planning (Fall 2010)**
In the initial phase of developing the IRP, BC Hydro focused on updating and gathering key technical inputs to the planning process, such as updating its inventory of potential energy sources. At this juncture, BC Hydro sought input on the design of consultation. This involved seeking input from stakeholders about the proposed consultation topics and methods.

Also, during this first phase, BC Hydro sought technical input from those with specific information about the resource potential in B.C. in order to update its inventory of potential energy sources.

Finally, during this phase, BC Hydro established an IRP Technical Advisory Committee to aid it in creating a thorough, well-considered plan through detailed, technical, advisory input and feedback.
Considering our Clean Energy Future – Assessing and Evaluating Options (March/April 2011)
In March and April 2011, BC Hydro gathered public and stakeholder input into the development of the draft IRP. This included input on potential future conservation and efficiency options, electricity generation options (including Site C), electrification, planning transmission, and export market potential.

Reviewing the Draft Integrated Resource Plan (June/July 2012)
In the final phase of developing the IRP, BC Hydro will gather feedback on the draft IRP. Consultation feedback will be considered along with financial, technical, environmental, and economic development input as BC Hydro finalizes the IRP for submission to the Ministry of Energy.

MEETING BEST PRACTICES IN CONSULTATION

Consultation best practices have been developed using the International Association for Public Participation (IAP2) Core Values of Public Participation and the IAP2 Code of Ethics for Public Participation Practitioner, the Office of the Auditor General of British Columbia Public Participation: Principles and Best Practices for British Columbia, 2008/2009 Report 11, and an independent survey of six other consultation best practices documents.

The IRP consultation program incorporates the following best practice criteria:

- **Why Consult?** There is support for, and a clear understanding of the importance of including public input in planning, policy and infrastructure decisions that affect the public interest.
- **Accountability.** There are well-defined policy or consultation guidelines including: mandate for consultation activities, areas where consultation is required and/or an optional activity, general steps in the process, roles and responsibilities, and feedback and evaluation.
- **Policy Framework.** Policy frameworks identify the role of consultation processes (advisory or joint decision-making), and outline public and corporate rights and responsibilities related to consultation processes.
- **Fair, Transparent and Legitimate.** Where possible, stakeholders have the opportunity to influence the design of a consultation program. The public is made aware of opportunities to participate and materials are made available in a manner that encourages public understanding.
- **Identifying Topics and Decisions for Consultation.** Consultation is only conducted when there are decisions that can benefit from public input, and input is used effectively to improve decisions.
- **Clarity of the Terms of Reference for Consultation.** There is a clear Terms of Reference for the consultation including a description of the design or steps in the public consultation process. Consultation plans usually elaborate with nature and purpose of specific consultations.
- **Consultation Methods.** A range of consultation methods are used to maximize opportunities for participation. Staff and consultants have the necessary skills to implement consultation programs.
- **Reporting.** Consultation Summary Reports provide participants, the public and decision makers with an analysis of input.
- **Consideration of Input.** The public is kept informed as consultation progresses (reporting at each consultation phase), including how input is considered and used.
CONSULTATION METHODS

The IRP Public and Stakeholder Consultation provides a variety of opportunities to provide input into the development of the draft IRP to account for various levels of interest and ability to participate. For example, some participants may feel comfortable providing their input in an open house or multi-stakeholder meeting, while others may wish to complete a feedback form, submit a written submission or participate in a webinar. Online consultation opportunities will be provided to allow participants to provide feedback at their convenience. Consultation methods may include, but are not limited to:

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<tr>
<td>Consultation Materials (Content)</td>
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<td>March/April 2011</td>
<td>June/July 2012</td>
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<td>Backgrounder and Feedback Form</td>
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<td>Consultation Workbook and Feedback Form</td>
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<td>Technical Discussion Paper / Briefs</td>
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<td>Email, letter and phone notification of stakeholders</td>
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<td>Email notification to Electricity Conservation &amp; Efficiency Advisory Committee</td>
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<td>Consultation Methods</td>
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<td>Online feedback form</td>
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<td>Input Analysis and Reporting</td>
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<td>Meeting notes</td>
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<td>Feedback Form analysis</td>
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<td>Electricity Conservation &amp; Efficiency Advisory Committee analysis</td>
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<td>Technical Advisory Committee analysis</td>
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<td>Consultation Summary Report</td>
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<td>Consideration of Input</td>
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<td>Review of Consultation Summary Report</td>
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<td>Consideration Memo¹</td>
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In addition, extensive notification to the public and stakeholders regarding the consultation period and ways to participate will be completed.

¹ A Consideration Memo reviewing consideration of input from the 2011 and 2012 public and stakeholder consultations will be developed by BC Hydro along with the submission of the final draft of the Integrated Resource Plan to the provincial government.
CONSULTATION REPORTING

At the conclusion of each phase of consultation, a Public and Stakeholder Consultation Summary Report will be produced, summarizing input received during the consultation period. Consultation Summary Reports provide participants, the public and decision makers with an analysis of input. Generally, each report will:

- Provide an overview of the consultation phase, methods and tools
- Report on levels of participation
- Summarize input received through:
  - Feedback forms
  - Submissions
  - Key themes from multi-stakeholder meetings
  - Key themes from open houses
- Include appendices:
  - Consultation materials
  - Meeting notes from multi-stakeholder meetings and open houses
  - Notification materials (including copies of newspaper ads, emails sent to stakeholders, etc.)
  - Returned feedback forms
  - Others

Consultation Summary Reports will be posted to the project website and consultation participants will be advised when the report is available.

HOW INPUT WILL BE USED

Input received through consultation will be considered, along with technical, financial, environmental and economic development input, as BC Hydro refines the IRP.

A Consideration Memo will be prepared that summarizes how public and stakeholder input was considered by BC Hydro during each phase of consultation. The Consideration Memo will be included in the final Integrated Resource Plan.
Appendix 2
Notification of Consultation

BC Hydro
Integrated Resource Plan 2012
A Plan to Meet B.C.’s Future Electricity Needs
Consultation Summary Report
August 2012
British Columbia is growing and so is our demand for electricity. Although British Columbians are doing more than ever to conserve electricity, B.C.’s overall electricity use is expected to continue to increase by about 50 percent over the next 20 years, so we must plan now to ensure future generations can enjoy clean and reliable power.

The Integrated Resources Plan (IRP) is BC Hydro’s plan for acquiring the resources needed to meet our customers’ demand for electricity. In 2011, we conducted province-wide consultation to gather input into the development of the IRP. BC Hydro now has a draft plan and we are inviting the public stakeholders, and First Nations across B.C. to provide feedback on it.

BC Hydro is offering a number of ways for you to get involved in planning for the province’s future energy needs:

**IN PERSON**

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<thead>
<tr>
<th>Community</th>
<th>Location</th>
<th>Date</th>
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<tbody>
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<td>Prince George</td>
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<td>Fort St. John</td>
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<td>Vancouver</td>
<td>SFU Harbour Centre</td>
<td>June 12</td>
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<td>Terrace</td>
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<td>June 14</td>
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<td>Victoria</td>
<td>Hotel Grand Pacific</td>
<td>June 20</td>
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**ONLINE**

Visit bchydro.com/irp

Read the consultation Discussion Guide

Fill out a feedback form

Write a submission to BC Hydro

Participate in a webinar June 25 or 26*

* Please sign up online in advance
Notice of Public Consultation from May 28 to July 6, 2012 about BC Hydro’s Draft Integrated Resource Plan

BC Hydro is inviting the public and stakeholders to participate in the upcoming consultation on its draft Integrated Resource Plan (IRP). Last year, we sought your input into the development of the draft IRP. Now we are seeking your feedback on our draft Plan for meeting BC Hydro customers’ future electricity needs. While British Columbians are doing more than ever to conserve electricity, B.C.’s overall electricity use is expected to continue to increase as a result of projected population growth and increased demand in the large industrial sector.

Public consultation is being undertaken from May 28 to July 6, 2012, to gather feedback on the draft Integrated Resource Plan. BC Hydro will also be holding separate workshops for First Nations.

You are invited to attend the following consultation meeting to provide your feedback:

DATE: Tuesday, May 29, 2012
TIME: 10:30 a.m. – 12:30 p.m.
LOCATION: The Prestige Hotel & Conference Centre (4411 32nd Street, Vernon, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

A consultation Discussion Guide and Feedback Form, along with other related materials will be available online beginning May 28, 2012. You can also provide feedback and learn more by:

- Filling out an online feedback form: www.bchydro.com/irp
- Attending a public open house (visit www.bchydro.com/irp to view schedule)
- Registering for an online Webinar: (visit www.bchydro.com/irp to register)
- Providing written submissions: integrated.resource.planning@bchydro.com or P.O. Box 2850, Vancouver, B.C. V6B 3X2
- Toll-free Phone: 1 888-747-4832

Public Open House Schedule

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<td>6:00 p.m. – 9:00 p.m.</td>
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<td>Wednesday, June 6</td>
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For details about the Integrated Resource Plan and consultation program, visit [www.bchydro.com/irp](http://www.bchydro.com/irp)

We look forward to hearing your feedback about the draft Integrated Resource Plan.

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Vice President, Energy Planning and Economic Development, BC Hydro
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You are invited to attend the following consultation meeting to provide your feedback:

DATE: Tuesday, May 29, 2012
TIME: 2:00 p.m. – 4:00 p.m.
LOCATION: Delta Grand Okanagan (1310 Water Street, Kelowna, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

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Public consultation is being undertaken from May 28 to July 6, 2012, to gather feedback on the draft Integrated Resource Plan. BC Hydro will also be holding separate workshops for First Nations.

You are invited to attend the following consultation meeting to provide your feedback:

DATE Wednesday, May 30, 2012
TIME 10:00 a.m. – 12:00 p.m.
LOCATION Hotel 540 (540 Victoria Street, Kamloops, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

A consultation Discussion Guide and Feedback Form, along with other related materials will be available online beginning May 28, 2012. You can also provide feedback and learn more by:

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You are invited to attend the following consultation meeting to provide your feedback:

DATE: Thursday, May 31, 2012
TIME: 1:00 p.m. – 3:00 p.m.
LOCATION: Prestige Rocky Mountain Resort and Conference Centre (209 Van Horne Street, Cranbrook, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

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You are invited to attend the following consultation meeting to provide your feedback:

DATE: Tuesday, June 05, 2012
TIME: 1:00 p.m. – 3:00 p.m.
LOCATION: Ramada Hotel Downtown Prince George (444 George Street, Prince George, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

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You are invited to attend the following consultation meeting to provide your feedback:

Wednesday, June 06, 2012
2:30 p.m. – 4:30 p.m.
Quality Inn Northern Grand (9830 100th Avenue, Fort St. John, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

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Public consultation is being undertaken from May 28 to July 6, 2012, to gather feedback on the draft Integrated Resource Plan. BC Hydro will also be holding separate workshops for First Nations.

You are invited to attend the following consultation meeting to provide your feedback:

DATE: Thursday, June 7, 2012
TIME: 1:00 p.m. – 3:00 p.m.
LOCATION: Sheraton Vancouver Guildford Hotel (15269 104th Avenue, Surrey, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

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You are invited to attend the following consultation meeting to provide your feedback:

DATE: Tuesday, June 12, 2012
TIME: 1:00 p.m. – 3:00 p.m.
LOCATION: SFU Vancouver Harbour Centre (515 West Hastings Street, Vancouver, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

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You are invited to attend the following consultation meeting to provide your feedback:

DATE: Wednesday, June 13, 2012
TIME: 1:00 p.m. – 3:00 p.m.
LOCATION: Best Western Plus Regency Inn & Conference Centre (32110 Marshall Road, Abbotsford, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

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You are invited to attend the following consultation meeting to provide your feedback:

DATE Thursday, June 14, 2012
TIME 1:00 p.m. – 3:00 p.m.
LOCATION Terrace Best Western Inn (4553 Greig Avenue, Terrace, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

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You are invited to attend the following consultation meeting to provide your feedback:

DATE: Tuesday, June 19, 2012
TIME: 1:00 p.m. – 3:00 p.m.
LOCATION: Coast Discovery Inn & Marina (975 Shoppers Row, Campbell River, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

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You are invited to attend the following consultation meeting to provide your feedback:

DATE: Wednesday, June 20, 2012
TIME: 1:00 p.m. – 3:00 p.m.
LOCATION: Hotel Grand Pacific (463 Belleville Street, Victoria, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

A consultation Discussion Guide and Feedback Form, along with other related materials will be available online beginning May 28, 2012. You can also provide feedback and learn more by:

- Filling out an online feedback form: www.bchydro.com/irp
- Attending a public open house (visit www.bchydro.com/irp to view schedule)
- Registering for an online Webinar: (visit www.bchydro.com/irp to register)
- Providing written submissions: integrated.resource.planning@bchydro.com or P.O. Box 2850, Vancouver, B.C. V6B 3X2
- Toll-free Phone: 1 888-747-4832

Public Open House Schedule

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For details about the Integrated Resource Plan and consultation program, visit [www.bchydro.com/irp](http://www.bchydro.com/irp)

We look forward to hearing your feedback about the draft Integrated Resource Plan.

Doug Little  
Vice President, Energy Planning and Economic Development, BC Hydro
Notice of Public Consultation from May 28 to July 6, 2012 about BC Hydro’s Draft Integrated Resource Plan

BC Hydro is inviting the public and stakeholders to participate in the upcoming consultation on its draft Integrated Resource Plan (IRP). Last year, we sought your input into the development of the draft IRP. Now we are seeking your feedback on our draft Plan for meeting BC Hydro customers’ future electricity needs. While British Columbians are doing more than ever to conserve electricity, B.C.’s overall electricity use is expected to continue to increase as a result of projected population growth and increased demand in the large industrial sector.

Public consultation is being undertaken from May 28 to July 6, 2012, to gather feedback on the draft Integrated Resource Plan. BC Hydro will also be holding separate workshops for First Nations.

You are invited to attend the following consultation meeting to provide your feedback:

DATE       Thursday, June 21, 2012
TIME       10:00 a.m. – 12:00 p.m.
LOCATION   Castlegar & District Recreation & Aquatic Centre (2101 6th Avenue, Castlegar, BC)

To confirm your attendance, please e-mail integrated.resource.planning@bchydro.com or call 1 888-747-4832. Please leave your name, phone number and reference the meeting date that you’ll be attending. Attendance is determined on a first come first served basis.

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A PLAN TO MEET B.C.’S FUTURE ELECTRICITY NEEDS
CONSULTATION DISCUSSION GUIDE & FEEDBACK FORM
MAY 28 TO JULY 6, 2012

bchydro.com/irp
No single factor explains the comfort and quality of life in the 21st century as well as our ability to enlist external forms of energy to do work for us. From the alarm that wakes us in the morning to the tools that animate our lives, almost everything we touch is either powered by — or has been created, changed or moved by — some form of energy. British Columbia has a particular wealth of electricity resources. Colourless, odorless, safe and instantly available, clean electricity is also endlessly renewable. But while it arrives at the flick of a switch, electrical energy cannot be mustered with the snap of your fingers. The electricity that heats our homes, lights our streets and powers our industries is generated in many regions of the province and delivered over thousands of kilometres of transmission and distribution lines. Along the way, it is measured and adjusted, moment by moment, to meet the changing needs of all British Columbians. Put too much electricity into the system and it will overload and crash; too little and the entire economy could grind to a halt.

Given the long lead time necessary to build new power generation facilities and transmission infrastructure, BC Hydro must plan well into the future to ensure a continued flow of clean, safe, reliable and cost-effective electricity. This draft Integrated Resource Plan (IRP) describes the actions BC Hydro recommends to meet growing demand so that our customers will continue to receive affordable, clean and reliable electricity. The draft Plan includes consideration of the most recent changes in the electricity demand forecast and reflects input gathered in 2011 from First Nations, stakeholder and public consultation. Once again, we are interested in your feedback.
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This discussion guide is offered to First Nations, stakeholders and the public as an overview of BC Hydro’s draft Integrated Resource Plan (IRP) — including the key actions that BC Hydro proposes for meeting electricity demand over the long term. BC Hydro is seeking feedback on major aspects of the draft plan.

Electricity systems are inherently complex and capital-intensive, and generally require significant lead time to construct. It can take five to six years to plan and build a new generation facility and even longer to develop transmission lines and infrastructure. So, BC Hydro must plan carefully to determine the least-cost options and keep rates affordable, to encourage conservation, and to acquire the right mix of generation and transmission resources to meet its customers’ needs.

In the process of preparing the draft, BC Hydro considered input from First Nations, stakeholder and public consultations conducted in March and April 2011. Now, BC Hydro is seeking feedback on this draft plan. Consultation will take place May 28 to July 6, 2012. BC Hydro will also be holding separate workshops for First Nations.

Consultation materials are on the BC Hydro website at bchydro.com/irp. You can provide feedback and learn more by:

- Reading more background information available online
- Completing an online feedback form
- Participating in open houses
- Participating in a webinar
- Viewing the IRP video
- Writing comments to BC Hydro

HOW YOUR FEEDBACK WILL BE USED

BC Hydro will consider feedback received through this consultation, along with technical, financial, environmental and economic development inputs, when preparing a final IRP. The plan will be submitted to the provincial government by December 2012, after which government will review the plan and decide whether to approve it.

PUBLIC OPEN HOUSES

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<td>Webinar</td>
<td>Monday, June 25</td>
<td>12:00 noon</td>
<td>bchydro.com/irp*</td>
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<tr>
<td>Webinar</td>
<td>Tuesday, June 26</td>
<td>12:00 noon</td>
<td>bchydro.com/irp*</td>
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*Please check bchydro.com/irp for further information.
ABOUT BC HYDRO

Fifty years ago, the Province of B.C. created a Crown-owned utility to plan, develop and deliver clean and reliable electricity to homes and businesses throughout most of the province. Today, BC Hydro is one of the largest electrical utilities in Canada. It serves 1.8 million customers — 95 per cent of B.C.’s population — safely, reliably and at rates that are competitive with jurisdictions across North America. Nearly 90 per cent of customer accounts are residential, with the remainder either commercial or large industrial. Each of these three groups consumes roughly one-third of the total electricity supplied.

More than 93 per cent of BC Hydro’s electricity supply is clean or renewable, creating little or no greenhouse gas emissions. This energy comes from a combination of BC Hydro’s own existing resources and from power purchased from independent power producers who generate electricity from a range of resources.

As the map shows, BC Hydro operates 31 hydroelectric facilities and three thermal generation plants that use natural gas.

The major hydroelectric facilities are located in the Peace and Columbia regions.

PROVINCIAL ENERGY GOALS

BC Hydro’s mandate is to provide British Columbians with reliable and affordable electricity. As a Crown-owned utility, it is governed by the Hydro and Power Authority Act and regulated by the British Columbia Utilities Commission under the Utilities Commission Act.

The provincial Clean Energy Act requires BC Hydro to submit an Integrated Resource Plan to the Minister of Energy by December 2012 and every five years thereafter. The Act also requires BC Hydro to be self-sufficient* by 2016 and to describe how it will respond to objectives in the Act including:

- Generate and deliver at least 93 per cent of all electricity in British Columbia through clean or renewable sources.
- Keep rates among the most competitive in North America.
- Meet at least 66 per cent of any increase in demand through conservation and efficiency by 2020.
- Use renewable power to help achieve provincial greenhouse gas reduction targets.
- Encourage economic development and the creation and retention of jobs.
- Explore and, subject to cabinet approval, pursue the opportunity to develop and sell clean electricity into interprovincial and international markets.
- Foster the development of First Nations and rural communities through the use and development of clean or renewable resources.

* In February 2012, government amended the definition of self-sufficiency so that BC Hydro must be self-sufficient during average water conditions. The previous definition had required self-sufficiency during historically low inflows or critical water conditions.
PUBLIC, STAKEHOLDER AND FIRST NATIONS CONSULTATION 2011

During March and April 2011, BC Hydro sought input from First Nations, stakeholders and the public as it developed the information and conducted the analysis necessary to prepare the draft Integrated Resource Plan (IRP). During consultation, more than 700 stakeholders and members of the public attended stakeholder meetings and open houses. Participants completed 400 feedback forms and made 52 written submissions. At the same time, BC Hydro held nine First Nations regional workshops that were attended by 121 participants representing 78 First Nations, tribal councils and Aboriginal organizations. BC Hydro also sought input from the IRP Technical Advisory Committee on its analysis.

For more information about the IRP Consultation program and reports summarizing the input received to date, go to bchydro.com/irp.
The Integrated Resource Plan (IRP) is BC Hydro’s plan for acquiring the resources to meet customer needs over the long term. But this is not a once-every-20-years exercise. BC Hydro will update its long-term electricity plan at least once every five years. As part of this process, BC Hydro asks three questions:

1. **How much electricity will British Columbians need over the next 20 years?**
   This depends on a host of factors that increase or decrease demand. That demand must also be understood in two ways: how much energy is required in total over the course of a year, and how much capacity might be needed to meet demand peaks, such as seasonal and daily peaks — to ensure that BC Hydro can keep the lights on, even on the coldest, darkest days.

2. **What is the gap between existing supply and forecast demand?**
   What is the expected output of BC Hydro’s existing electricity generation, contracted energy supply and transmission assets, and to what degree might conservation and efficiency measures reduce future demand? After conservation measures are taken into account, what is the gap between existing supply and anticipated demand?

3. **How can BC Hydro close the electricity gap?**
   What blend of additional conservation measures and additional generation and transmission resources will be needed to meet demand, reliably and cost-effectively?

By addressing these questions, BC Hydro identifies actions it must take within the next 10 years to meet its customers’ future long-term electricity needs.

BC Hydro’s Integrated Resource Plan does not, by itself, commit BC Hydro to any specific capital projects.

Recommended action items will be subject to subsequent approval and consultation requirements.

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**WHERE WE ARE TODAY**

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
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<tr>
<td>2010</td>
<td>Identify the gap between existing supply and forecast electricity demand. What is the gap between existing resources and forecast electricity demand?</td>
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<tr>
<td>2011</td>
<td>Public, stakeholder, and First Nations consultation. Input into the draft plan on key planning questions.</td>
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<tr>
<td>2012</td>
<td>Consider public, stakeholder and First Nations feedback and finalize the IRP.</td>
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**Inputs to integrated resource planning**
- Including the resource options report, the long-term load forecast, and other technical information.

---

**Identify the gap between existing supply and forecast electricity demand**
- What is the gap between existing resources and forecast electricity demand?

---

**Public, stakeholder, and First Nations consultation**
- What is the optimal blend of new conservation, generation, and transmission resources?

---

**Analyze options to close the gap**
- Develop the draft IRP.

---

**Public, stakeholder, and First Nations consultation**
- Gather feedback on draft plan.

---

**Consider public, stakeholder, and First Nations feedback and finalize the IRP**
- Submit the IRP to the government of British Columbia.
FORECAST DEMAND: HOW MUCH ELECTRICITY WILL BRITISH COLUMBIANS NEED OVER THE NEXT 20 YEARS?

Approximately one-third of BC Hydro’s current electricity demand comes from residential customers, another third from commercial and small industrial customers (e.g., hospitals, schools and shopping malls) and the final third from large customers (e.g., pulp mills, mines). Changes in any one of these customer segments can have significant impacts on the overall growth in electricity demand.

20-YEAR ANNUAL ENERGY LOAD FORECAST

To ensure that it has sufficient energy to meet future demand, BC Hydro establishes a probable forecast of how much customers will need per year (the red line, below right). It also calculates the potential for higher and lower demand (the grey area around the red line). The green line indicates the anticipated demand, reduced by savings from BC Hydro’s existing conservation and efficiency plans.

In its December 2011 load forecast, BC Hydro anticipated that growth in demand from the mining and oil and gas sectors will be particularly strong. BC Hydro has included the development of two new Liquefied Natural Gas facilities proposed for the north coast of the province in the demand represented in the graph below.

The long-term load forecast shows that demand for energy could grow by approximately 50 per cent over the next 20 years, before accounting for the savings that can be achieved by conservation and efficiency measures.

While growth in population and general economic activity are relatively predictable drivers of electricity demand, it is more difficult to forecast growth in demand among large industrial customers, as this is subject to the fluctuating global market for B.C.’s natural resources.

To manage uncertainty, BC Hydro is concentrating on its most probable forecast, but is continuing to work with government and customers to manage scenarios that reflect potential additional demand.

ENERGY is the amount of electricity produced or used over a period of time measured in gigawatt hours (one gigawatt hour equals one million kilowatt hours). The average British Columbian household uses 11,000 kilowatt hours per year.
20-YEAR PEAK CAPACITY FORECAST

In addition to examining the total energy that BC Hydro customers need in a year, BC Hydro must also ensure that it has sufficient peak capacity to meet the moment-by-moment demands placed on its system.

BC Hydro’s load forecast indicates that peak capacity demand will grow by approximately 50 per cent over the next 20 years, before accounting for the savings that can be achieved by conservation and efficiency measures.

Demand for electricity varies through the year. In British Columbia, the peak demand typically occurs in the early evening in December or January on a very cold weekday.

In the graph below, the blue line represents the projected peak capacity demand before conservation is taken into account; the green line shows the peak demand including the conservation and efficiency levels that BC Hydro believes can be delivered based on existing plans. The grey area shows the demand uncertainty.

**Peak Capacity** refers to the maximum amount of electricity that BC Hydro can supply at any one time throughout the whole province. For example, BC Hydro’s system experiences seasonal and daily peaks in demand.

**ELECTRIFICATION: SWITCHING FROM OTHER FUELS TO ELECTRICITY**

The Clean Energy Act seeks “to encourage the switching from one kind of energy source or use to another that decreases greenhouse gas emissions in British Columbia.” Fuel switching to clean electricity could occur across the economy. The Horn River Basin is one example of potential “electrification” – traditionally, industry burned fossil fuels to power their industrial processes; now they are considering electricity. The transportation sector is another example – switching automobiles from gasoline and diesel to electricity could help reduce the largest source of greenhouse gas emissions in B.C.

Within the IRP, BC Hydro has examined the drivers of electrification, the potential impact of electrification on the system, and when electrification might occur. Analysis shows that future carbon prices (including the regulated cost of emitting greenhouse gases) would have the strongest influence on the speed with which the transportation and industrial sectors will switch fuels and electrify. In the next 10 years, demand for electric vehicles is predicted to be relatively small, due to the availability and cost of vehicles. In the long term, electric vehicles could become a significant component of overall electricity demand and a source of distributed energy storage.

BC Hydro will continue to monitor carbon prices and analyze potential system demand to accommodate fuel switching as the marketplace transitions.
WHAT IS THE GAP BETWEEN EXISTING SUPPLY AND FORECAST DEMAND?

A key step in long-term integrated resource planning involves comparing the energy and capacity load forecast (demand) to currently available resources (supply). When forecast demand exceeds current supply, BC Hydro must fill the gap by encouraging consumers to use less and by increasing the sources of electricity supply.

In BC Hydro’s energy supply-demand outlook (right) the blue bars show the current annual supply of BC Hydro facilities and independent power producers. The bars increase over the next three years, reflecting BC Hydro’s own operating plans and the new independent power production that is coming online. Beyond 2018, the net energy supply goes down as contracts with some independent power producers expire. BC Hydro must fill the gap between the blue bars (the existing supply) and the green line (showing anticipated demand, as reduced by conservation and efficiency measures).

Meanwhile the capacity outlook indicates that customers will need an additional 2,400 megawatts of peak capacity by 2031.

The decrease in capacity from 2012 to 2031 is due to some biomass-based Independent Power Producer contracts going off-line.
The Draft Integrated Resource Plan describes the actions that BC Hydro proposes to take over the next 10 years to ensure British Columbians continue to receive low-cost, reliable electricity over the long term.

To evaluate the different options and identify the appropriate mix of resources, BC Hydro has considered the following factors:

- **Technical specifications**: the potential peak capacity and energy each resource option offers, its earliest possible in-service date, etc.
- **Cost**
- **Effect on provincial energy objectives**: e.g., the objective that at least 93 per cent of energy should come from clean or renewable sources, at least 66 per cent of any increased demand be met by conservation by 2020, and greenhouse gas emissions be reduced, etc.
- **Environmental attributes**: land, water and air footprints of projects that BC Hydro believes can be permitted.
- **Economic development attributes**: contributions to jobs, GDP and provincial revenue.
- **First Nations, stakeholder, public and Technical Advisory Committee** input gathered through the 2011 consultation process.

On the following pages, BC Hydro recommends a set of actions to close the gap. It involves:

- **Conserving More**
- **Building and Reinvesting More**
- **Buying More**

In addition, BC Hydro must also develop contingency plans to address the “what ifs” such as what if demand grows more quickly than expected. BC Hydro has additional recommendations to:

- **Prepare for Potentially Greater Demand**

Electricity sources can be divided into two categories: dependable capacity and intermittent energy.

**Dependable capacity** resources, such as large hydro reservoirs and generating stations, pumped storage facilities and natural gas-fired generators, all deliver a consistent, dependable amount of power over time.

**Intermittent energy** resources, such as wind, solar, run-of-river hydro, and tidal and wave energy, deliver power only when the wind is blowing, the sun is shining or the water is flowing.

The challenge for electric utilities is to deliver a reliable supply of electricity and operate with an appropriate balance of cost-effective, dependable capacity and intermittent renewable resources to minimize environmental impacts.

BC Hydro has many dependable capacity resources in the form of water stored behind its dams on the Peace and Columbia River systems, which can be used when needed. However, as B.C.’s capacity needs have grown over the years, BC Hydro is now having to look at new additional capacity solutions to ensure customers have energy when they need it.
RECOMMENDED ACTION #1: CONSERVE MORE:

a) Increase our energy savings target to 9,800 gigawatt hours per year by 2020 (1,000 gigawatt hours more than the current plan) through conservation and efficiency programs, incentives and regulations.

b) Explore more codes, standards and rate options for savings beyond the annual target of 9,800 gigawatt hours.

Conservation and efficiency, also referred to as demand-side measures (DSM), is the cleanest and least expensive way for BC Hydro to reduce the gap between future electricity demand and existing resources.

Conservation measures can include:

- Programs that provide information, education and incentives (for example, the BC Hydro Fridge Buy-Back Program).
- Specifically designed electricity rates such as the existing residential inclining block rate that encourages conservation while collecting no additional revenue for BC Hydro.
- Government codes and standards that set minimum energy performance levels for products or systems that use, control or affect the use of energy — for example, by eliminating the sale of low-efficiency light bulbs.

BC Hydro’s current conservation and efficiency plan, established in 2008, aimed to reduce current levels of consumption by 8,800 gigawatt hours per year by 2020. In analyzing how efficiency can be improved and how much energy can be conserved over a 20-year horizon, BC Hydro compared its current approach, which emphasizes a complementary mix of programs, rates and government codes and standards, against a more aggressive approach, which would rely more on government-regulated codes and standards as well as other conservation measures. This more aggressive approach would require a shift in how British Columbians use electricity — for example, new housing would need to be built more efficiently. Mandatory time of use rates would not be part of this approach, as the government has directed BC Hydro not to introduce them.

In determining how much conservation and efficiency it should recommend, BC Hydro considered:

- How much energy savings is BC Hydro confident will be delivered? [Conservation levels are uncertain because they depend upon customers adopting new behaviours and technologies.]
- At what cost can savings be achieved?
- What has been the consultation input to date?

The recommended approach will provide BC Hydro with the time needed to learn more about customers’ willingness to accept new codes and standards. Depending on results, the conservation target could be increased even more in the next Integrated Resource Plan (IRP).

By targeting 9,800 gigawatt hours per year, BC Hydro expects to defer about 78 per cent of incremental demand for traditional energy loads. This target is in excess of B.C.’s Clean Energy Act objective to meet 66 per cent of new demand for electricity through conservation.
ENCOURAGE LESS CONSUMPTION DURING PERIODS OF PEAK DEMAND

➤ RECOMMENDED ACTION #2: Pursue voluntary conservation programs that encourage residential, commercial and industrial customers to reduce energy consumption during peak periods.

In addition to conservation measures that target total energy savings over the course of a year, BC Hydro will improve voluntary programs designed to reduce peak demand or shift demand away from peak hours. For example, BC Hydro can work with large industrial customers to adjust their processes and equipment operations in a way that reduces consumption for short periods when needed.

For more information about BC Hydro’s Power Smart programs, go to bchydro.com/powersmart.
BUILD AND REINVEST MORE

While conservation is the first and preferred strategy to meet customers’ future electricity needs, made-in-B.C. power is still required to fill the gap between existing supply and anticipated demand — for both the total amount of energy used in the course of a year and for the peak capacity needed during times of maximum consumption.

Over the last 30 years, British Columbians have been able to rely on the total energy and peak capacity that was created when BC Hydro built the large dams, reservoirs and generating stations on the Peace and Columbia river systems. BC Hydro has been able to meet rising peak demand by adding generating units and making other improvements to the existing generating stations on the Peace and Columbia to take maximum advantage of the energy storage capabilities of their reservoirs.

Now that this infrastructure is nearing its maximum potential, BC Hydro will need to seek other solutions to meet growing needs. One of the objectives of the Clean Energy Act is that at least 93 per cent of B.C.’s electricity comes from clean or renewable sources. Run-of-river hydro and wind generation can fill some of this demand, but these are intermittent sources and therefore are not solutions when needing reliable peak capacity.

BUILD THE SITE C CLEAN ENERGY PROJECT

RECOMMENDED ACTION #3: Build Site C to add 5,100 gigawatt hours of annual energy and 1,100 megawatts of dependable capacity to the system for the earliest in-service date, subject to environmental certification and fulfilling the Crown’s duty to consult and, where appropriate, accommodate Aboriginal groups.

The Site C Clean Energy Project is a proposed third dam and hydroelectric generating station on the Peace River, downstream from the existing BC Hydro reservoirs and the G.M. Shrum and Peace Canyon generating stations.

In preparing the Integrated Resource Plan, BC Hydro compared the efficiency, environmental attributes and cost of Site C against other renewable resources (wind, run-of-river hydro) that could meet the same annual energy and peak capacity requirements in the same time frame. BC Hydro also compared Site C against other peak capacity options, including natural gas and pumped storage. The analysis generally showed the following:

- Portfolios of resource options with Site C would have lower costs to ratepayers and would provide additional flexibility to integrate intermittent renewable resources.
- Portfolios that include Site C would generally have a greater footprint on land, with the creation of a new reservoir, although portfolios excluding Site C would require a greater number of projects with more dispersed environmental footprints.

SITE C:

- Supports the provincial clean energy, self-sufficiency and climate change objectives by providing energy and capacity with low greenhouse gas emissions intensity.
- Projected to provide 35,000 direct and indirect jobs, supporting the provincial objective of encouraging economic development and job creation.
- Facilitates the development of wind and run-of-river hydro that require backup from a dependable and flexible resource.
Site C is currently in the environmental and regulatory review stage, which includes a co-operative federal and provincial environmental assessment process, including a joint review panel. The environmental assessment process for Site C will include multiple opportunities for participation by the public, Aboriginal groups, governments and other interested stakeholders.

Separate from consultation opportunities led by the regulatory agencies as part of the environmental assessment, BC Hydro is leading several streams of public and stakeholder consultation.

- **Government Liaison**
  BC Hydro is engaging key municipal, regional and provincial government stakeholders to ensure they are kept up to date on the status of the project.

- **Property Owner Liaison**
  Ongoing meetings and two-way information sharing with property owners is continuing throughout the Site C project.

- **Local Area Consultation**
  BC Hydro will conduct area-specific consultations where local issues arise. For example, consultation with the community of Hudson’s Hope was held in fall 2011 to gather local input about proposed berm options.

- **Aboriginal Consultation and Engagement**
  BC Hydro and Aboriginal groups are engaged in a thorough consultation and engagement process that continues through all stages of the Site C Clean Energy Project.

- **Project Definition Consultation**
  Project Definition Consultation is designed to consult and engage with the public and stakeholders on topics important to project planning and the environmental assessment.
  - Project Definition Consultation, Spring 2012, held between April 10 and May 31, asked the public and stakeholders for input about Highway 29 Preferred Realignments, Outdoor Recreation and the 85th Avenue Industrial Lands.
  - Project Definition Consultation, planned for fall 2012, will include consultation topics such as worker accommodation and reservoir clearing.

For more information about Site C, the work of the joint review panel and the opportunities for consultation and input, visit bchydro.com/sitec.
TAKE ADVANTAGE OF REMAINING RESOURCE SMART CAPACITY OPPORTUNITIES

BC Hydro initiated the Resource Smart program in 1988 to identify and implement efficiency gains at existing BC Hydro facilities. The program provides additional annual energy and peak capacity by modifying, updating and retrofitting our existing generation facilities. Recently, BC Hydro began the addition of the fifth and sixth generating units at Mica Generating Station. These investments will ensure that the backbone of our system remains strong and reliable.

REVELSTOKE GENERATING UNIT 6

➤ RECOMMENDED ACTION #4: Begin work to allow the sixth generating unit at Revelstoke Generating Station to be built by 2018, adding 500 megawatts of peak capacity to the BC Hydro system.

The Revelstoke Generating Station, which was designed to accommodate six generating units, opened in 1984 with four units and a combined peak capacity of 1,980 megawatts. With the addition of a 500-megawatt fifth unit in 2010, Revelstoke now provides more than 20 per cent of BC Hydro’s total peak capacity.

A sixth turbine in the Revelstoke Generating Station would increase BC Hydro’s peak capacity, helping to ensure that electricity is available during peak hours during the coldest periods of winter.

PURSUE ADDITIONAL RESOURCE SMART OPPORTUNITIES

➤ RECOMMENDED ACTION #5: Continue to investigate and advance cost-effective resource smart projects to utilize the remaining untapped capacity within BC Hydro’s existing hydroelectric system.

While BC Hydro has completed a large number of Resource Smart projects over the past 20 years and has other generation refurbishment plans underway, there are still some remaining ways to modify, update and retrofit our existing generation facilities to secure additional energy and peak capacity. Upgrading the existing system through the Resource Smart projects can provide additional energy production and peak capacity on the system in a cost-effective way, with generally low or no incremental environmental impact.
A short-term capacity gap emerges in 2015 before new projects such as Revelstoke 6 and Site C come online and provide additional peak capacity. To fill this short-term gap until alternative resources are developed, BC Hydro proposes relying on cost-effective and readily available resources to meet customers’ growing requirements.

During this gap period, BC Hydro plans to continue to purchase capacity from the marketplace via the western electricity grid to ensure that customers’ growing peak requirements can be met. BC Hydro considers the purchasing of out-of-province power to meet peak needs to be a prudent, low-cost choice prior to a large resource like Site C coming online.

The Canadian Entitlement is a feature of the Columbia River Treaty between Canada and the United States, under which Canada operates its dams on the Columbia River in a way that optimizes generating potential and regulates water flow in both countries. In return, B.C. receives an “entitlement” of one-half of the extra power produced in the U.S. The actual entitlement varies annually, but is generally about 4,600 gigawatt hours of energy per year and 1,300 megawatts of capacity.

Using the Canadian Entitlement and purchasing peak capacity on the open market involves calling upon electricity from the U.S. during periods when customers’ demand peaks. Transmission line constraints on U.S. connections are such that BC Hydro can rely on no more than 500 megawatts of additional peak capacity, which means that these options alone may be insufficient to fill the peak capacity gap.

Burrard Thermal Generating Station is a major generating facility located in the Lower Mainland and is valuable as an emergency backup resource. The plant is available with government approval to meet demand in the Lower Mainland in the event that peak demand exceeds available resources, or on an emergency basis. BC Hydro has, on average, called upon Burrard 12 days per year during the past three years to meet peak demand and to provide emergency backup for generation and transmission outages.
TRANSMISSION REQUIREMENTS

➤ RECOMMENDED ACTION #7: Reinforce the existing 500-kilovolt line from Prince George to Terrace to meet new demand on the north coast.

B.C.’s bulk high-voltage transmission system is the backbone of the grid that delivers electricity to customers across the province. It carries electricity from where it is generated to the cities, towns and industrial centres where it is largely consumed. To meet expected demand, BC Hydro has concluded that no new high-voltage inter-regional transmission lines are needed in the next 20 years. However, the existing 500-kilovolt line from Prince George to Terrace will need to be reinforced to meet new demand on the north coast. Consultation and project definition studies have begun to move forward on reinforcing this line to ensure it keeps its earliest in-service date.

In addition, BC Hydro must:
- Complete committed transmission line projects, including the Interior-to-Lower Mainland (ILM) and Northwest Transmission Line (NTL).
- Address region-specific transmission needs. For example, oil and gas industry expansion is driving rapid growth in the South Peace area.

30-YEAR TRANSMISSION PERSPECTIVE

In recent years, the provincial government and utilities have become increasingly concerned about timely development of transmission infrastructure. In addition, transmission lines often require long lead times to develop (10 or more years) and rights-of-way can be difficult to secure.

Therefore, BC Hydro looked farther into the future — 30 years out — to see if a longer perspective leads to new conclusions. Extending the transmission planning horizon from 20 to 30 years validated the transmission choices identified in the initial 20-year horizon. No new transmission options were identified as a result of extending the planning horizon.

BC Hydro also considered whether pre-building new transmission would be beneficial in areas where a high number of clean generation projects were expected to be clustered in the next three decades. The analysis shows only marginal economic and environmental benefits from pre-building into areas with high generation potential in advance of need. At the same time, pre-building may also cause unnecessary environmental impacts and costs in the event the transmission need does not materialize.

BC Hydro will continue to take a proactive approach to transmission planning. In future acquisitions processes for new electricity, BC Hydro will identify potential opportunities to cluster generation facilities and avoid multiple transmission lines.
While conservation is our first and preferred strategy to meet customers’ future electricity requirements, made-in-B.C. power is still required to help close the gap between supply and demand. British Columbia is fortunate to have a wealth of potential clean resources, including hydroelectricity, biomass and wind. The B.C. Clean Energy Act objective that at least 93 per cent of B.C.’s electricity generation comes from clean or renewable sources allows for not more than seven per cent of generation from sources such as natural gas-fired generation.

ENERGY FROM B.C.-BASED CLEAN ENERGY PRODUCERS

RECOMMENDED ACTION #8: Develop energy procurement options to acquire up to 2,000 gigawatt hours per year from clean energy producers for projects that would come into service in the 2016–2018 time period.

Final decisions on the timing and the volume of energy will be made once there is more certainty regarding projected new electricity loads.

BC Hydro has been purchasing power through long-term contracts with independent power producers for over 20 years. During fiscal 2011, independent power producers supplied 10,805 gigawatt hours of annual energy — about 20 per cent of all BC Hydro electricity requirements — while also contributing to the Province’s self-sufficiency, clean energy generation, and greenhouse gas reduction objectives.

Independent clean energy producers can bring new projects online in five to six years and in smaller increments that match B.C.’s electricity demand growth. As BC Hydro’s long-term forecast is updated in late 2012 and future demand is confirmed by customers, new energy can be acquired through acquisition processes involving affordable long-term contracts at fixed energy prices. Acquisitions from independent power producers also help to meet the Clean Energy Act objective of fostering the use and development of clean or renewable energy in First Nations and rural communities.

Based on its assessment of potential generation resources, BC Hydro expects the majority of new power will come from low-cost resources such as wind, run-of-river and biomass projects because these are currently the lowest-cost options. However, producers will have the opportunity to propose other forms of renewable power projects such as geothermal, wave and tidal for consideration.

BC Hydro plans to continue the Standing Offer Program for projects less than 15 megawatts as well as the Net Metering Program for small residential and commercial projects. BC Hydro also plans to assess and potentially expand the opportunities for geothermal resources as well as other distributed generation sources that are not participating in existing acquisitions programs.
As part of good utility practice, BC Hydro must have contingency plans in case electricity requirements grow faster than forecast, or if planned resources don’t come online when expected.

BC Hydro is paying particular attention to two areas of the province where there is potential for greater load growth from development in the large industrial sector. While this new demand is difficult to forecast with certainty, it warrants careful examination now because of the large volumes of energy and capacity that could be required and the unique geographic challenges associated with serving major new loads in northern B.C.

In addition to the two Liquefied Natural Gas (LNG) facilities that are included within the IRP’s base resource plan, BC Hydro is aware of a number of other LNG and new mine developments on the north coast. If a third LNG plant requests service or a number of new mines come online, BC Hydro would need to acquire significant additional annual energy and peak capacity. BC Hydro is studying a range of options to serve additional potential need on the north coast, involving both the energy supply and the associated transmission infrastructure.

Several proponents are currently working to establish Liquefied Natural Gas (LNG) export facilities on the north coast — a potential investment of approximately $20 billion that could also create many new jobs. The process of converting natural gas into a liquefied state consumes large amounts of energy. Usually, that energy is provided on-site by burning natural gas. BC Hydro is working with industry and the provincial government to determine how BC Hydro could meet the LNG industry’s energy needs via clean electricity backed up by natural gas-fired generation, thereby reducing related greenhouse gas emissions.

The provincial government has committed to having three LNG plants in operation by 2020 being serviced by clean electricity and backed up by gas. Related provincial goals include:

- Ensuring that B.C. is competitive in the global Liquefied Natural Gas (LNG) market.
- Maintaining leadership on climate change and clean energy.
- Keeping energy rates affordable for families, communities and industry.

BC Hydro has sufficient current and planned energy supply to meet the energy needs of the first two of three potential Liquefied Natural Gas facilities. BC Hydro is studying supply options to meet possible additional electricity demand that could emerge if a third LNG plant is established in the longer term or if other additional electricity demand emerges.
NORTHEAST: NATURAL GAS EXTRACTION

➤ RECOMMENDED ACTION #10: Continue to monitor the northeast natural gas industry and undertake studies to keep electricity supply options open, including transmission connection to the integrated system, and local gas-fired generation.

BC Hydro is looking at the potential that large new natural gas extraction will emerge in the Horn River Basin in northeast B.C. and that the gas industry will seek electrical power from BC Hydro. The Horn River Basin encompasses a large area northeast of Fort Nelson that is not currently connected to BC Hydro’s integrated transmission system. Gas production in the Horn River Basin requires energy for two purposes: moving gas through pipelines, and processing the gas to remove impurities such as carbon dioxide (formation CO₂) and hydrogen sulphide (H₂S). Traditionally, the natural gas industry has met its own energy requirements by burning natural gas or diesel. However, the industry could be electrified — thereby reducing related greenhouse gas emissions and helping to achieve provincial climate change goals.

Two broad alternatives to serve this potential demand are:

• Building a new northeast transmission line to bring new clean energy to the region via the integrated system.
• Acquiring gas-fired electricity generated locally. Additional clean generation resources may also be added; however, these will not displace the need for gas as a backup.

BC Hydro is working with the provincial government, industry and potential independent power producers in assessing the options for serving the Horn River Basin.

PEAK CAPACITY RESOURCES

➤ RECOMMENDED ACTION #11a: Working with industry, explore pumped storage capacity options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

➤ RECOMMENDED ACTION #11b: Working with industry, explore natural gas-fired generation options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

In its base resource plan, BC Hydro recommends a combination of additional resources to address the forecast growth in peak capacity requirements. As discussed, BC Hydro has been able to rely on additional capacity within its large hydroelectric system to address growing capacity demands over the past two decades and, as part of this plan, will study how it can tap into the remaining Resource Smart opportunities on its existing facilities. Going forward, finding additional capacity resources will be more challenging. Renewable resources such as wind and run-of-river supply options cannot store energy. This means that when the wind doesn’t blow or rivers do not have adequate flows, BC Hydro needs to rely on other resources to meet demand. Now, for contingency planning purposes, BC Hydro must look beyond the base plan recommended actions and address what if growth is even greater than expected or other resources don’t come online when expected.
Pumped storage involves taking advantage of the fact that reservoirs make excellent batteries: the water can be held for long periods and released through generating turbines only when necessary to meet electricity demand.

Utilities have the ability to recharge these batteries by using electricity to pump water from a lower reservoir to a higher reservoir when electricity is plentiful and cheap (in the middle of the night, or at times of the year when demand is low). Then, during periods of high electrical demand (i.e., at dinnertime on a cold, dark day), the stored water is released through the turbines to produce electricity when it is needed most. The pumping process makes the plant a net consumer of energy, but this storage of water for peak capacity gives significant additional flexibility to meet customers’ electricity requirements.

Pumped storage projects are generally sited close to high-demand centres (to minimize electricity losses and the need for transmission lines) and in locations with a significant elevation difference. With high mountains near the major load centre in the Lower Mainland and on Vancouver Island, B.C. is well suited to pumped storage. However, such projects have not been built in B.C. before and the construction time for such a large project would be significant.

After BC Hydro exhausts Resource Smart projects, natural gas is the next-lowest-cost alternative for adding additional capacity to the system and therefore best addresses keeping electricity rates affordable. Natural gas-fired plants can be located close to where the electricity is needed, reducing the need to build new transmission lines.

As part of the Clean Energy Act, government directed BC Hydro to study the potential to acquire electricity for the purpose of export. Through its wholly owned subsidiary Powerex, BC Hydro has a long and successful track record of trading electricity for the benefit of BC Hydro ratepayers. BC Hydro’s reservoirs and its transmission connections to Alberta and the western United States have made it possible to trade electricity in a way that optimizes system efficiency and finds a market for electricity that is surplus to domestic needs.

Beyond this regular electricity trading, the government asked BC Hydro to examine whether there was a business case for acquiring renewable energy solely for purposes of export. In response, BC Hydro examined market drivers such as:

- U.S. government energy and environmental policies.
- The potential size of the renewable electricity market.
- The market share that B.C. could expect to capture.
- The transmission infrastructure that would be needed.

BC Hydro’s analysis shows that current market conditions are not conducive to building clean electricity resources for export. B.C. electricity exports face relative disadvantages, including longer distances to potential markets (primarily California) and constrained transmission pathways. Also, U.S. tax credits for renewable energy, decreased interest in advancing greenhouse gas emissions regulation, and low natural gas prices all currently create an unfavourable environment for B.C. electricity exports. However, market conditions could change; therefore, BC Hydro will continue to monitor the export market potential.
**REDUCE ENERGY CONSUMPTION**

1. Conserve More:
   a) Increase our energy savings target to 9,800 gigawatt hours per year by 2020 (1,000 gigawatt hours more than the current plan) through conservation and efficiency programs, incentives and regulations.
   b) Explore more codes, standards and rate options for savings beyond the annual target of 9,800 gigawatt hours.

2. Pursue voluntary conservation programs that encourage residential, commercial and industrial customers to reduce energy consumption during peak periods.

**ENCOURAGE LESS CONSUMPTION DURING PEAK DEMAND PERIODS**

3. Build Site C to add 5,100 gigawatt hours of annual energy and 1,100 megawatts of dependable capacity to the system for the earliest in-service date, subject to environmental certification and fulfilling the Crown’s duty to consult and, where appropriate, accommodate Aboriginal groups.

4. Begin work to allow the sixth generating unit at Revelstoke Generating Station to be built by 2018, adding 500 megawatts of peak capacity to the BC Hydro system.

5. Continue to investigate and advance cost-effective Resource Smart projects to utilize the remaining untapped capacity within BC Hydro’s existing hydroelectric system.

6. Fill the short-term peak capacity gap from 2015 to 2020 with a combination of market purchases first, power from the Columbia River Treaty second, and extending the existing backup use of Burrard Thermal Generating Station, if required and authorized by regulation.

7. Reinforce the existing 500-kilovolt line from Prince George to Terrace to meet new demand on the north coast.

**BUILD AND REINVEST MORE**

8. Develop energy procurement options to acquire up to 2,000 gigawatt hours per year from clean energy producers for projects that would come into service in the 2016 – 2018 time period.

9. Continue to work with LNG developers to understand their electricity requirements, and keep options open until further certainty on future requirements can be established. Specifically:
   - Undertake work to maintain the earliest in-service date for a new 500-kV transmission line from Prince George to Terrace and Kitimat and from the Peace River region to Prince George.
   - Develop procurement options for additional clean energy resources, backed up by gas-fired generation (located only in the north coast, or in both the north coast and across the province) for electricity that could be delivered in the 2019 – 2020 time frame, should it be needed.

10. Continue to monitor the northeast natural gas industry and undertake studies to keep electricity supply options open, including transmission connection to the integrated system, and local gas-fired generation.

**COMBINE READILY AVAILABLE RESOURCES TO MEET THE SHORT-TERM CAPACITY GAP**

11. a) Working with industry, explore pumped storage capacity options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

   b) Working with industry, explore natural gas-fired generation options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

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BC Hydro’s Integrated Resource Plan does not, by itself, commit BC Hydro to any specific capital projects. Recommended action items will be subject to subsequent approval and consultation requirements.
From an environmental and economic development perspective, the province’s clean energy, conservation, self-sufficiency and greenhouse gas reduction policies have guided BC Hydro in this plan, minimizing environmental impacts and supporting economic development. Beyond that, BC Hydro also compared the environmental footprints and economic development attributes of different portfolios. More information on the outcomes of BC Hydro’s portfolio analysis is available in Chapter 6 of the draft IRP available online at bchydro.com/irp.

The diagram below left summarizes how BC Hydro proposes to close the energy gap — first through cutting energy demand through conservation, then filling the remaining gap through a combination of energy from B.C.-based clean energy producers and Site C.

The diagram below right summarizes how BC Hydro proposes to close the gap between peak capacity requirements and existing resources, both in the short-term (the 2017 time frame) and the longer term (2021 and 2031).

As BC Hydro works toward fulfilling future electricity requirements, it will continue to monitor emerging new demand closely and be ready to adjust course as needed. In particular, forecast new demand from the liquefied natural gas industry requires close attention, as new LNG demand will arrive in substantial segments, versus growing slowly and incrementally over time.
A PLAN TO MEET B.C.’S FUTURE ELECTRICITY NEEDS
CONSULTATION FEEDBACK FORM
MAY 28 TO JULY 6, 2012
BC Hydro is forecasting that demand for power will increase by about 50 per cent over the next 20 years. In order to meet that demand reliably, affordably and within guidelines set by the B.C. Clean Energy Act, BC Hydro has created a plan to: conserve more, build and reinvest more in existing facilities, buy more made-in-B.C. energy, and prepare to meet potentially greater demand if required. Please provide your feedback about the following set of recommended actions for meeting B.C.’s future electricity needs.

➤ CONSERVE MORE

REDUCE ENERGY CONSUMPTION

1. a) BC HYDRO RECOMMENDS CONSERVING MORE BY:
   • Increasing our energy savings target to 9,800 gigawatt hours per year by 2020 (1,000 gigawatt hours more than the current plan) through conservation and efficiency programs, incentives and regulations.

a) Please indicate your level of agreement with this recommendation.

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b) Please indicate the reasons for your level of agreement:

ENCOURAGE LESS CONSUMPTION DURING PEAK DEMAND PERIODS

2. BC Hydro recommends pursuing voluntary conservation programs that encourage residential, commercial and industrial customers to reduce energy consumption during peak periods.

a) Please indicate your level of agreement with this recommendation.

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b) Please indicate the reasons for your level of agreement:

1. b) BC HYDRO RECOMMENDS CONSERVING MORE BY:

   • Exploring more codes, standards and rate options for savings beyond the annual target of 9,800 gigawatt hours.

a) Please indicate your level of agreement with this recommendation.

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b) Please indicate the reasons for your level of agreement:

Turn to pages 10 – 11 for more information on this topic.
BUILD THE SITE C CLEAN ENERGY PROJECT

3. BC Hydro recommends building Site C to add 5,100 gigawatt hours of annual energy and 1,100 megawatts of dependable capacity to the system for the earliest in-service date, subject to environmental certification and fulfilling the Crown’s duty to consult and, where appropriate, accommodate Aboriginal groups.

   a) Please indicate your level of agreement with this recommendation.

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TAKE ADVANTAGE OF RESOURCE SMART OPPORTUNITIES

4. BC Hydro recommends beginning work to allow the sixth generating unit at Revelstoke Generating Station to be built by 2018, adding 500 megawatts of peak capacity to the BC Hydro system.

   a) Please indicate your level of agreement with this recommendation.

   Strongly Agree | Somewhat Agree | Neither Agree Nor Disagree | Somewhat Disagree | Strongly Disagree

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   b) Please indicate the reasons for your level of agreement:

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5. BC Hydro recommends continuing to investigate and advance cost-effective Resource Smart projects to utilize the remaining untapped capacity within BC Hydro’s existing hydroelectric system.

a) Please indicate your level of agreement with this recommendation.

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6. BC Hydro recommends filling the short-term peak capacity gap from 2015 to 2020 with a combination of market purchases first, power from the Columbia River Treaty second, and extending the existing backup use of Burrard Thermal Generating Station, if required and as authorized by regulation.

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**REINFORCE TRANSMISSION**

7. BC Hydro is recommending reinforcing the existing 500-kilovolt line from Prince George to Terrace to meet new demand on the north coast.

a) Please indicate your level of agreement with this recommendation.

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**ENERGY FROM B.C.-BASED CLEAN ENERGY PRODUCERS**

8. BC Hydro recommends developing energy procurement options to acquire up to 2,000 gigawatt hours from clean energy producers for projects that would come into service in the 2016–2018 time period.

a) Please indicate your level of agreement with this recommendation.

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b) Please indicate the reasons for your level of agreement:

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As part of prudent utility practice, BC Hydro must have a contingency plan in case electricity demand grows faster than forecast, or one of the planned resources does not come online when expected.

POTENTIAL ADDITIONAL LARGE INDUSTRIAL DEMAND

9. BC Hydro recommends continuing to work with Liquefied Natural Gas (LNG) developers to understand their electricity requirements, and keep options open until further certainty on future requirements can be established. Specifically:
   • Undertake work to maintain the earliest in-service date for a new 500-kV transmission line from Prince George to Terrace and Kitimat and from the Peace River region to Prince George.

a) Please indicate your level of agreement with this recommendation.

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• Develop procurement options for additional clean energy resources, backed up by gas-fired generation (located only in the north coast, or in both the north coast and across the province) for electricity that could be delivered in the 2019 – 2020 timeframe, should it be needed.

a) Please indicate your level of agreement with this recommendation.

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Turn to page 18 for more information on this topic
10. BC Hydro recommends continuing to monitor the northeast natural gas industry and undertake studies to keep electricity supply options open, including transmission connection to the integrated system, and local gas-fired generation.

a) Please indicate your level of agreement with this recommendation.

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b) Please indicate the reasons for your level of agreement:

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11. a) BC Hydro recommends working with industry to explore pumped storage capacity options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

a) Please indicate your level of agreement with this recommendation.

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b) Please indicate the reasons for your level of agreement:

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Turn to pages 19 – 20 for more information on this topic.
11. **b)** BC Hydro recommends working with industry to explore natural gas-fired generation options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

a) Please indicate your level of agreement with this recommendation.

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HOW INPUT WILL BE USED

Feedback received through consultation on the draft Integrated Resource Plan will be considered, along with any other final inputs, as BC Hydro prepares a final Integrated Resource Plan for submission to government for review and approval. A Consultation Summary Report summarizing feedback received through consultation will be posted on BC Hydro’s website at bchydro.com/irp and will be included in the plan submitted to government.

FEEDBACK DEADLINE:

Please submit your feedback by JULY 6, 2012.

Are you a:
- BC Hydro customer
- BC Hydro employee
- Other

Please provide your contact information (optional):

Name: ____________________________
Address: ____________________________  Postal Code: ____________________________
Phone: ____________________________  Email: ____________________________

Consent to Use Personal Information

I consent to the use of my personal information by BC Hydro for the purpose of contacting me and keeping me updated about future consultations on integrated resource planning. For the purposes of the above, “my personal information” includes name, mailing address, telephone number and email address, as provided above.

Signature: ____________________________  Date: ____________________________

BC Hydro is collecting information for its Integrated Resource Plan in accordance with BC Hydro’s mandate under the Hydro and Power Authority Act, the BC Hydro Tariff, the Clean Energy Act and related Regulations and Directions. If you have any questions regarding the information collection undertaken on this form, please contact the IRP Project Team Administrator at 1 888 747-4832.

For further information or to submit your feedback form:

BC Hydro Integrated Resource Plan
Email: integrated.resource.planning@bchydro.com
Web: bchydro.com/irp
Mailing Address: P.O. Box 2850, Vancouver, B.C. V6B 3X2
• Attribute A characteristic that describes a resource option or portfolio, used to assess its performance in meeting the planning objectives.

• Base Load An amount of electricity committed or available over a period of time at a steady rate.

• British Columbia Utilities Commission (BCUC) An independent regulatory agency of the provincial government operating under and administering the Utilities Commission Act. The BCUC regulates BC Hydro’s domestic supply and rates, and the safety and reliability of the BC Hydro system, as well as operating, management and administrative costs, and also assesses concerns from ratepayers regarding BC Hydro’s service.

• Bulk Transmission The transfer of electricity on the major high-voltage transmission system that carries the majority of power from the generators to the lower-voltage distribution systems.

• Canadian Entitlement A result of the Columbia River Treaty between Canada and the United States in which Canada agrees to operate its dam on the Columbia River in a way that optimizes hydroelectric power-generating potential in both countries. In return, Canada receives one-half of the extra power it receives from the Columbia River in a way that optimizes hydroelectric power-generating potential in both countries. In return, Canada receives one-half of the extra power potential in the U.S.

• Capacity The instantaneous power output or electricity demand at any given time, normally measured in kilowatts (kW) or megawatts (MW). A transmission facility’s ability to transmit electricity at any instant.

• Clean or Renewable Energy Is defined by the Clean Energy Act as including biomass, biogas, geothermal heat, hydro, solar, wind or other prescribed resources.

• cogeneration The simultaneous production of electrical or mechanical energy and useful heat energy from a single fuel source.

• Columbia River Treaty A treaty signed in 1912 between Canada and the U.S. that enabled storage reservoirs to be built and operated in British Columbia to regulate Columbia River flows to the U.S. for power production and flood control.

• Conservation Reducing energy consumption. For example, turning off unused lights to conserve resources.

• curtailment A reduction in demand as a result of demand-side management.

• Demand Customers’ requirement for electric power.

• Demand-side Management Actions, programs and initiatives aimed at modifying or reducing energy consumption through conservation and energy efficiency.

• Dependable Capacity The amount a plant can reliably produce when required, assuming all units are in service, measured in megawatts (MW). Factors external to the plant affect its dependable capacity. For example, steamflow conditions can restrict the dependable capacity of hydropower plants and fuel supply constraints can impact thermal plants’ dependable capacity. Planned and forced outage rates are not included. The dependable capacity used for long-term planning is the maximum capacity that a plant/unit can reliably provide for three hours in the peak load period of weekdays during two continuous weeks of cold weather.

• dispatchable A resource whose output can be adjusted to meet various conditions including fluctuating customer demand, weather changes, outages, market price changes and non-power considerations.

• distribution system Electrical lines, cables, transformers and switches used to distribute electricity ever short distances from substations to the customer, generally at voltages lower than 69 kV.

• Efficiency The effective rate of conversion of hydroelectric power to usable energy; the effective rate of conversion of electricity to an end use (e.g., heating).

• electricity A type of energy fuelled by the transfer of electrons from positive and negative points within a conductor.

• Electricity Purchase Agreement (EPA) The contract that defines the terms and conditions by which BC Hydro purchases electric energy from Independent Power Producers.

• electrification is the process of switching from an alternative power source to electricity. Some examples include switching from gasoline-powered cars to electric cars, replacing diesel generators, or using electrical conveyor systems instead of diesel trucks in mining operations.

• Emerging Technologies Technology at the first stages of development or demonstration. Not readily available in commercial markets and not in commercial use, as evidenced by at least three generation plants generating energy for a period of not less than three years, to a standard of reliability generally required by good utility practice.

• energy The amount of electricity produced or used over a period of time, usually measured in kilowatt hours, megawatt hours and gigawatt hours.

• energy capability is the amount of energy that can be generated under specified conditions by a generating unit or by the electric system over a period of time, typically expressed in GW/year.

• firm energy refers to electricity that is available at all times. Resources typically providing firm energy include large hydroelectric dams, bioenergy, geothermal and natural gas.

• greenhouse gases (GHG) Gases that contribute to global climate change, or the “greenhouse effect,” including carbon dioxide, nitrous oxide and methane.

• grid A network of distribution or transmission lines.

• gwh stands for gigawatt hour, a unit of electrical energy equal to one billion watt hours.

• independent power producer Independent Power Producers (IPP) A non-utility-owned electricity-generating facility that produces electricity for sale to utilities or other customers.

• integrated system An interconnected network of transmission lines, distribution lines by its customers’ stations linking generating stations to one another and to customers throughout a utility’s service area. Excludes customers located in remote locations who are connected via non-integrated generating plants.

• intermittent Electricity supply that fluctuates or is not available at all times. For example, wind energy only produces power when the wind is blowing.

• liquefied natural gas natural gas that has been cooled sufficiently that it will liquefy under normal pressure.

• load The amount of electricity required by a customer or group of customers.

• load forecast The expected amount of electricity required to meet customer needs in future years.

• mw stands for megawatt, a unit of electrical power equal to one million watts.

• outage A planned or unplanned interruption of one or more elements of an integrated power system.

• peak capacity The maximum amount of electrical power that generating stations can produce in any instant.

• peak demand The maximum instantaneous demand on a power system. Normally, the maximum hourly demand.

• portfolio A group of individual resource options to be acquired in a sequence over time to fill customers’ future electricity needs.

• power The instantaneous rate at which electrical energy is produced, transmitted or consumed, typically measured in kilowatts (kW), or megawatts (MW).

• power smart BC Hydro’s demand-side management initiative to encourage technical improvements by its customers’ stations linking generating stations to one another and to customers throughout a utility’s service area. Excludes customers located in remote locations who are connected via non-integrated generating plants.

• rate Term used for a utility’s unit price of service.

• rate structure Represents the set of rates paid by a class of customers (e.g., residential) for use of electricity.

• reinforcement Improvements in the transmission system to maintain or increase reliability and security of supply.

• reliability A measure of the adequacy and security of electric service. Adequacy refers to the existence of sufficient facilities in the system to satisfy the load demand and system operational constraints. Security refers to the system’s ability to respond to transient disturbances in the system.

• reserve System generating capacity beyond that required to meet peak demand, ensuring sufficient generation is available if some generating units are not available; necessary to meet reliability criteria for planning and operation.

• reserve storage The volume available in a reservoir to hold water for power generation or flood control.

• resource option A source of electricity that is available to help meet or reduce electricity demand, including generation, purchases, demand-side management and transmission facilities.

• run-of-river A hydroelectric facility that operates with no significant storage facilities.

• scenario analysis A set of planning assumptions to test the long-term performance of a portfolio.

• tac A Technical Advisory Committee (TAC) was established to provide technical advice to BC Hydro for the purpose of developing, assisting and coordinating the implementation of DRAFT INTEGRATED RESOURCE PLAN — 2012 | CONSULTATION DISCUSSION GUIDE & FEEDBACK FORM 33
For more information, please visit: bchydro.com/irp.

You can also provide feedback and learn more about the Integrated Resource Plan by:

- Attending a public open house: bchydro.com/irp
- Online feedback form: bchydro.com/irp
- Written submissions: integrated.resource.planning@bchydro.com or P.O. Box 2850, Vancouver, B.C. V6B 3X2
- Toll-free phone: 1 888 747-4832
Appendix 4
Open House Display Boards

BC Hydro
Integrated Resource Plan 2012
A Plan to Meet B.C.’s Future Electricity Needs
Consultation Summary Report
August 2012
British Columbia is growing and so is our demand for electricity. Although British Columbians are doing more than ever to conserve electricity, B.C.’s overall electricity use is expected to continue to increase by about 50 percent over the next 20 years, so we must plan now to ensure future generations can enjoy clean and reliable power.

The Integrated Resources Plan (IRP) is BC Hydro’s plan for acquiring the resources needed to meet our customers’ demand for electricity. In 2011, we conducted province-wide consultation to gather input into the development of the IRP. BC Hydro now has a draft plan and we are inviting the public stakeholders, and First Nations across B.C. to provide feedback on it.

**BC Hydro is offering a number of ways for you to get involved in planning for the province’s future energy needs:**

**OPEN HOUSES**

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<th>Community</th>
<th>Location</th>
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<td>Prince George</td>
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<td>Fort St. John</td>
<td>Quality Inn Northern Grand</td>
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<td>Vancouver</td>
<td>SFU Harbour Centre</td>
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<td>Victoria</td>
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**ONLINE**

- Visit [bchydro.com/irp](http://bchydro.com/irp)
- Read the consultation Discussion Guide
- Fill out a feedback form
- Write a submission to BC Hydro
- Participate in a webinar June 25 or 26*

* Please sign up online in advance
PUBLIC, STAKEHOLDER AND FIRST NATIONS CONSULTATION 2011

During March and April 2011, BC Hydro sought input from First Nations, stakeholders and the public as it developed the information and conducted the analysis necessary to prepare the draft Integrated Resource Plan (IRP). During consultation, more than 700 stakeholders and members of the public attended stakeholder meetings and open houses. Participants completed 400 feedback forms and made 52 written submissions. At the same time, BC Hydro held nine First Nations regional workshops that were attended by 121 participants representing 78 First Nations, tribal councils and Aboriginal organizations. BC Hydro also sought input from the IRP Technical Advisory Committee on its analysis.

PROVINCIAL ENERGY GOALS

BC Hydro’s mandate is to provide British Columbians with reliable and affordable electricity. As a Crown-owned utility, it is governed by the Hydro and Power Authority Act and regulated by the B.C. Utilities Commission under the Utilities Commission Act. The provincial Clean Energy Act requires BC Hydro to submit an Integrated Resource Plan to the Minister of Energy by December 2012 and every five years thereafter. The Act also requires BC Hydro to be self-sufficient* by 2016 and to describe how it will respond to objectives in the Act including:

• Generate and deliver at least 93 per cent of all electricity in British Columbia through clean or renewable sources.
• Keep rates among the most competitive in North America.
• Meet at least 66 per cent of any increase in demand through conservation and efficiency by 2020.
• Use renewable power to help achieve provincial greenhouse gas reduction targets.
• Encourage economic development and the creation and retention of jobs.
• Explore and, subject to cabinet approval, pursue the opportunity to develop and sell clean electricity into interprovincial and international markets.
• Foster the development of First Nations and rural communities through the use and development of clean or renewable resources.

* In February 2012, government amended the definition of self-sufficiency to say that BC Hydro must be self-sufficient during average water conditions. The previous definition had required self-sufficiency during historically low inflows or critical water conditions.
THE INTEGRATED RESOURCE PLAN

The Integrated Resource Plan (IRP) is BC Hydro’s plan for acquiring the resources to meet customer needs over the long term. BC Hydro will update its long-term electricity plan at least once every five years. As part of this process, BC Hydro asks three questions:

1. HOW MUCH ELECTRICITY WILL BRITISH COLUMBIANS NEED OVER THE NEXT 20 YEARS?

This depends on a host of factors that increase or decrease demand. That demand must also be understood in two ways: how much energy is required in total over the course of a year, and how much capacity might be needed to meet demand peaks, such as seasonal and daily peaks — to ensure that BC Hydro can keep the lights on, even on the coldest, darkest days.

2. WHAT IS THE GAP BETWEEN EXISTING SUPPLY AND FORECAST DEMAND?

What is the expected output of BC Hydro’s existing electricity generation, contracted energy supply and transmission assets, and to what degree might conservation and efficiency measures reduce future demand? After conservation measures are taken into account, what is the gap between existing supply and anticipated demand?

3. HOW CAN BC HYDRO CLOSE THE ELECTRICITY GAP?

What blend of additional conservation measures and additional generation and transmission resources will be needed to meet demand, reliably and cost-effectively?

By addressing these questions, BC Hydro identifies actions it must take within the next 10 years to meet its customers’ future long-term electricity needs.

WHERE WE ARE TODAY

Inputs to integrated resource planning including the resource options report, the long-term load forecast and other technical information

Identify the gap between existing supply and forecast electricity demand

What is the gap between existing resources and forecast electricity demand?

Public, stakeholder and First Nations consultation

Input into the draft plan on key planning questions

Analyze options to close the gap

Develop the draft IRP

What is the optimal blend of new conservation, generation and transmission resources?

Public, stakeholder and First Nations consultation

Gather feedback on draft plan

Consider public, stakeholder and First Nations feedback and finalize the IRP

Submit the IRP to the government of British Columbia

2010 | 2011 | 2012

BC Hydro’s Integrated Resource Plan does not, by itself, commit BC Hydro to any specific capital projects.

Recommended action items will be subject to subsequent approval and consultation requirements.
**20-YEAR ELECTRICITY DEMAND FORECAST**

**FORECAST DEMAND: HOW MUCH ELECTRICITY WILL BRITISH COLUMBIANS NEED OVER THE NEXT 20 YEARS?**

Approximately one-third of BC Hydro’s current electricity demand comes from residential customers, another third from commercial and small industrial customers (e.g., hospitals, schools and shopping malls) and the final third from large customers (e.g., pulp mills, mines). Changes in any one of these customer segments can have significant impacts on the overall growth in electricity demand.

**20-YEAR ANNUAL ENERGY LOAD FORECAST**

To ensure that it has sufficient energy to meet future demand, BC Hydro establishes a probable forecast of how much customers will need per year (the red line, below).

It also calculates the potential for higher and lower demand (the grey area around the red line). The green line indicates the anticipated demand, reduced by savings from BC Hydro’s existing conservation and efficiency plans.

In its December 2011 load forecast, BC Hydro anticipated that growth in demand from the mining and oil and gas sectors will be particularly strong. BC Hydro has included the development of two new Liquefied Natural Gas facilities proposed for the north coast of the province in the demand represented in the graph below.

**The long-term load forecast shows that demand for energy could grow by approximately 50 per cent over the next 20 years before accounting for the savings that can be achieved by conservation and efficiency.**

**ANNUAL ENERGY FORECAST**

Energy demand in the above pie chart does not include sales to other utilities and BC Hydro’s own electricity use.

ENERGY is the amount of electricity produced or used over a period of time measured in gigawatt hours (one gigawatt hour equals one million kilowatt hours). The average British Columbian household uses 11,000 kilowatt hours per year.

**Fiscal Year** (year ending March 31)

Source: BC Hydro December 2011 Long-Term Load Forecast
**20-YEAR PEAK CAPACITY FORECAST**

In addition to examining the total energy that BC Hydro customers need in a year, BC Hydro must also ensure that it has sufficient peak capacity to meet the moment-by-moment demands placed on its system.

BC Hydro’s load forecast indicates that peak capacity demand will grow by approximately 50 per cent over the next 20 years, before accounting for the savings that can be achieved by conservation and efficiency measures.

Demand for electricity varies through the year. In British Columbia, the peak demand typically occurs in the early evening in December or January on a very cold weekday.

In the graph below, the blue line represents the projected peak capacity demand before conservation is taken into account; the green line shows the peak demand including the conservation and efficiency levels that BC Hydro believes can be delivered based on existing plans. The grey area shows the demand uncertainty.

**PEAK CAPACITY** refers to the maximum amount of electricity that BC Hydro can supply at any one time throughout the whole province. For example, BC Hydro’s system experiences seasonal and daily peaks in demand.

Source: BC Hydro December 2011 Long-Term Load Forecast
WHAT IS THE GAP BETWEEN EXISTING SUPPLY AND FORECAST DEMAND?

A key step in long-term integrated resource planning involves comparing the energy and capacity load forecast (demand) to currently available resources (supply). When forecast demand exceeds current supply, BC Hydro must fill the gap by encouraging consumers to use less and by increasing the sources of electricity supply.

In BC Hydro’s energy supply-demand outlook (right) the blue bars show the current annual supply of BC Hydro facilities and independent power producers. The bars increase over the next three years, reflecting BC Hydro’s own operating plans and the new independent power production that is coming online. Beyond 2018, the net energy supply goes down as contracts with some independent power producers expire. BC Hydro must fill the gap between the blue bars (the existing supply) and the green line (showing anticipated demand, as reduced by conservation and efficiency measures).

Meanwhile, the capacity outlook indicates that customers will need an additional 2,400 megawatts of peak capacity by 2031.

The decrease in capacity from 2012 to 2031 is due to some biomass-based Independent Power Producer contracts going off-line.
THE DRAFT INTEGRATED RESOURCE PLAN: HOW CAN BC HYDRO CLOSE THE ELECTRICITY GAP?

The draft Integrated Resource Plan describes the actions that BC Hydro proposes to take over the next 10 years to ensure British Columbians continue to receive low-cost, reliable electricity over the long term.

To evaluate the different options and identify the appropriate mix of resources, BC Hydro has considered the following factors:

- Technical Specifications
- Cost
- Effect on provincial energy objectives
- Environmental attributes
- Economic development attributes
- First Nations, stakeholder, public and Technical Advisory Committee input

BC Hydro recommends a set of actions to close the gap. It involves:

- CONSERVING MORE
- BUILDING AND REINVESTING MORE
- BUYING MORE

In addition, BC Hydro must also develop contingency plans to the address the “what ifs” such as what if demand grows more quickly than expected. BC Hydro has additional recommendations to:

- PREPARE FOR POTENTIALLY GREATER DEMAND

FINDING THE RIGHT MIX

Electricity sources can be divided into two categories: dependable capacity and intermittent energy.

Dependable capacity resources, such as large hydro reservoirs and generating stations, pumped storage facilities and natural gas-fired generators, all deliver a consistent, dependable amount of power over time.

Intermittent energy resources, such as wind, solar, run-of-river hydro, and tidal and wave energy, deliver power only when the wind is blowing, the sun is shining or the water is flowing.

The challenge for electric utilities is to deliver a reliable supply of electricity and operate with an appropriate balance of cost-effective, dependable capacity and intermittent renewable resources to minimize environmental impacts.
CONSERVE MORE – USE LESS ELECTRICITY AND USE IT WISELY

RECOMMENDED ACTIONS

➤ CONSERVE MORE

REDUCE ENERGY CONSUMPTION

➤ RECOMMENDED ACTION #1: CONSERVE MORE:
  a) Increase our energy savings target to 9,800 gigawatt hours per year by 2020 (1,000 gigawatt hours more than the current plan) through conservation and efficiency programs, incentives and regulations.
  b) Explore more codes, standards and rate options for savings beyond the annual target of 9,800 gigawatt hours.

Conservation and efficiency, also referred to as demand-side measures (DSM), is the cleanest and least expensive way for BC Hydro to reduce the gap between future electricity demand and existing resources.

Conservation measures can include:
- Programs that provide information, education and incentives.
- Specifically designed electricity rates such as the existing residential inclining block rate that encourages conservation while collecting no additional revenue for BC Hydro.
- Government codes and standards that set minimum energy performance levels for products or systems that use, control or affect the use of energy — for example, by eliminating the sale of low-efficiency light bulbs.

In determining how much conservation and efficiency it should recommend, BC Hydro considered:
- How much energy savings is BC Hydro confident will be delivered?
- At what cost can savings be achieved?
- What has been the consultation input to date?

ENCOURAGE LESS CONSUMPTION DURING PERIODS OF PEAK DEMAND

➤ RECOMMENDED ACTION #2: Pursue voluntary conservation programs that encourage residential, commercial and industrial customers to reduce energy consumption during peak periods.

In addition to conservation measures that target total energy savings over the course of a year, BC Hydro will improve voluntary programs designed to reduce peak demand or shift demand away from peak hours. For example, BC Hydro can work with large industrial customers to adjust their processes and equipment operations in a way that reduces consumption for short periods when needed.

For more information about BC Hydro’s Power Smart programs, go to bchydro.com/powersmart.

For more information about BC Hydro’s Power Smart programs, go to bchydro.com/powersmart.
**BUILD AND REINVEST MORE**

While conservation is the first and preferred strategy to meet customers’ future electricity needs, made-in-B.C. power is still required to fill the gap between existing supply and anticipated demand — for both the total amount of energy used in the course of a year and for the peak capacity needed during times of maximum consumption.

Over the last 30 years, British Columbians have been able to rely on the total energy and peak capacity that was created when BC Hydro built the large dams, reservoirs and generating stations on the Peace and Columbia river systems. BC Hydro has been able to meet rising peak demand by adding generating units and making other improvements to the existing generating stations on the Peace and Columbia to take maximum advantage of the energy storage capabilities of their reservoirs.

Now that this infrastructure is nearing its maximum potential, BC Hydro will need to seek other solutions to meet growing needs. One of the objectives of the Clean Energy Act is that at least 93 per cent of B.C.’s electricity comes from clean or renewable sources. Run-of-river hydro and wind generation can fill some of this demand, but these are intermittent sources and therefore are not solutions when needing reliable peak capacity.

**SITE C PUBLIC AND STAKEHOLDER CONSULTATION**

Site C is currently in the environmental and regulatory review stage, which includes a co-operative federal and provincial environmental assessment process, including a joint review panel. The environmental assessment process for Site C will include multiple opportunities for participation by the public, Aboriginal groups, governments and other interested stakeholders.

Separate from consultation opportunities led by the regulatory agencies as part of the environmental assessment, BC Hydro is leading several streams of public and stakeholder consultation:

- Regional and Local Government Liaison
- Property Owner Liaison
- Local Area Consultation
- Aboriginal Consultation and Engagement
- Project Definition Consultation

**SITE C:**

- Supports the provincial clean energy, self-sufficiency and climate change objectives by providing energy and capacity with low greenhouse gas emissions intensity.
- Projected to provide 35,000 direct and indirect jobs, supporting the provincial objective of encouraging economic development and job creation.
- Facilitates the development of wind and run-of-river hydro that require backup from a dependable and flexible resource.

**BUILD THE SITE C CLEAN ENERGY PROJECT**

The Site C Clean Energy Project is a proposed third dam and hydroelectric generating station on the Peace River, downstream from the existing BC Hydro reservoirs and the G.M. Shrum and Peace Canyon generating stations.

**RECOMMENDED ACTION #3: Build Site C to add 5,100 gigawatt hours of annual energy and 1,100 megawatts of dependable capacity to the system for the earliest in-service date, subject to environmental certification and fulfilling the Crown’s duty to consult and, where appropriate, accommodate Aboriginal groups.**

Artist’s rendering of the proposed Site C Dam.
BC Hydro initiated the Resource Smart program in 1988 to identify and implement efficiency gains at existing BC Hydro facilities. The program provides additional annual energy and peak capacity by modifying, updating and retrofitting our existing generation facilities. Recently, BC Hydro began the addition of the fifth and sixth generating units at Mica Generating Station. These investments will ensure that the backbone of our system remains strong and reliable.

**RECOMMENDED ACTION #4:** Begin work to allow the sixth generating unit at Revelstoke Generating Station to be built by 2018, adding 500 megawatts of peak capacity to the BC Hydro system.

The Revelstoke Generating Station, which was designed to accommodate six generating units, opened in 1984 with four units and a combined peak capacity of 1,980 megawatts. With the addition of a 500-megawatt fifth unit in 2010, Revelstoke now provides more than 20 per cent of BC Hydro’s total peak capacity.

**RECOMMENDED ACTION #5:** Continue to investigate and advance cost-effective Resource Smart projects to utilize the remaining untapped capacity within BC Hydro’s existing hydroelectric system.

While BC Hydro has completed a large number of Resource Smart projects over the past 20 years and has other generation refurbishment plans underway, there are still some remaining ways to modify, update and retrofit our existing generation facilities to secure additional energy and peak capacity. Upgrading the existing system through the Resource Smart projects can provide additional energy production and peak capacity on the system in a cost-effective way, with generally low or no incremental environmental impact.
COMBINE READILY AVAILABLE RESOURCES TO MEET THE SHORT-TERM CAPACITY GAP

➤ RECOMMENDED ACTION #6: Fill the short-term peak capacity gap from 2015 to 2020 with a combination of market purchases first, power from the Columbia River Treaty second, and extending the existing backup use of Burrard Thermal Generating Station, if required and as authorized by regulation.

A short-term capacity gap emerges in 2015 before new projects such as Revelstoke 6 and Site C come online and provide additional peak capacity. To fill this short-term gap until alternative resources are developed, BC Hydro proposes relying on cost-effective and readily available resources to meet customers’ growing requirements.

During this gap period, BC Hydro plans to continue to purchase capacity from the marketplace via the western electricity grid to ensure that customers' growing peak requirements can be met.

The Canadian Entitlement is a feature of the Columbia River Treaty between Canada and the United States, under which Canada operates its dams on the Columbia River in a way that optimizes generating potential and regulates water flow in both countries. In return, B.C. receives an “entitlement” of one-half of the extra power produced in the U.S.

Using the Canadian Entitlement and purchasing peak capacity on the open market involves calling upon electricity from the U.S. during periods when customers’ demand peaks.

Burrard Thermal Generating Station is a major generating facility located in the Lower Mainland and is valuable as an emergency backup resource. The plant is available with government approval to meet demand in the Lower Mainland in the event that peak demand exceeds available resources, or on an emergency basis. BC Hydro has, on average, called upon Burrard 12 days per year during the past three years to meet peak demand and to provide emergency backup for generation and transmission outages.
TRANSMISSION REQUIREMENTS

➤ RECOMMENDED ACTION #7: Reinforce the existing 500-kilovolt line from Prince George to Terrace to meet new demand on the north coast.

B.C.’s bulk high-voltage transmission system is the backbone of the grid that delivers electricity to customers across the province. It carries electricity from where it is generated to the cities, towns and industrial centres where it is largely consumed. To meet expected demand, BC Hydro has concluded that no new high-voltage inter-regional transmission lines are needed in the next 20 years. However, the existing 500-kilovolt line from Prince George to Terrace will need to be reinforced to meet new demand on the north coast.

In addition, BC Hydro must:

- Complete committed transmission line projects, including the Interior-to-Lower Mainland (ILM) and Northwest Transmission Line (NTL).
- Address region-specific transmission needs. For example, oil and gas industry expansion is driving rapid growth in the South Peace area.
BUY MORE

While conservation is our first and preferred strategy to meet customers’ future electricity requirements, made-in-B.C. power is still required to help close the gap between supply and demand. British Columbia is fortunate to have a wealth of potential clean resources, including hydroelectricity, biomass and wind. The B.C. Clean Energy Act objective that at least 93 per cent of B.C.’s electricity generation comes from clean or renewable sources allows for not more than seven per cent of generation from sources such as natural gas-fired generation.

ENERGY FROM B.C.-BASED CLEAN ENERGY PRODUCERS

➤ RECOMMENDED ACTION #8: Develop energy procurement options to acquire up to 2,000 gigawatt hours per year from clean energy producers for projects that would come into service in the 2016–2018 time period.

Final decisions on the timing, and the volume of energy will be made once there is more certainty regarding projected new electricity loads.

BC Hydro has been purchasing power through long-term contracts with independent power producers for over 20 years. During fiscal 2011, independent power producers supplied 10,805 gigawatt hours of annual energy — about 20 per cent of all BC Hydro electricity requirements — while also contributing to the Province’s self-sufficiency, clean energy generation, and greenhouse gas reduction objectives.
As part of good utility practice, BC Hydro must have contingency plans in case electricity requirements grow faster than forecast, or if planned resources don’t come online when expected.

BC Hydro is paying particular attention to two areas of the province where there is potential for greater demand growth from development in the large industrial sector. While this new demand is difficult to forecast with certainty, it warrants careful examination now because of the large volumes of energy and capacity that could be required and the unique geographic challenges associated with serving major new demand in northern B.C.

### NORTH COAST: LIQUEFIED NATURAL GAS DEVELOPMENT

**RECOMMENDED ACTION #9:** Continue to work with LNG developers to understand their electricity requirements, and keep options open until further certainty on future requirements can be established. Specifically:

- Undertake work to maintain the earliest in-service date for a new 500-kV transmission line from Prince George to Terrace and Kitimat and from the Peace River region to Prince George.
- Develop procurement options for additional clean energy resources, backed up by gas-fired generation (located only in the north coast, or in both the north coast and across the province) for electricity that could be delivered in the 2019–2020 time frame, should it be needed.

In addition to the two Liquefied Natural Gas (LNG) facilities that are included within the IRP’s base resource plan, BC Hydro is aware of a number of other LNG and new mine developments on the north coast. If a third LNG plant requests service or a number of new mines come online, BC Hydro would need to acquire significant additional annual energy and peak capacity. BC Hydro is studying a range of options to serve additional potential need on the north coast, involving both the energy supply and the associated transmission infrastructure.

### NORTH EAST: NATURAL GAS EXTRACTION

**RECOMMENDED ACTION #10:** Continue to monitor the northeast natural gas industry and undertake studies to keep electricity supply options open, including transmission connection to the integrated system, and local gas-fired generation.

BC Hydro is looking at the potential that large new natural gas extraction will emerge in the Horn River Basin in northeast B.C. and that the gas industry will seek electrical power from BC Hydro. The Horn River Basin encompasses a large area northeast of Fort Nelson that is not currently connected to BC Hydro’s integrated transmission system. Gas production in the Horn River Basin requires energy for two purposes: moving gas through pipelines, and processing the gas to remove impurities. Traditionally, the natural gas industry has met its own energy requirements by burning natural gas or diesel. However, the industry could be electrified.

Two broad alternatives to serve this potential demand include:

- Building a new northeast transmission line to bring new clean energy to the region via the integrated system.
- Acquiring gas-fired electricity generated locally.
PEAK CAPACITY RESOURCE OPTIONS

➤ RECOMMENDED ACTION #11a: Working with industry, explore pumped storage capacity options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

➤ RECOMMENDED ACTION #11b: Working with industry, explore natural gas-fired generation options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

For contingency planning purposes, BC Hydro must look beyond the Integrated Resource Plan base plan recommended actions and address what if growth is even greater than expected or other resources don’t come online when expected.

Pumped storage involves taking advantage of the fact that reservoirs make excellent batteries: the water can be held for long periods and released through generating turbines only when necessary to meet electricity demand.

Utilities have the ability to recharge these batteries by using electricity to pump water from a lower reservoir to a higher reservoir when electricity is plentiful and cheap. Then, during periods of high electrical demand (i.e., at dinnertime on a cold, dark day), the stored water is re-released through the turbines to produce electricity when it is needed most.

After BC Hydro exhausts Resource Smart projects, natural gas is the next-lowest-cost alternative for adding additional capacity to the system and therefore best addresses keeping electricity rates affordable. Natural gas-fired plants can be located close to where the electricity is needed, reducing the need to build new transmission lines.
**SUMMARY OF RECOMMENDED ACTIONS**

**CONSERVE MORE**

**REDUCE ENERGY CONSUMPTION**
1. Conserve More:
   a) Increase our energy savings target to 9,800 gigawatt hours per year by 2020 (1,000 gigawatt hours more than the current plan) through conservation and efficiency programs, incentives and regulations.
   b) Explore more codes, standards and rate options for savings beyond the annual target of 9,800 gigawatt hours.

**ENCOURAGE LESS CONSUMPTION DURING PEAK DEMAND PERIODS**
2. Pursue voluntary conservation programs that encourage residential, commercial and industrial customers to reduce energy consumption during peak periods.

**BUILD AND REINVEST MORE**

**BUILD THE SITE C CLEAN ENERGY PROJECT**
3. Build Site C to add 5,100 gigawatt hours of annual energy and 1,100 megawatts of dependable capacity to the system for the earliest in-service date, subject to environmental certification and fulfilling the Crown’s duty to consult and, where appropriate, accommodate Aboriginal groups.

**TAKE ADVANTAGE OF RESOURCE SMART OPPORTUNITIES**
4. Begin work to allow the sixth generating unit at Revelstoke Generating Station to be built by 2018, adding 500 megawatts of peak capacity to the BC Hydro system.
5. Continue to investigate and advance cost-effective Resource Smart projects to utilize the remaining untapped capacity within BC Hydro’s existing hydroelectric system.

**COMBINE READILY AVAILABLE RESOURCES TO MEET THE SHORT-TERM CAPACITY GAP**
6. Fill the short-term peak capacity gap from 2015 to 2020 with a combination of market purchases first, power from the Columbia River Treaty second, and extending the existing backup use of Burrard Thermal Generating Station, if required and authorized by regulation.

**REINFORCE TRANSMISSION**
7. Reinforce the existing 500-kilovolt line from Prince George to Terrace to meet new demand on the north coast.

**BUY MORE**

**ENERGY FROM B.C.-BASED CLEAN ENERGY PRODUCERS**
8. Develop energy procurement options to acquire up to 2,000 gigawatt hours per year from clean energy producers for projects that would come into service in the 2016 – 2018 time period.

**PREPARE FOR POTENTIALLY GREATER DEMAND**

**POTENTIAL ADDITIONAL LARGE INDUSTRIAL DEMAND**
9. Continue to work with LNG developers to understand their electricity requirements, and keep options open until further certainty on future requirements can be established. Specifically:
   - Undertake work to maintain the earliest in-service date for a new 500-kV transmission line from Prince George to Terrace and Kitimat and from the Peace River region to Prince George.
   - Develop procurement options for additional clean energy resources, backed up by gas-fired generation (located only in the north coast, or in both the north coast and across the province) for electricity that could be delivered in the 2019 – 2020 time frame, should it be needed.

10. Continue to monitor the northeast natural gas industry and undertake studies to keep electricity supply options open, including transmission connection to the integrated system, and local gas-fired generation.

**PEAK CAPACITY RESOURCES**
11. a) Working with industry, explore pumped storage capacity options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.
   b) Working with industry, explore natural gas-fired generation options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

**BC Hydro’s Integrated Resource Plan does not, by itself, commit BC Hydro to any specific capital projects. Recommended action items will be subject to subsequent approval and consultation requirements.**

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May 28 to JULY 6, 2012 | bchydro.com/irp
RESULT OF ACTIONS TO CONSERVE, BUILD, REINVEST AND BUY MORE

Recommended actions #1 through #8 address the forecast annual energy and peak capacity gaps. This portfolio of resources is recommended based on BC Hydro’s consideration of technical requirements, cost, provincial energy objectives, environmental and economic development attributes, and input gathered through consultation in 2011.

THE RECOMMENDED ACTIONS WILL FILL THE PROJECTED ANNUAL ENERGY GAP.

The diagram below left summarizes how BC Hydro proposes to close the energy gap — first through cutting energy demand through conservation, then filling the remaining gap through a combination of energy from B.C.-based clean energy producers and Site C.

THE RECOMMENDED ACTIONS WILL FILL THE PROJECTED PEAK CAPACITY GAP.

The diagram below right summarizes how BC Hydro proposes to close the gap between peak capacity requirements and existing resources, both in the short-term (the 2017 time frame) and the longer term (2021 and 2031).
**MEETING DETAILS**

<table>
<thead>
<tr>
<th>BC Hydro Integrated Resource Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Clean Energy Plan to Meet B.C.’s Future Electricity Needs</td>
</tr>
</tbody>
</table>

Vernon–Multi-Stakeholder Meeting  
May 29, 2012, 10:30 a.m. – 12:30 p.m.  
The Prestige Hotel & Conference Centre Vernon – Vernon Room  
4411 32nd Street, Vernon, B.C.

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**PURPOSE**


**FACILITATOR**

Judy Kirk, Kirk & Co. Consulting Ltd.

**PRESENTER**

David Ince, BC Hydro

**ATTENDEES**

Janice Brown, Township of Spallumcheen  
Michael Curd  
Shirley Fowler, City of Armstrong  
Pamela Jenkins, City of Vernon  
Robin LeDrew  
Dean McLean  
Deb McLean  
Jodi McLean  
Peter McLean  
Patrick Nicol, Mayor of Vernon  
Chris Pieper, Mayor of Armstrong  
Rob Sawatzky, City of Vernon  
Nadine Wilson, DVA Board of Directors

**BC HYDRO INTEGRATED RESOURCE PLAN PROJECT TEAM**

Kevin Maxwell, BC Hydro  
Dag Sharman, BC Hydro  
Tim Lai, Kirk & Co. Consulting Ltd, Meeting Recorder

**AGENDA**

1. Introduction  
2. Draft Integrated Resource Plan Overview  
3. Consultation Topics – IRP Recommendations  
4. Question and Answer  
5. Feedback Form

**KEY THEMES**

- Some participants asked BC Hydro to consider charging higher rates to large industrial customers to allow for lower rates to residential customers and asked BC Hydro to consider charging new commercial and industrial customers a higher rate to reflect the higher cost of generating new energy.
• Some participants asked BC Hydro to consider building more energy generation close to where energy demand originates.
• Some participants asked BC Hydro to be cautious about how much energy generation it invests in to serve proposed LNG plants, in case the LNG demand does not materialize.

DISCUSSION

The record notes that the meeting was called to order at 10:30.

(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. Judy Kirk – Welcome and Introductions
   Judy Kirk welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Judy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. David Ince – Consultation Discussion Guide
   David Ince reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

   Introduction pp. 1 - 9

   Q: Rob Sawatzky: How do you balance keeping rates low and reducing consumption?
   A: David Ince: Each of our specific rate groups have specific rates. For example, residents pay about 7 cents, but in order to get new generation, building or buying it costs almost double that. Every time we add a load, we have to increase the rates on a net basis. It seems like a strange business model, but it’s like an old car, where it’s depreciated. It’s very inexpensive to run. Any new generation is going to cost more than our current rate and that’s why conservation is the cheaper, most attractive and environmentally friendly rate.

   Q: Rob Sawatzky: Isn’t the easiest way to encourage conservation to raise rates?
   A: David Ince: That is one way. That involves some unpopular decisions. We’re trying to maintain low rates and balancing the system to keep the lights on.

   A: Judy Kirk: What people said last year was that they wanted BC Hydro to look at more proactive conservation, but they cautioned between voluntary and mandatory measures. They saw rate increases as a mandatory measure. They were really firm about looking for a balance.

   Q: Pamela Jenkins: How much energy is lost through transmission?
   A: David Ince: It’s a significant – about 10 per cent, but it’s an unavoidable fact. We lose about 7 per cent through the transmission lines and about 3 per cent through local distribution.
Q: Dean McLean: So if BC Hydro is losing 10 per cent, are you looking at replacing those lines since they’re the original? Did they become inefficient because they’re worn out?
A: David Ince: They don’t wear out, but the more power you push through those lines, the more power you’ll lose. Because we have load growth, we may have to upgrade that transmission.

Q: Michael Curd: How does revenue break down with the customer classes? Is it one third, one third, one third?
A: David Ince: What we try to do is maintain rate principles of cost recovery. We try to charge them what their expenditure was.

Q: Michael Curd: The residential customer is still probably paying a lot more for their electricity.
A: David Ince: For industrial customers, it’s about 4 cents, for residential, it’s about 7 cents. That may sound discriminatory, but it’s less expensive to serve large customers because they’re connected right to the transmission system. Residential customers are on that large distribution system.

Q: Deb McLean: You keep referring to 7 cents for residential, but my step 1 rate is 9 cents and step 2 is 12 cents. Where are you coming up with 7 because I’ll take the 7?
A: Dag Sharman: It’s higher than 7. It’s about 8.

Q: Dean McLean: It seems to be that the larger companies have better ability to pay more than 4 cents. Has there been discussion around that? Us families don’t get any tax breaks against it, where big companies have a cheaper power source, they get the chance to deduct and get further savings. Could you download the cost onto them to give us residential customer better value?
A: David Ince: That’s a possibility. In some jurisdictions, big industrial pay proportionally more. It’s a balance of keeping jobs and keeping those businesses going. We try to maintain a 1:1 for revenue and cost for each customer class.

Q: Peter McLean: You’ve adjusted the residential rates higher, but have industrials been adjusted to go higher than 4 cents?
A: David Ince: All of the customers would rise at the same rate.

Q: Peter McLean: Those 166 large industrial, what rate are they at?
A: Dag Sharman: It’s a complicated rate. It’s a formula based on historic baselines, infrastructure. It’s not a straightforward answer, which is why they have energy manager. I can get you the formula, but it’s under the formula. It’s not just 4 cents.

A: Judy Kirk: It’s because large customers are required to build up until distribution. They have energy infrastructure in addition to what residential customers would have and they’re subject to load curtailment.

A: Dag Sharman: They also have to build lines to the transmission sites. If your residential lines go out, BC Hydro will fix it. But if their power goes out, they have to fix it.

C: Peter McLean: But that’s the cost to do business.
Q: **Peter McLean**: You have complicated formula. If you take a snapshot of customers now and you apply your forecasts, could new clients get a new formula? Perhaps current customers get grandfathered rates since they paid for existing infrastructure.

A: **David Ince**: That’s a significant issue. Our rates people have agonized over that. We have an old principle in which old and new customers are blended together – a postage stamp rate. Some have suggested that there should differentiation of rates, but would be discriminatory.

Q: **Peter McLean**: I know it’s not a simple as I paint it to be, but we have bought it into the system as it is today. We have no choice who BC Hydro accommodates in the future. We don’t have an option or say if BC Hydro says it wants to supply another customer. We as the general public have to carry those decisions.

A: **Judy Kirk**: In the last round of consultation, we talked about economic development. The blended rate allows for new businesses and industries to get started without higher costs. We have to look at all considerations.

C: **Peter McLean**: Yes, we as local government come up with ways to save new business money.

**Build and Reinvest More pp. 12 - 16**

Q: **Chris Pieper**: Is the gap similar to Revelstoke or Mica?

A: **David Ince**: It’s similar to Revelstoke which is good for 3,000 MW capacity.

Q: **Dean McLean**: Are all the dams on the Columbia run at full capacity in terms of generators? There was that upgrade on Keenleyside. Any more room for more generators or are they maxed out?

A: **David Ince**: They’re not maxed out yet, but we’ll get into that later.

Q: **Dag Sharman**: To be clear, at Keenleyside, the generating station is Columbia Power, but BC Hydro operates the dam.

Q: **Dean McLean**: Is Columbia Power part of BC Hydro?

A: **Dag Sharman**: No, it’s a separate Crown corporation.

Q: **Rob Sawatzky**: How do we compare to other jurisdictions in terms of conservation since each household uses on average 11,000 KWh?

A: **David Ince**: We’re quite a bit higher. In California, it’s about half, but their power is about 30 cents at the highest tier. California and Alberta’s rate is about 3 times higher.

Q: **Deb McLean**: We live in a area that’s only electricity, we have no other option for heating as there is no gas. Are these rates going to take into consideration areas like this in order to give them a break?

A: **David Ince**: No, we haven’t considered it.

Q: **Robin LeDrew**: Notion of rate increases is in this plan?

A: **Judy Kirk**: Yes, absolutely.
A:  *David Ince*: Our current rate is revenue neutral, it used to be flat. The first rate was reduced and the second rate was increased. If you’re consuming the average rate of energy, it would be the same as before. I don’t want to imply that we would have a rate for the sake of conservation. It would be a balanced rate to make it revenue neutral.

Q:  *Nadine Wilson*: You said you’re trying to save 10 per cent in the conservation program, but you also said that you’re losing 10 per cent through transmission. You could save money by upgrading the system and still save that 10 per cent.

A:  *David Ince*: You’re always going to have losses on the system due to distances. We’re always trying to reduce those losses – we’ll never get it to zero.

Q:  *Dean McLean*: You could set a really good example to the rest of the users by setting an example of reducing that 10 per cent loss number, perhaps through the advancement of technology.

A:  *David Ince*: There is nothing out there right that is revolutionary. You could increase the size of the wires.

Q:  *Dean McLean*: How much of shortfall does Site C address?

A:  *David Ince*: Most of it. Our average load growth is about 1,000 GWh a year, so this is good for at least 5 years.

Q:  *Pamela Jenkins*: How much land flooded for Site C?

A:  *David Ince*: I don’t have the exact hectares.

A:  *Kevin Maxwell*: It’s about 2-3 times the width of the current river, on average.

Q:  *Pamela Jenkins*: Will you cut trees before it’s flooded?

A:  *David Ince*: Yes, but there aren’t many trees in the river valley.

Q:  *Robin LeDrew*: Is there farmland?

A:  *Judy Kirk*: Yes, there is farmland. It’s currently in the environmental review process, which address things like agriculture and clearing.

A:  *David Ince*: Site C will flood some land, but there are always compromises. If we don’t build Site C, we’d have to build something else. When we look at other options, this affects less land since you’d have to clear land for roads and transmission.

Q:  *Robin LeDrew*: Site C energy has to go the furthest. Is there an estimation of the loss of power from that distance during transmission? It doesn’t seem to be the most convenient place to generate power for the Lower Mainland. Do you weigh the amount of transmission loss?

A:  *David Ince*: It’s a compromise – it’s looking at the quality of the resource versus the losses.

Q:  *Robin LeDrew*: Geographically, it seems like that site would meet the needs of Alberta better than down here.

A:  *David Ince*: One of the classic examples of BC Hydro is that load and resources are quite far apart.

Q:  *Dean McLean*: Does it make sense to send power to Alberta since it may be closer and you’d lose less? Does the grid have the ability to do that?

A:  *David Ince*: There is no connection to Alberta in the north and nothing envisioned.
Q: Deb McLean: What is the cost to run Burrard for 12 days and to maintain it through the year. Is it cost effective to run Burrard for those 12 days?
A: David Ince: Yes, because it’s a large facility that’s depreciated.
Q: Deb McLean: All the costs to pay workers year round and to maintain it - is worth it?
A: David Ince: Yes, that’s the problem with meeting peak demand where you need short sporadic bursts of power. BC Hydro has to maintain the infrastructure to keep the lights on.

Q: Dean McLean: Is this gap where the IPPs come into to meeting short-term gap? From the numbers I’ve seen for IPP, it’s not a good deal for residential customers – they’re expensive options. Have you abandoned some of those ideas because the price isn’t good?
A: David Ince: BC Hydro signed contracts over the last few years to meet general load growth, the 1,000 GWh a year. It’s not tied to the gap. We brought in power at 13 cents. Our recommendations are more cost effective than IPPs, so that’s how we would stack things up. IPPs are towards the end.

Q: Nadine Wilson: Can Burrard be converted to electricity instead of gas since it’s paid for?
A: Kevin Maxwell: We’ve looked at that as an option and it ends up slightly more expensive than Site C.
Q: Nadine Wilson: But it’s so close.
A: Kevin Maxwell: Once you add up costs, which include delivery price and transmission losses, and environmental issues, it’s still more than Site C.
Q: Robin LeDrew: What do you mean by slightly?
A: Kevin Maxwell: It depends on market gas price. If they were high like they were a few years ago, it could be 50% more.
C: Robin LeDrew: That’s more than slightly.
Q: Chris Pieper: How big is Burrard?
A: David Ince: 900 MW with everything going, but its 1960’s technology.
Q: Chris Pieper: How many generators are in there?
A: David Ince: 6 generators.

Q: Jodi McLean: Regarding the Columbia River Treaty itself, is it my understanding that we have to resign in 2014?
A: Dag Sharman: It expires in 2024, but if we were to terminate, we would have to give 10 years notice, which would be 2014.
Q: Robin LeDrew: When could the treaty change?
A: Dag Sharman: I don’t know the answer to that.
C: Judy Kirk: BC Hydro representatives aren’t experts in Columbia River Treaty. It’s a complex deal and we don’t want to give misinformation.
Q: Rob Sawatzky: Regarding Canadian entitlement, does it mean we can get more than 500 MW of power?
C: Pamela Jenkins: It seems like the U.S. is trying to get more of our power.
A: David Ince: It’s power that’s generated in the U.S. The province has a certain allocation and it’s traded in the U.S. to make money for the provincial government. It’s up to 500 MW.

Q: Patrick Nicol: When they start Site C, when will they notify people when the flooding begins? On Mica, the flooding began as they were starting the environmental processes.
A: David Ince: Construction would take 7 years. There’s been extensive consultation and the environmental review is under way. We’re not going to surprise people when there’s flooding occurring.
Q: Patrick Nicol: That’s what happened in the past and it shouldn’t happen again.
A: Judy Kirk: We have been doing consultation for 5 years. There have been lots of questions about the construction period and inundation, all of which are subject to environmental review.
Q: Patrick Nicol: How much of Site C’s power will go to northern customers?
A: David Ince: All customer classes are growing and Site C isn’t allocated to any particular class.

Q: Dean McLean: Does BC Hydro own a power facility in the U.S.?
A: David Ince: The Bonnyville administration owns the dam and in compensation of us building things on our side, we got an allocation of power.
Q: Dean McLean: So BC Hydro doesn’t own Bonnyville dam?
A: David Ince: No, we get an entitlement. We’d like to own it.
Q: Dean McLean: We don’t own that facility, but if the negotiation of how the water goes back and forth, they threw us 500 MW?
A: David Ince: We build dams on our border to protect them from floods on their side.

C: Peter McLean: With the new projects on the North Coast, there are significant costs which won’t be carried by them. The general public will cover that it seems.
A: David Ince: There is negotiation going on with various proponents of what costs will be paid.
Q: Peter McLean: If these projects don’t go through, there are no added costs?
A: David Ince: We’re always guarding against stranded costs.
Q: Dean McLean: Are we subsidizing their demand?
C: Peter McLean: That’s my general concern and we’re hearing these large projects coming, but we’re flipping the bill.

C: Kevin Maxwell: I’d to point out that we’re looking to building the Interior to Lower Mainland transmission line, which would help reduce transmission losses, which are about 5 per cent, dropping it to 3.5 per cent.
Q: Chris Pieper: Could you increase lines to 750 KV or 1 million without new towers, but realigning or adding lines?
A: David Ince: That’s a good question but I don’t think so with the existing towers.
Q: **Michael Curd:** How about high-voltage direct current transmission?
A: **David Ince:** That form would transmit more power and reduce losses, but it came up as a higher cost option. We don’t have these HVDC lines in our system.

**Buy More pp. 17**

Q: **Chris Pieper:** How big is a wind turbine and how much would it generate?
A: **David Ince:** In Pincher Creek, AB, they are 44 metres high and it produces 6 MW. BC Hydro peak load is 12,000 MW.
Q: **Nadine Wilson:** For how long?
A: **David Ince:** The unit’s lifespan is for about 20 years. The 6 MW is the most it could produce instantly.
A: **Kevin Maxwell:** It also depends on when the wind blows. In some areas of the province, the wind blows 40 per cent of them. Other areas, it’s 20 per cent.
Q: **Chris Pieper:** So in doing some quick math, you’d need 800 wind turbines for one generator at Mica.
A: **David Ince:** It gets worse because more wind facilities operate at a 30 per cent capacity. So take your number and divide it by three.
Q: **Kevin Maxwell:** And that’s if the wind is going to blow in the winter when we need it.

**Prepare for Potentially Greater Demand pp. 18 - 20**

C: **Michael Curd:** It sounds like a bad idea for BC Hydro to get into this business with LNG. The shale gas deposit seems to deplete very quickly. There may be a glut right now, but that could change and prices will change and it won’t be viable to ship. BC Hydro could be left with a huge cost of transmission lines.
Q: **Dean McLean:** Is the demand increase predominantly driven by industries? If that’s the case, you really have to watch that because as a resident, I don’t want to pay for that. If you commit to industries that have fluctuations, it could hurt residents as we will be hung with that.
A: **David Ince:** Those are genuine concerns. During the negotiations of how to meet this demand, there will be talk about subsidies and we want to minimize that issue. There could be a deal where they pay for the transmission and the extra electricity demand.
C: **Dean McLean:** There has to be balance because you don’t want to discourage economic development as that won’t help the taxpayer.

C: **Michael Curd:** The gas supply isn’t reliable over time and depleting faster than predicted, so I hope BC Hydro doesn’t place too many eggs in that basket. You could find that gas prices may be too high in the future.
Q: **Peter McLean:** When you’re looking at so much energy consumption, is it not feasible for the LNG plants to self-generate and send it back down the system?
A:  *David Ince*: Yes, they could build gas-fired generation themselves. That’s part of the review that we’re doing now.

C:  *Peter McLean*: I don’t know definition of conservation, but my experience in the political realm is that you get the one group that is very concerned – the single interest – then you get the general public involvement. Towards the end, the community as a whole will try to find the balance in the end.

C:  *Judy Kirk*: The composition of participants was very balanced. It’s interesting to see whether what you’re saying holds true.

C:  *David Ince*: That’s a good comment. In Kitimat, there’s a series of fjords and if you have a gas plants, the winds could create funneling effect of a lot of emissions. I’m not sure if the communities up there would appreciate that.

C:  *Dean McLean*: It seems like that that project is very reliant on BC Hydro supplying for them.

C:  *David Ince*: That could be.

C:  *Judy Kirk*: No decisions have been made.

C:  *David Ince*: It’s under negotiation. If they apply for service and meet the terms and conditions, and there’s a deal struck for the existing ratepayers and government, then we’ll have to catch up and serve them.

Q:  *Michael Curd*: Do our dams have capacity for pumped storage?

A:  *David Ince*: We don’t have pumped storage in our other reservoirs.

C:  *Michael Curd*: One of the great things about BC Hydro is its capacity, which we can hold water to say up to 6 months.

C:  *David Ince*: The beauty of the BC Hydro system is the flexibility. We haven’t built anything since 1984, which was Revelstoke. With the load that’s been growing, our flexibility has diminished.

Q:  *Jodi McLean*: Would Site C be built with the potential for pumped storage?

A:  *David Ince*: Normally, you would want a facility with a very high elevation gain. Site C is very much like a flat plain. Something like a high alpine lake would be useful.

A:  *Kevin Maxwell*: One of the identified options was pumped storage was Mica Dam and the 6th unit. The 5 others would be normal. It’s the cheapest option we’ve found so far.

Q:  *Patrick Nicol*: What’s the cost of pumped storage?

A:  *David Ince*: You lose about 50 per cent of the energy you put in.

Q:  *Kevin Maxwell*: It’s more of a capacity cost, not an energy cost. It’s harder to calculate. It’s not like building a new Site C. You’re using an existing facility and I believe for Mica or Revelstoke, it’s about $50/KWh. It’s among the cheapest options I’m aware of. It’s more expensive than completing the Revelstoke upgrade, but cheaper than building gas plants.

Q:  *Peter McLean*: For example, is there a secondary reservoir at Mica to take this water?

A:  *David Ince*: There isn’t the volume; we would have to add a small auxiliary reservoir.

Q:  *Robin LeDrew*: Have you looked at the impacts on fish?

A:  *Judy Kirk*: Yes, but this plan doesn’t look at specific site. It’s more about the concept.
Q: Dean McLean: So pumped storage would be about $50/KWh?
A: Judy Kirk: It’s a capacity price, not an energy price.
A: Kevin Maxwell: For example, the cost of maintaining and operating Burrard for those 12 days in the year is a capacity cost. I don’t know what the average kw costs for Burrard.
A: David Ince: In terms of capacity, Revelstoke is the cheapest, pumped storage is next, and gas peakers are next. Gas for an energy planner is a good resource because it’s so dependable, but not that popular
C: Judy Kirk: Let me be clear that gas was the least popular option.
C: Dean McLean: You’re subject to a lot of fluctuations, so you couldn’t guarantee a rate. And the province doesn’t own the gas deposits.
A: David Ince: Yes, the province doesn’t own the deposit and there there’s lots of volatility.

Additional Comments

Q: Deb McLean: Are we getting a list of specific conservation guidelines for public users?
A: David Ince: BC Hydro has to file its long-term conservation plan with BCUC.
Q: Deb McLean: I hope it won’t be treated like the smart metres and be exempted.
A: Kevin Maxwell: You can find the draft plan online with a section on conservation.

Q: Peter McLean: With an emphasis and focus on conservation for homeowners, do you have teams that will come to my home to evaluate and identify opportunities for conservation?
A: Dag Sharman: We don’t have that due to scale of cost, but at BC Hydro, we have outreach teams that attend large events to reach the public. We have the website with lots of ideas. It’s a matter of getting the education out there.
C: Kevin Maxwell: There is a program through the Province, called LiveSmart, where you can get an energy audit done.

Q: Michael Curd: Has BC Hydro thought about upgrading heat pumps instead of investing in heat plants?
A: Dag Sharman: No, there’s no plan to upgrade heat pumps.
Q: Robin LeDrew: Are there any studies looking into how much net energy would be saved if you’re heating with electricity?
C: Nadine Wilson: It’s better to have a ground or water source, than electrical power.
A: Dag Sharman: I’m not aware of one out there.

Q: Peter McLean: I’d be cautious about heat pumps. I would not recommend and would recommend heat pumps because they consume a lot of power.
A: Dag Sharman: I’ve heard from people that they’ve had high bills.
Q: Deb McLean: It takes about 14-16 years to recover costs when you put geothermal in. Is it worth going it?
Q:  *Dean McLean:* Regarding the pie chart on page 6, of those large companies, are any of those non-Canadian companies?

A:  *David Ince:* These are all located in B.C. and serviced areas.

*David Ince wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.*

*The record notes the meeting ended at 12:30 p.m.*
**MEETING DETAILS**

**MULTI-STAKEHOLDER MEETING**

**BC Hydro Integrated Resource Plan**

_A Clean Energy Plan to Meet B.C.’s Future Electricity Needs_

Terrace – Multi-Stakeholder Meeting
June 14, 2012, 1:00 p.m. – 3:00 p.m.

Terrace Best Western Inn, Skeena 1
4553 Greig Avenue, Terrace, B.C.

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**PURPOSE**

Notes from a multi-stakeholder meeting for the BC Hydro Integrated Resource Plan held with Stakeholders and representatives of the Integrated Resource Plan on June 14, 2012 at the Terrace Best Western Inn, Terrace, B.C.

**FACILITATOR**

Nancy Spooner, Kirk & Co. Consulting Ltd.

**PRESENTER**

Doug Little, BC Hydro

**ATTENDEES**

Naved Amirzada, CPU Canada
Derek Baker, PREDC
Richard Bohn
Lynne Christiansen
Marilyn Davies, City of Terrace
Brian Downie, City of Terrace
Evan van Dyk, Terrace Economic Development Authority
Denis Gagné, Robin Austin MLA
Phil Germuth, Kitimat Council
Rob Goffinet, District of Kitimat
Ed Gonsalves
John Garossino, School District 82
Rose Klukas, District of Kitimat
Gail Lowry, New Hazleton
Mary Murphy, District of Kitimat
Trish Parsons, Kitimat Chamber of Commerce
Paula Peinsznksi, TDCSS
Tracy Petley
Frank Shale, School District 52
Margo Van der Touw, Northwest Community College
Andrew Webber
Rick Wozney

**BC HYDRO INTEGRATED RESOURCE PLAN TEAM ATTENDEES**

Brandee Clayton, BC Hydro
Kathy Lee, BC Hydro
Dave Mosure, BC Hydro
Susan Campbell, Kirk & Co. Consulting Ltd, Meeting Recorder

**AGENDA**

1. Introduction
2. Draft Integrated Resource Plan Overview
3. Consultation Topics – IRP Recommendations
4. Question and Answer
5. Feedback Form

KEY THEMES

- Several participants questioned the timing/urgency to double the Kitimat transmission line when the first two LNG projects are not scheduled to be online until 2016. Some participants felt that the timing of the upgrades relative to contract talks might enable Alcan to continue its practice of selling power out of the province.
- Several participants questioned the focus on LNG in the plan, and wondered why the LNG proponents are not planning to self-supply as they are in other parts of the world. This discussion led to questions about taxpayer subsidies, potential impact on residential rates, proponent cost sharing of infrastructure, and contingencies if the LNG projects do not move ahead.

DISCUSSION

The record notes that the meeting was called to order at 1:00 p.m.

(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. Nancy Spooner – Welcome and Introductions
   Facilitator welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Nancy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. Doug Little - Discussion Guide Overview
   The discussion guide was reviewed by Mr. Doug Little, BC Hydro and participants asked questions throughout the presentation.

   Introduction pp. 1 - 9

Q: Trish Parsons: In terms of megawatts, how many megawatts would Kitimat’s LNG plants use and what about Shell?
A: Doug Little: The LNG plants would use about 500 megawatts. In the base forecast, the first two LNG projects are included and the reason is that they both have their NEB\(^1\) permits and their

\(^1\) National Energy Board
environmental approvals; however, with respect to your reference to Shell – that is not included. Further, our expectation is that there will be significant mining growth in the area as well.

Q: Rob Goffinet: Going back to page three you say there are 70 IPPs in B.C. and that they produce 20% of the electricity and the largest is Kemano - how much of RTA is that 20%?
A: Kathy Lee: In the near term it is about 1,000 gigawatts and the new smelter (refurbished Alcan smelter) will take most of the energy and then it drops back to about half of what they can provide right now.

Q: John Garossino: Are all the projections based on domestic use excluding export – is that correct?
A: Doug Little: Yes, it is based on domestic consumption.

Conserve More pp. 10 - 11

Q: Rob Goffinet: On page 10 you have a mandatory time-of-use rate, but you say it is not mandated to be implemented but what is the difference between that and encouraging voluntary time-of-use rates?
A: Doug Little: The key point is the word ‘mandatory’ – it is not a mandatory program but there will be incentives for customers to voluntarily enroll in programs so we will be working on some of these programs. For example, we will be looking at programs, but on a volunteer basis – similar to some of our other Power Smart incentive programs where customers can get incentives for compact fluorescent light bulbs or energy efficiency programs in their houses. If customers can shift their behavior it will provide savings for us and we’d reflect those savings in the incentives.

Build and Reinvest More pp. 12 -16

Q: Rob Goffinet: A reservoir is the key to BC Hydro operations and so that is why they have control of the reservoirs. Now just so that I can understand this, the reservoir is the battery so you can use intermittent power like that which comes from wind farms. That is there to supply when you are not using your water and so the level of the reservoir is stored energy? Don’t you already do that with Alberta, when you buy their coal-fired power? We should be buying power all night when the price is cheap and then running the reservoir during the day and selling that power when it is more expensive. Don’t you already do that?
A: Doug Little: Yes, we do that and that is one the great things about BC Hydro’s system – electricity is produced and we use the wind farms and that allows us to store it and use it at a later time and yes we do that with power from Alberta. That trading has earned billions of dollars for the benefit of BC Hydro’s ratepayers and we will continue to do – that is one of our real strengths.
Q: Paula Peinsznski: So the need is 10,000 gigawatts per year in 2021 and then about 40,000 gigawatts per year by 2031 – that is on Page 8 when you talk about the energy gap – will Site C meet that gap?

A: Doug Little: So in 2021 it is around 5,000-gigawatts and in 2031 it is 12,700-gigawatts and that is the supply gap based on the demand forecast and we do run scenarios about potential additional LNG or mining projects beyond the base case and those would add to our demand for electricity.

Q: Paula Peinsznski: So between now and 2021, you expect the conservation plan to fill the gap?

A: Doug Little: That is largely our intent. With respect to Site C, look ahead to Page 22 and you will see in 2022 that the Site C energy is added so before Site C we have a gap we need to fill and also at the end of the decade we will see another gap for additional energy and as the province continues to grow we will need to add new resources after Site C.

Q: Phil Germuth: With respect to the recommendation around Revelstoke, is that 500 megawatts from those facilities – that’s not from one generator, that’s from all four correct?

A: Doug Little: No, that’s per generator. The original four produced 2,000 megawatts. At the Revelstoke Dam, we added a fifth unit so now we’re up to 2,500 megawatts. With the sixth we’ll get 3,000 megawatts total from the Revelstoke Dam and the same again for Mica. These units are totally massive and if you are in the area of the Revelstoke Dam I would encourage you to stop in at the Visitors Center as it is very cool to see it if you are headed that way.

Q: Rob Goffinet: With respect to Burrard Thermal – how many megawatts?

A: Doug Little: Burrard Thermal has a total of 6 units at 150 megawatts each however it is a very old plant and we can only really count on 600-megawatts on short notice.

Q: Tracy Petley: What is Plan ‘B’? Do you have a Plan ‘B’ if there is no Site C?

A: Doug Little: Site C is a sizable amount of peak capacity and sizable energy so options for peak capacity are fairly limited and we have always relied on big hydro so two options are natural-gas-fired generation or pump storage generation. We have never tried pump storage in B.C. so the timeline is uncertain; however, we want to start exploring it. Pump storage cycles water up and down between the reservoir and it is good for about six or eight peak hours a day so we run the water through then we pump it back up at night. So, we will have to look at natural gas or pump storage.

Q: Rob Goffinet: On Page 15 - the downstream benefits are being hampered by insufficient transmission line capacity linking to the US4 - has BC hydro studied upgrading the transmission line to get the 1,300 megawatts promised from the Columbia River Treaty?

A: Doug Little: Yes we have but there are constraints with the population growth in the King County and Seattle areas. However, most of the time, the 1,300-megawatts is delivered back to B.C. and we are continually in talks with Bonneville Power, the operator in the US.

Q: Rob Goffinet: But if you can’t take the downstream benefits then don’t you get a cash component?

4United States
| MEETING DETAILS | BC Hydro Integrated Resource Plan  
| A Clean Energy Plan to Meet B.C.’s Future Electricity Needs |
| MULTI-STAKEHOLDER MEETING | Terrace –Multi-Stakeholder Meeting  
| June 14, 2012, 1:00 p.m. – 3:00 p.m. |
| Terrace Best Western Inn, Skeena 1  
| 4553 Greig Avenue, Terrace, B.C. |

A: *Doug Little:* That is an arrangement through government and PowerEx and if we need to use hydro then we can and most of the time we don’t need it so PowerEx markets it in the US which is a benefit to BC and most of the revenue from the sale of that power goes back to the BC government.

Q: *Rob Goffinet:* Is that a free decision of BC Hydro and not interfered with by government?

A: *Doug Little:* Correct.

Q: *Tracy Petley:* But the money goes to government?

A: *Doug Little:* The bulk of revenues go to the province and some revenue goes back to ratepayers.

Q: *Phil Germuth:* You have mentioned the transmission line from Prince George to Terrace and something doesn’t make sense to me – your Site C cost is about $87 to $95 megawatt hour and yet IPPs are up to $100, a megawatt hour so how is LNG not paying, and why is the line being upgraded for LNG’s?

A: *Doug Little:* The provincial policy for LNGs is that they contribute to infrastructure as well as the cost of energy necessary to meet those large new load so they won’t get the normal industrial rate rather, they will pay a lot more. Other choices for LNG plants would be to use natural gas but to do that they would have to build a whole new infrastructure to accommodate that and pay carbon taxes for their used of natural gas and so we are in negotiations with the companies around what those supply arrangements would look like. There are reliability benefits with electric rather than gas and there are a number of other factors they are considering. They (LNG plants) are keeping their options open and looking at grid supply as well as self-serve supply.

Q: *Phil Germuth:* LNG plants use their own power all over the world so why are you upgrading the (transmission) line from Terrace to Kitimat?

A: *Doug Little:* This is a $7 million project to upgrade the line which is basically at the end of its life and will need a full on replacement in the next decade. It is relatively inexpensive to upgrade the line and it gives us the ability to serve LNG customers while we sort out what size of line we need to build.

Q: *Tracy Petley:* But, you could back ship (power)?

A: *Doug Little:* Correct, right now it is power from Kemano to the grid. The upgrade serves both ways.

Q: *Tracy Petley:* They could supply the LNG plants with the second tunnel, couldn’t they?

A: *Doug Little:* The second tunnel is about efficiency not generating ability.

Q: *Phil Germuth:* So knowing that the LNG plant is years away, what is the purpose of upgrading the line right now?

A: *Doug Little:* The line is between Terrace and Kitimat and we have had two pole top fires, it is a very old line, the line needs re-investment and this is a common maintenance practice given the years of service. There is a reliability issue that needs addressing so to address that the work is underway – this is basically low hanging fruit to get additional capacity on the line for $7 million.
**MEETING DETAILS**

**MULTI-STAKEHOLDER MEETING**

**BC Hydro Integrated Resource Plan**  
*A Clean Energy Plan to Meet B.C.’s Future Electricity Needs*

Terrace – Multi-Stakeholder Meeting  
June 14, 2012, 1:00 p.m. – 3:00 p.m.

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**Q:** *Phil Germuth:* RTA is getting the benefit from the upgrade, how much are they involved in pushing you to upgrade that line and why aren’t they funding it.

**A:** *Doug Little:* It is not entirely of benefit for RTA rather the line is used to supply our customers in Kitimat and if Kemano went out of service we would need the ability to service Kitimat and the existing circuit must be reliable to serve the Kitimat customers. So, it is not being done for the benefit of Alcan rather it is being upgraded for the benefit of the whole region.

**Q:** *Rick Wozney:* What is the capacity of the line?

**A:** *Doug Little:* 400 megawatts.

**Q:** *Rick Wozney:* What is the town’s (Kitimat) requirement?

**A:** *Doug Little:* I don’t know the number off the top of my head, but we could get that number. I know it has gone down, but I would have to look it up.

**Q:** *Rick Wozney:* There has been some discussion to say BC Hydro has to double the capacity of the line?

**A:** *Doug Little:* No, the upgrade it is from 400 to about 650 - the new circuits we’re looking at will be entirely new and will really depend on which and how many LNG projects and whether they take electricity supply.

**Q:** *Rick Wozney:* We know that it will take five years or more to upgrade the line but can it be done in a shorter period of time using existing pole structure? And, second question, Kemano II – are you taking that into consideration?

**A:** *Doug Little:* With those existing poles, we need a whole new circuit and so we will be out consulting on a whole new route because we can’t use the existing stuff – it will be at the end of its life in the next decade and needs to be replaced.

**Q:** *Rick Wozney:* Will it be metal towers or more poles?

**A:** *Doug Little:* Likely it will be steel structures of some sort but that will ultimately depend upon the voltage.

**Q:** *Phil Germuth:* But, aren’t there a lot of power lines in the province that are older than 40 years and they aren’t been redone?

**A:** *Doug Little:* No, we have been replacing lines as they age and certainly there are cases where we are replacing 40-year old lines, for example, work has been done on Vancouver Island lines and lines in the Dawson Creek area – the maintenance is done on a business case-by-business case basis and it depends on the load and demand growth in the area and the state of the old circuits.

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**Buy More pp. 17**

There were no questions.

**Prepare for Potentially Greater Demand pp. 18 - 20**

**Q:** *Tracy Petley:* So are there changes to standard BC Hydro procurement strategies?
**Meeting Details**

**BC Hydro Integrated Resource Plan**
**A Clean Energy Plan to Meet B.C.’s Future Electricity Needs**

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June 14, 2012, 1:00 p.m. – 3:00 p.m.

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A: *Doug Little*: This is different – first of all the loads will be in big chunks, if you will, a step-change, these are 24/7 processes so a lot of energy but they won’t make their final decision to invest in B.C. for a couple of years so we have to have a procurement process that is shovel ready when they make their decision to invest.

Q: *Tracy Petley*: Will this involve partnerships with pulp gas and companies like Enbridge – is this about more partnerships because of the limited time constraint?

A: *Doug Little*: There will be some sort of partnership, we are just at the very beginning stages of thinking about what that would be but yes the timelines are quite tight. The other thing that we are changing is how we evaluate those projects to reflect the load growth in the northwest. In the past we’ve valued all of the generation projects in BC at a price delivered to the Lower Mainland because that is where the largest amount of load is – 70% of B.C.’s demand is made up of the Lower Mainland and southern Vancouver Island. With this potential load growth in the northwest, we’re going to value those projects as being delivered. This means projects in the northwest will be more attractive because they won’t have transmission losses and transmission reinforcement costs added.

Q: *Phil Germuth*: Unless BC Hydro is expecting ratepayers to subsidize the LNG plants it doesn’t make sense because it would be cheaper for them to generate their own power?

A: *Doug Little*: That is an open question and BC Hydro is talking with the LNG plants and they have not said grid supply is way more expensive than self-supply. It is an open question. They are paying for study work to be done and preliminary engineering and they are serious about the possibilities and they have not decided. Likely they will decide in 2012 whether it will be self-supply or electric supply, and at this point, they are actively exploring both options. It’s not a given that self-supply is much cheaper than grid supply.

Q: *Phil Germuth*: Have you talked to them about the cost of feedstock and what is their break point where it is cheaper for them to generate their own rather than buy off the grid? Is there any idea what that number is?

A: *Doug Little*: Yes, those discussions are taking place in a joint negotiating team and we can’t publicly say the number.

Q: *Ed Gonsalves*: Doesn’t the BC Hydro mandate or rules force them not to deny power to a client whether it be industrial or residential?

A: *Doug Little*: BC Hydro has an obligation to serve as a utility and that obligation is not unique to B.C. If a customer is prepared to pay charges of approved rates and tariffs then we cannot deny them service. LNG is different because the provincial government has new policy, this is new industry for B.C. and it is large electric loads and BC Hydro and the Province will negotiate for contribution to infrastructure and new energy to meet that need. This is a new class of customer because it is a new industry.

Q: *Tracy Petley*: What about the Enbridge terminal and pipeline, how much will they impact? Will it be about 1/5th of the LNG?
A: *Doug Little:* It is very much smaller because it is a liquid pumping load but I don’t have the numbers. Based on the Kinder Morgan pipeline that goes through the north Thompson where we already provide electricity for the pumps for that pipeline, it is a lot smaller - less than a 1/5th. The LNG process is essentially a massive refrigeration process – a lot of compressors to run that refrigeration.

Q: *Rick Wozney:* In your negotiations with LNG components, are your discussions related to transmission costs from Prince George to Terrace and Terrace to Kitimat as part of the price that they’ll have to pay or is simply just some other basis?

A: *Doug Little:* The cost of that new transmission infrastructure is part of the cost.

Q: *Rick Wozney:* Would that also apply to all new industrial users? Will they be a part of this negotiation or are they simply grandfathers? Just the LNG?

A: *Doug Little:* It’s relating to this new industry. Yes, just the LNG.

Q: *Tracy Petley:* You say that you are in negotiations with the LNG plants – will they have any ownership on the infrastructure that they are helping build?

A: *Doug Little:* No, that they won’t.

Q: *Paula Peinsznski:* What is your forecast on the impact on residential rates?

A: *Doug Little:* That was asked during the last revenue requirement and the rate forecast goes out three or four years but I would have to get back to you on that. This planning exercise looks out 20 to 30 years and it doesn’t make sense to try and forecast rates that far out.

Q: *Ed Gonsalves:* We all like to use renewable energy and there has been tremendous work done here - are we running into the possibility of strangling future large industrial projects because we are running out of energy?

A: *Doug Little:* No, we have tremendous resources here in the province, and for example, wind resources which are at the earliest stages of development in B.C. We’ve got two operating wind farms now. The best areas are in the Peace River, the north coast and northern Vancouver Island. There is more small hydro potential and then natural gas and while natural gas is not renewable we do have the ability to add some natural gas generation. There is a 93% clean generation requirement so we can have 7% natural gas generation – over time we can add more. Unlike most jurisdictions, we have tremendous choice of generation here and there is potential for biomass so I am not at all concerned about running out of supply options.
Rob Goffinet: You are recording this as you tour the province and it is not just for politicians but for the ratepayers – you are hearing from everyone. I come from Kitimat and I am aware of the beneficiary of LNG proposal and I am in favor of that because it is in my own self-interest. I see here in the Discussion Guide you say that it is the public creation of renewable clean hydro and yet it is to put in place a competitive global LNG industry which is nonrenewable and unclean. It’s not Hydro, you are a power company, and it’s in your best interest to put in place what is best for the province and backed up by clean renewable public hydro energy. Yet it becomes hard for me the moment the co-generation of electricity in Kitimat required – even on your graphs, I notice a steep incline that is about 2015 to 2020 you’re talking about rapid increase of LNG. When you force a public utility to generate clean and renewable energy to liquefy rather than allow them to co-generate, what you’re doing is saying you’re going to use clean energy to produce an unclean industry. You won’t even allow the LNG plants to generate their own electricity. We don’t need billion dollar power lines from the Peace River because fundamentally the natural gas is unclean as a power source. The gas plants are not in the interest of climate change, clean energy and a competitive LNG market. As a rate payer and member of the public, are you independent or are you an economic development wing of the provincial government? I see this as paradoxical here but I could be wrong.

Doug Little: When you look back over the decades BC Hydro has been an economic engine for the province and it was instrumental in the build-out of the forestry industry and the development of saw and pulp mills. I expect that we will always be, in varying degrees, an economic engine of the province and we follow the policies set by government and we respond to that policy direction.

Phil Germuth: Going back to your statement on the power line it is the concern of many Kitimat residents. You have mentioned that the first two LNG plants are scheduled for 2015 and 2016 and yet you are doubling the line out of Kitimat and it could be done by next fall but you could wait a few years. Here is the position we’re being put in in Kitimat: right now there are contract talks between Rio Tinto and their union and the only reason we still have 1,200 jobs there is because that line out of Kitimat can take 420 megawatts. By upgrading the line now you are putting the union in a bad position and allowing Rio Tinto the ability to lock out the union by selling their power.

Doug Little: That scenario has never entered into our thinking in terms of the need for upgrading that line – BC Hydro is upgrading the line based on the need to maintain it - that scenario never entered our minds.

Phil Germuth: I hope it does. You could wait a couple of years before you double the capacity of that line. Are you going ahead with the upgrade?

Doug Little: We’re running into reliability issues and the fact that we’ve had a couple of pole-top fires is suggesting that that line needs attention and that is why we are doing it (upgrade).

Tracy Petley: I find that hard to believe that you didn’t know since you know about the transmission of power but that is not my question. There is going to be a carbon tax review through
the provincial government and we don’t know if that is an issue to make it acceptable for LNG to use their own power but I anticipate that will change. If LNG supplies their own power and you will have an increased generation of power will we then start selling power to other provinces?

A: Doug Little: If it was self-supply or self-generate we would not go ahead with acquiring additional energy - we would stop the work.

Q: Andrew Webber: What should the hydro strategy be in extending a transmission line – should it be based on speculation of load coming? What happened to that earlier consultation around extension of the grid?

A: Brandee Clayton: In that earlier consultation there were two transmission scenarios – one was proactive and one less so and it was around when the need comes we react. With a proactive approach there is less of a ‘spider web’ effect of transmission lines but the con is stranded assets. The northeast transmission line is summarized in the discussion guide on Page 16.

A: Doug Little: That line is basically up Highway 37 and is in anticipation of some future loads – future mining growth and we did get a contribution from AltaGas and it is a good long-term investment. One single project couldn’t justify the line extension and so by taking the ‘anchored tenant’ approach it has taken a longer term but it our expectation that as the mining sector grows we will recoup some of our investment. We are considering a similar model in the Robson Valley and North Thompson areas.

Q: Andrew Webber: Will you lean towards a proactive approach?

A: Doug Little: Yes, but we do a business case analysis and we do assess the economics of the situation.

Q: Phil Germuth: If LNG has a separate power arrangement and given the line, how will industrial rates of the IPPs be affected?

A: Doug Little: There is a new charge for customers connecting to the northeast transmission line to recoup the rate payer investment in that line.

Q: Rick Wozney: Will the Terrace to Kitimat line be finished by fall of 2013?

A: Doug Little: Yes.

Q: Rick Wozney: So the idea behind that is so that there will be no more pole fires because there is too much electricity pumped through the line?

A: Doug Little: Correct. We need to plan all of this work because some outages will be required. The planning of this maintenance has to be perfectly organized in advance so that we can continue to serve customers.

Q: Rick Wozney: Remind me - what would be the time line on the Terrace to Prince George 500 kV line and then from Terrace to Kitimat?

A: Doug Little: The first series of milestones will be around the LNG companies determining grid supply or self-supply; the next series of milestones will be around a final investment decision on the part of the LNG plants, so there are multiple milestones, and accordingly, we are looking at multiple
scenarios around that, so we are looking at all the different combinations and these are intriguing planning exercises. If self-supply we would defer further work on the transmission line.

Q: **Phil Germuth:** You said that you were upgrading the line so Kitimat would be reliable but honestly mostly the power is leaving Kitimat at well over 400 megawatts correct? It has been that way for quite a while. You are really upgrading to benefit the corporation – for selling the power, not to protect us.

A: **Doug Little:** No, we are not upgrading for Alcan related purposes, rather we are upgrading for reliability and to be ready to serve those new LNG loads in the Kitimat area and have that circuit capable of serving those loads until we can get new circuits in place which might not be for six or eight years.

Q: **Brian Downie:** Bio mass projects were proposed, but the economics has not worked out, like at Houston, and we were told part of the problem was the negotiation with BC Hydro for dealing with the evaluation process as you talked about earlier. In this area the use of low-grade fiber is key to the revitalization of the towns and many proponents have looked at what the options are and then hit a brick wall. Re-evaluating the process is signaling a change in BC Hydro’s policy process around procurement of energy and I’m wondering if you could lay out some more specific timelines on when you might be able to create a new call of proposals it will encourage that part of the sector.

A: **Doug Little:** Based on the base forecast we have a need for about 2,000 megawatts from IPPs from 2016 to 2018 timeframe. Projects typically take three or four years to be built so if we want power in place by 2016 to 2018 we need to get started pretty soon because of all of the permitting let alone construction that is needed for that. Either later in 2012 or 2013 we will start the procurement exercise and we would like to see more biomass proposals but it hasn’t until recently been competitive with wind; however, in 2011 we awarded four bioenergy contracts. None of those contracts were right here in the northwest, but with the change in the evaluation methodology it reflects that energy will be produced here and consumed here rather than shipping to the Lower Mainland.

C: **Brian Downie:** I think that one change will be very significant.

Q: **Derek Baker:** Around 2015 and 2016, when we’re looking at the demand forecast and LNG projects and the Shell project is fairly small, but if they came through what would it do to the graph?

A: **Doug Little:** It would cause the graph to rise up substantially, resulting in a much steeper curve in the 2019, 2020 period.

Q: **Tracy Petley:** BC Hydro has laid off about 1,000 people and now we’re talking about building all of the infrastructure and how the lines need upgrading, so obviously you will be contracting out–how will this increase reliability? Will we see Terrace open a contracting office and hire people back, etc.?

A: **Doug Little:** I don’t have specific answers on that and I would have to get back to you on that, but it depends on the area and size of the project, typically we do our own maintenance work.
Q: *Margo Van Der Touw:* If all the existing LNGs generate their own power on a worldwide power basis then common sense says that these LNG projects will do the same thing here other than a polite request to BC Hydro – what is different about these proposals?

A: *Doug Little:* It is more than a polite request and they have been funding studies and at this stage they seem very serious. There are a number of factors, consent to operate etc. self-generation and a lot of emissions – there are many factors that would go into that decision.

Q: *Nancy Spooner:* Oh, we now have a response to Paula’s (Peinsznski) earlier question regarding future impact on rates?

A: *Dave Mosure:* With respect to the question about rate increases I have just looked it up and it is proposed for 2011-2012 - 8%, for the year 2012-13 - 7.1% and for the 2013-14 year it is 1.44% and that was from the application submitted to the BCUC\(^5\).

David Little wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.

The record notes the meeting ended at 3:05 p.m.

\(^5\)British Columbia Utilities Commission
MEETING DETAILS

BC Hydro Integrated Resource Plan
A Clean Energy Plan to Meet B.C.’s Future Electricity Needs

Campbell River–Multi-Stakeholder Meeting
June 19, 2012, 1:00 p.m. – 3:00 p.m.

Coast Discovery Inn & Marina – Quadra Room
975 Shoppers Row, Campbell River B.C.

PURPOSE

Notes from a multi-stakeholder meeting for the BC Hydro Integrated Resource Plan held with Stakeholders and representatives of the Integrated Resource Plan on June 19, 2012 at the Coast Discovery Inn & Marina, Campbell River, B.C.

FACILITATOR

Nancy Spooner, Kirk & Co. Consulting Ltd.

PRESENTER

Basil Stumborg, BC Hydro

ATTENDEES

Andy Adams, City of Campbell River
Jamie Boulding, Strathcona Park Lodge and Outdoor Recreation Centre
Kim Burden, Parksville and District Chamber of Commerce
Joe Ciarniello, Vancouver Island Health Authority
Dave Ewart, Fisheries and Oceans Canada
Eric Geall, Alberni - Clayoquot Regional District
Vic Goodman, Campbell River Economic Development Corp.
Walter Jakeway, City of Campbell River
Norm Kirschner, Village of Sayward
Ian Lightfoot
Layne Marshal, Community Futures Development Corporation of Strathcona
Amber Zirnhelt, City of Campbell River

BC HYDRO INTEGRATED RESOURCE PLAN PROJECT TEAM

Lindsay Fane, BC Hydro
Ted Olynnyk, BC Hydro
Stephen Watson, BC Hydro
Susan Campbell, Kirk & Co. Consulting Ltd, Meeting Recorder

AGENDA

1. Introduction
2. Draft Integrated Resource Plan Overview
3. Consultation Topics – IRP Recommendations
4. Question and Answer
5. Feedback Form

KEY THEMES

- Several participants were interested in BC Hydro programs that would encourage municipalities to conserve more energy.
- Some participants mentioned Vancouver Island’s potential for tidal/wave power and asked that BC Hydro look at this more seriously.
The record notes that the meeting was called to order at 1:00 p.m.

(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. Nancy Spooner – Welcome and Introductions
   Nancy Spooner welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Nancy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. Basil Stumborg – Consultation Discussion Guide
   Basil Stumborg reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

   Introduction pp. 1 – 9

   Q:  Joe Ciarniello: Are you referring to domestic or imports when you talk about the capacity gap? Where does the import capacity fit in?
   A:  Lindsay Fane: Domestic. The energy graph and the capacity graph are set out so they meet self-sufficiency by 2016.
   C:  Basil Stumborg: We’ll return to your question when we talk about meeting this with domestic resources versus imported resources.

   Conserve More pp. 10 - 11

   Q:  Amber Zirnhelt: I am wondering, in the 93% clean energy requirement, if you are considering natural gas resources in that or is that in the 7%?
   A:  Basil Stumborg: Natural gas is in the calculation but falls into the 7% non-clean. Under regulations if your natural gas lines do come on line then they have to be offset 100%. Despite that, they go into 7% non-clean.

   Q:  Layne Marshal: In my house, if I unplug my cable box it takes about a day to figure out my programs again when I plug it back in? How do you drive those kinds of commercial producers to provide equipment/machinery that doesn’t do that?
   A:  Basil Stumborg: That’s a big topic for energy conservation. I have heard that there is about a 10% of ‘vampire’ load that is just sitting waiting to be acted and we are looking at that and if producers can move to design energy conservation into these things. But it will require a collective movement and will have an added cost, but if it’s done at the same time then no one will lose the competitive advantage and it could be shifted through changes in codes and standards.
Q: **Amber Zirnhelt:** How does the residential “PAYS” program that is under development fit into this action? Is that something that you guys are looking at further that is recommended? That is a “pay as you save” program the province legislation enabled that BC Hydro and Fortis BC to have to unveil financing for residential retro place—how does this fit in?

A: **Basil Stumborg:** Financing DSM¹ has issues because people require very high paybacks before they will invest in energy conservation. I’m not that familiar with that but it sounds like one of those rules where we would work with government to encourage conservation.

Q: **Joe Ciarniello:** What stands out is the three major consumer groups (industrial, commercial, residential) and when you look at those groups the incentives for residential are very tiny. Most of my experience is on the commercial side and there are very good incentives on that side but on the residential side it is almost a token incentive. That is one point. The second point is and I don’t know about time and usage rates but as a residential consumer I would take advantage of that if it were offered.

A: **Basil Stumborg:** I would encourage you to add that comment to the feedback form. Working with PowerSmart on IRP, I know that the way they approach the residential side of things is that the barrier that is keeping residential consumers from not doing DSM is not a financial one—there is some financial incentive. There is also a barrier to the convenience, products, services, and information. If this is the pot of money we’re going to spend on residential programs, some or a large part of that pot will just go to information or convenience. Given that pot of money, they found that folks are responding less to incentives and we get less payback on those incentives. If you as a consumer think that statement is wrong, then that is a comment we’d like to hear. Time of use rates are rates that vary over the time of day that encourage people to shift their consumption from peak to non-peak times. The government has been pretty clear with us that it doesn’t think the public has an appetite right now for that kind of rate designed to encourage conservation so they’ve told us and the public that it’s not on the table as an option for capacity production.

Q: **Norm Kirschner:** With respect to cheap energy or low energy appliances and getting a way for the general public to purchase these things, perhaps you should talk to the suppliers and have the price a little bit less than the one (appliance) using full energy?

A: **Basil Stumborg:** Yes, that is a good point, and we are moving to more emphasis on the DSM programs and more of a push on that side in terms of creating incentives and also pushing out information programs and working with suppliers.

Q: **Andy Adams:** For home use, the phantom use of power is mostly with computers and media centers. Is there technology or a mechanism that when plugged into a power bar that can stop that phantom use? The other thing is, are there incentives for commercial buildings like ice rinks and

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¹ Demand Side Management
swimming pools because they are a big draw? What are the biggest draws and if they are identified, wouldn’t it be better to cater to those that already have the largest draw?

A: Basil Stumborg: Yes, I believe so, but I am not a PowerSmart expert. Ideally we are looking for solutions that are hard-wired – things that automatically go to sleep and wake up quickly so it doesn’t matter if you leave it on or not, it automatically powers to a lower level. On the computer side, suppliers are working on getting the computer to boot up quickly and that would be a hard-wired solution. I am not sure with respect to draw around swimming pools and ice rinks.

A: Ted Olynyk: There is a power bar that has just enough juice but does reduce actual consumption.

A: Basil Stumborg: There is a second part (to the question) – within the commercial sector who are the biggest energy consumers? I’m not sure of that.

Q: Kim Burden: On the incentive piece – I am working with the City of Parksville to switch over to LED lights for the street lights – is there anything coming down to encourage municipal governments to do the switching?

A: Basil Stumborg: We do have some more details laid out in the appendices to the draft IRP but I am not sure off the top of my head.

Build and Reinvest More pp. 12 - 16

Q: Amber Zirnhelt: When you did the analysis of the various options around Site C, did you factor in GHGs\(^2\) associated with the flooding of the land and the development of the dam or is it just he outputted power?

A: Basil Stumborg: We use a system optimizer that looks at demand growth after conservation. Here’s our current supply and the system optimizer finds the best option and looks at it in a number of different ways, but it is a cost-driven process. We also look at inundated land, stream affects, land that is flooded etc. and then put them side-by-side for comparison purposes.

Q: Andy Adams: Any thought of investing in wave and tidal energy as a stable source – right now you have barely touched the surface of this resource?

A: Basil Stumborg: We have a resources options report and BC Hydro canvassed producers across the province to get an idea of what resources and technologies were out there and we had them come in and present to us so we could figure out which one of those we would then continue our modeled section and allow our system optimizer to pick. We didn’t get anyone coming in to demonstrate tidal and wave power at a utility scale, but they will be attracted to us in the next 10-years or so because run-of-river is highly correlated with our hydro system, wind isn’t correlated with our hydro system. Tidal power is another resource that is very predictable and will be very useful if it can be developed. The government wants IPPs to bring the new projects in and take the risk and we are open to that.

\(^2\) Greenhouse Gases
C:  *Andy Adams*: I appreciate that but commercial applicants will need assistance with huge capital investment and if you were gauging opinion around the province you probably got only one-third of the respondents that were aware or interested. I would be interested for BC Hydro to keep that perspective as well.

C:  *Vic Goodman*: I have started work with some of these companies and I have confidence that the technology for generating tidal energy are going to be commercially viable within a short period of time whereas the commercialization gap exists is the ability to link that power to the grid because it is one of the most difficult financial parts of the entire equation. I think there is tremendous potential to be pioneers to develop tidal and wave energy and for those resources to become mainstays for several generations, but it is the gap around getting to the commercialization for the companies.

Q:  *Joe Ciarniello*: You say that Site C will use 5% of the reservoir but Site C will produce 35% of the energy with a small footprint for what we get out of it, is that right?
A:  *Basil Stumborg*: Yes, that is right; it will function almost like a run-of-river in that it is inundating some of the stream but it doesn’t have a large reservoir behind it. It also has a lot of storage.

Q:  *Amber Zirnhelt*: With respect to Site C and the recent changes in the federal process with CEA\(^3\) - what is BC Hydro going to do around those changes?
A:  *Basil Stumborg*: BC Hydro committed to a joint federal/provincial environmental assessment process and we are maintaining the course that was decided upon a year or so ago.

Q:  *Vic Goodman*: What plans are there for the Island co-gen plant?
A:  *Basil Stumborg*: It is not considered as part of the short-term gap; however, I will talk about that later on – hold that thought.

Q:  *Vic Goodman*: You talked about the capacity for power transfer between the US\(^4\) and Canada and I am assuming it is their grid (US) that is weak?
A:  *Basil Stumborg*: It is more of a question of congestion, I wouldn’t use the word ‘weak’ but they tend to move the energy around at the same time as we do so it is a congested system and the 500 megawatts is a function of how much congestion we think there will be and how much we can rely upon moving electricity through a congested system.

C:  *Vic Goodman*: I can picture us going through a black-out event like they experienced in the east a few years ago.
A:  *Basil Stumborg*: Government has recognized self-sufficiency and as we move towards that, we are an integrated system and we can manage costs better by interacting with the US.

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\(^3\) Canadian Environment Act
\(^4\) United States
**Q:** Andy Adams: You have said that there is limited capacity from B.C. to the US and the Lower Mainland and yet you are looking at adding Site C power to the Lower Mainland – is there some discussion about the Juan de Fuca line to provide a secondary back up to the single source line and provide more viable power in and out with respect to selling and buying for the United States?

**A:** Basil Stumborg: Yes and as part of the increased appetite for renewable energy there was a lot of interest in new pathways for energy and government asked us to investigate the opportunity to build for export. Given the number of negative factors we found, there was not a good export opportunity and we can’t overcome the hurdles to justify building here and exporting. So interest is waning; however, we will continue to keep an eye on it.

**Q:** Vic Goodman: With respect to your comment “keep an eye on it”, can you clarify?

**A:** Basil Stumborg: When we go out and look at the need to acquire power we may reopen the question as it may make sense if hydro wants to acquire power to build a transmission line but we will not be pursuing that in advance.

**Additional Comments**

**Q:** Kim Burden: You are running some very skinny margins and relying heavily on conservation – what is your backup?

**A:** Basil Stumborg: So in our IRP we have our base resource plan, which is what we are talking about here. We also have contingency resource plans and so we have walked through some of those scenarios.

**A:** Lindsay Fane: So if DSM programs or pump storage doesn’t work out our back up is gas and we will be looking at a few key regions around the province.

**Q:** Kim Burden: What does it do to the price of electricity?

**A:** Lindsay Fane: Gas is relatively inexpensive; however, we are really constrained through the 93% clean objective and gas we can use so we’re really reserving it for the contingency capacity conditions. Compared to storage, gas is shown in our resource options report to be a little bit cheaper.

**Q:** Vic Stumborg: On Page 22, when Site C comes into commission the IPPs appear redundant and then needed again at the end of the decade. There are many resource IPPs on the island – so what
happens to them in 2021 when Site C comes on – do they lose their markets? Does Site C run at capacity or less capacity to ensure your independent power producers stay online?

A: *Lindsay Fane:* BC Hydro signs contracts with IPPs and pays for the power they deliver and will upgrade the rest of our system while taking in that power. Any surpluses we have we will look to the market to sell the electricity or store in reservoirs.

C: *Vic Goodman:* That depends on the legal contract signed with the IPP.

A: *Basil Stumborg:* Earlier, the market we talked about was for long-term exports; however, when there is a surplus there is a short-term or spot market. We want to be a little short before 2021 and then a little bit long in 2021 and then that’s when we balance and bring on a chunky supply source. That is why we want to be a little bit short in advance however we don’t want to be at the mercies of the vagaries of the market and so it is a balance. We want to get it right in terms of surplus and selling.

Q: *Vic Goodman:* With respect to transmission capacity, do we have the ability for green power or are the transmission lines on the Island sufficiently adequate to move power, recognizing that Vancouver Island is not a self-sufficient power source?

A: *Basil Stumborg:* Until the Island becomes an exporter; any generation on the island will relieve congestion on transmission lines coming in. In a sense, it is helping out and later we will have to upgrade those lines. There are some significant load uncertainty projected to come on line and if these other LNG plants come on line then the graph could jump significantly. One of the things we’re struggling with is how do you actually line up more IPPs because we could need a whole lot more power? We’re a little bit surplus, we’re balancing off and we need some self-sufficiency before Site C comes in but we’re also recognizing that the surplus could go away quite quickly. It’s a difficult balance to get that we’re working on strengthening.

Q: *Walter Jakeway:* Is there work going on at Site C? I think that a lot of the processes should be quick because the damage is already done. Because, rather than having a liability of insufficient power, they (BC Hydro) should be starting work now on the project.

A: *Basil Stumborg:* There is no physical work taking place, but please turn to Page 13 of the Discussion Guide because it lists out the number of steps and processes that are going on in terms of engagement and consultation. There is a joint provincial and regulatory process that Site C has to go through before it can go on with the project. As we are a current corporation we have to sit down because federal regulators have turned down projects before.

A: *Nancy Spooner:* There is a pretty extensive amount of work underway and there is a significant amount of land impacted.

Q: *Layne Marshal:* Going back to the conservation impact and there is an interesting chart where I notice that is says that there are 166 large consumers versus 1.6 million residents that is 1/100th of one percent in terms of market. Looking at that consumption side across those three sectors what kind of conservation strategies are you employing in different places and what kind of impact will there be?
A: *Basil Stumborg*: So clearly working with residential customers is very different from large customers and as I said earlier it is not all about financial incentives with the residential customers. Part of it is building a culture of conservation so many of our efforts are softer about trying to convince people that it is the right thing to do as opposed to it pays off. On the industrial side it is the opposite and they are dedicated to optimizing and saving electricity consumption. BC Hydro is working with them (industrial customers) and works with those folks to find savings through individually based rate structures for the industrial sector. Each set of industries with have a customized baseline with a tailored approach to price increases and the way those impact them. There is a very different look and feel to the industrial side.

Q: *Layne Marshal*: Does BC Hydro have freedom and flexibility for mandatory measures? Government has said you can't mandate time differentials but what other limitations or other possibilities?

A: *Basil Stumborg*: There are three tools we could use and they are: rate structures, codes and standards, and programs. The first two are mandatory. We put in a rate – everyone faces that. If we help and work with government to change a code or standard then as the market place adopts that and those new products come on line then all new consumers are facing that. It’s taking choice away from the customer. The program side is more a carrot than a stick approach and is about incentive rather than force.

Q: *Layne Marshal*: About these growth projections where are they from?

A: *Basil Stumborg*: We do different load forecasts then we roll them up for the three sectors. The residential is about housing starts, population growth and is at the home owner level. We look at how the energy use is evolving in terms of fridge, TVs, etc. and is on a much finer scale. Commercial loads are driven off economic forecasts retrieved from provincial data bases and we look at provincial wide economic trends. On the industrial side, because we have a small number of customers, we will do individual forecasts and then they (three sectors) are all rolled together.

Q: *Layne Marshal*: Are growth demand and DSM partitioned accordingly?

A: *Basil Stumborg*: Yes. We’ll have different people working like key account managers with our large industrial customers (one person per customer) and we’ll tailor our DSM offers to them. Whereas commercial, particularly with the smaller ones, we will have a program we will run out to all small stores, even though they look different. Different offers for different customers.

C: *Eric Geall*: My comment is around tidal power and to the extent today you are in a coastal community framework. There is a company, out of Port Alberni that identifies areas for tidal power. It is disconcerting to me to see your attention is to natural gas but I don’t see a lot of attention paid to alternative energy. I understand that the current political climate is such that the market will drive these innovations forward to the market face. Earlier, in the meeting, you said that there was a place to be played for tidal and I would like to see that interest expressed in the record.

Q: *Ian Lightfoot*: How much is the transmission cost embedded in the cost charged to customers?
A: Basil Stumborg: When we go to the regulator we break out the cost of transmission, generation and distribution but I can’t recall the figures. We do have it and we can get back to you on it.

C: Ian Lightfoot: What is the cost of line loss?

A: Lindsay Fane: It is about 10-11%.

C: Ian Lightfoot: Wow.

C: Basil Stumborg: When we do our energy planning, for instance the Peace Wind project, if it producing energy up here and our main low-growth is in the Lower Mainland, that project has a significant hurdle because it will lose more than 10% of its energy as it is trying to push it down the line. If we could find projects that are closer to the Lower Mainland they have a leg up because they don’t have that hurdle to get over, so take that into account in the model. In terms of lines, we have identified those transmission lines, so we had a table that looked at the different areas of transmission and we asked the line costs. I can’t recall.

A: Nancy Spooner: Maybe we could get that information to Steve, and Steve can get it back to you.

Basil Stumborg wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.

The record notes the meeting ended at 2:45 p.m.
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<th>MEETING DETAILS</th>
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| **BC Hydro Integrated Resource Plan**  
| **A Clean Energy Plan to Meet B.C.’s Future Electricity Needs**  
| Castlegar–Stakeholder Meeting  
| June 21, 2012, 10:00 a.m. – 12:00 p.m.  
| Castlegar & District Recreation & Aquatic Centre – Monashee  
| 2101 6th Avenue, Castlegar, B.C. |

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<td>Notes from a multi-stakeholder meeting for the BC Hydro Integrated Resource Plan held with Stakeholders and representatives of the Integrated Resource Plan on June 21, 2012 at the Castlegar &amp; District Recreation &amp; Aquatic Centre, Castlegar, B.C.</td>
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| Gord De Rosa, City of Trail  
| John Duncan, Borderline Boaters Kayak Club  
| Norman Fields  
| Patrick Gall, Wildfire Management Branch  
| Mark Graf, Interfor  
| Larry Gray, Chair Regional District of Kootenay Boundary  
| Ellwood Grunerud  
| Gerry Grunerud  
| Brent Hancock  
| Alex Love, Nelson Power  
| Fiona Mackay, Zellstoff Celgar  
| Llewellyn Matthews, Columbia Power Corporation  
| Mike O’Connor  
| Lauren Retharet, Regional District of Central Kootenay  
| Karlie Shaughnessy, Wildfire Management Branch  
| Hanne Smith  
| Elroy Switlishoff, Independent Consultant  
| Mary Vann  
| Tom Vann  
| Frank Wszelaki, Columbia Power Corporation |

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| Mary Anne Coules, BC Hydro  
| Emilie O’Genski, Kirk & Co. Consulting Ltd, Meeting Recorder |

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| 1. Introduction  
| 2. Draft Integrated Resource Plan Overview  
| 3. Consultation Topics – IRP Recommendations  
| 4. Question and Answer  
| 5. Feedback Form |
KEY THEMES

- Some participants wanted to know that BC Hydro was exploring all available options for meeting demand, including maximizing demand-side management opportunities and looking at all clean options for domestic power generation.
- Some participants expressed concern about BC Hydro being required to provide electricity for the emerging Liquefied Natural Gas industry. Some participants indicated they would prefer this power be used for domestic needs, rather than to liquefy B.C.’s natural gas for export.
- Some participants were interested in the amount of power that BC Hydro is planning to buy from Independent Power Producers, and how that electricity source fits with the BC Hydro system. Some participants expressed concern about the lack of capacity produced by small hydro projects, and that they tend to produce electricity in the spring, when the BC Hydro reservoirs tend to be full.

DISCUSSION

*The record notes that the meeting was called to order at 10:00 a.m.*

(AppAbbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. **Madelaine Duke – Welcome and Introductions**
   Madelaine Duke welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Madelaine informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. **Basil Stumborg – Consultation Discussion Guide**
   Basil Stumborg reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

**Introduction pp. 1 - 9**

Q: *Elroy Switlishoff*: What is the target date to submit to the government?
A: *Basil Stumborg*: The date has been mandated before December, but we will try to get it submitted sometime in October 2012.

Q: *Hanne Smith*: Did you include any projections for electric vehicles?
A: *Basil Stumborg*: Yes. We have spent some time looking at this topic, and on page seven, there is a side bar. By 2024, there will be about 10,000 and half a million electric vehicles by 2030. There is
some sensitivity on this and part of the fan of uncertainty accounts for that. Currently, BC Hydro’s view is that the impact on load is fairly small. We are working with codes and standards groups so that we can solve all these “chicken and egg” problems, so if there’s a requirement for charging, they have it. We are looking at that level so the infrastructure is in place and we are ready to provide that power.

Q: Elroy Switlishoff: I’m interested in what your obligation to serve LNG facilities for export. Is there a threshold where your obligation to serve extinguishes? Do you have the ability to aggregate loadsto meet that threshold? For example, can large loads go into smaller pockets to get under a threshold if more exists?
A: BasilStumborg: Can I address that question later on in this presentation? We are going to get to that.

Q: John Duncan: What is the response been to your conservation efforts so far?
A: BasilStumborg: When we go out and talk to stakeholders and the public, people agree that we should be pursing conservation. We are in favor of it. Our programs to date have hit our targets, but how has it impacted overall? It’s a difficult topic to prove so we are wrestling with it.

Q: Elroy Switlishoff: What is your retention rate assumption for expiring power purchase contracts? The power plants won’t disappear. The trees are renewable resources.
A: BasilStumborg: We treat our renewable products differently. We assume that they will continue. For biomass, because the fuel supply is uncertain, we assume it will not last, but we hope they do.

Q: Elroy Switlishoff: What is the uncertainty?
A: BasilStumborg: There are factors like, has another source been found? Do we run out of wood? So, we are open to continuing those, but part of the decline is the biomass contracts running out. From a planning point of view we can’t count on it. We don’t know enough.

Q: Elroy Switlishoff: But the trees will be there, the assumption that it’s a renewable resource?
A: BasilStumborg: What puts it in a renewable resource is that trees will be planted; they will grow and can be used and whether a plant has enough fuel supply that you can lock in for up to 10 years.

Q: Brent Hancock: How do you take into account therun-of-river and wind power in capacity calculations?
A: BasilStumborg: We’ve recognized that the intermittent sources of power from ROR\(^1\) and wind are energy rich, but they don’t come with a lot of capacity. We have found that when you add them together there is some capacity from these projects. That’s an issue that we have to deal with.

Q: Gord De Rosa: Have you factored LED’s into your projections?

\(^1\)Run-of-river
BC Hydro Integrated Resource Plan
A Clean Energy Plan to Meet B.C.’s Future Electricity Needs

Castlegar–Stakeholder Meeting
June 21, 2012, 10:00 a.m. – 12:00 p.m.

Castlegar & District Recreation & Aquatic Centre – Monashee
2101 6th Avenue, Castlegar, B.C.

A: BasilStumborg: Our demand forecast tries to capture how technology is changing over time. There is a natural rate of conservation. There are things that Hydro can do to make that happen even faster. That’s a DSM tool.

Q: Llewellyn Matthews: Is the requirement for the objective to achieve the additional load through conservation? Is that included in addition to your green line DSM?

A: BasilStumborg: That green line came out of our LTAP in 2008. We have a new load, so all new loads have to be green. We recalculate the red line and then our plans on the books are pulling down the line 2/3’s of the growth.

Q: Elroy Switlishoff: Basil, did I hear correct when you mentioned that the economic development opportunities are leaning towards rural economic developments as opposed to urban?

A: BasilStumborg: The government, through its Clean Energy Act, has highlighted rural economic development. We looked at jobs, government revenue and we had a hard time splitting between urban and rural. In our calculations we did general.

Conserve More pp. 10 - 11

Q: Larry Gray: On the 66% figure, when you talk about the large LNG plants coming online, are you saying that with that increase, 66% of that will come from conservation. Is that a scientific or a political projection?

A: BasilStumborg: The next page will answer that question. Our current plans on the book put us at the front of energy conservation and we found more ways to save over the next 20 years. This IRP is going to increase the target by another 1,000 GWh so by 2020, we’ll be saving about 9,800 GWh. A year ago, when we first started looking at this it was 78% through energy conservation. Then the LNG came along and asked for electricity from BCHydro and it’s an extremely large industrial load. With those new loads coming online, the target will meet about 58% of the incremental load through DSM. To answer Larry’s question, we will not be able to meet the target in the next little while, just because the load is growing in such a large way and the nature of the load growth is in an area where we can’t find conservation opportunities. This DSM plan is the most we feel we can get given our knowledge and the technology.


A: Nan Dai: When we did the ROU work, it’s still being studied. We haven’t committed to anything yet. I don’t think we have considered that particular option yet.

2Demand Side Management
3GigaWatt Hours
4Liquefied Natural Gas
5Resource Option Update
C: *Norman Fields*: Germany did and they are well ahead of B.C. They are way ahead of us. They use solar, sewage and wind and I wish I brought that article. I was shocked with how much they are getting that way. I’ll bring it to the BC Hydro office.

Q: *Llewellyn Matthews*: Does that include economic incentives like time-of-use?
A: *Basil Stumborg*: Time-of-use rates is a type of pricing that gives people price signals that give an economic incentive to shift consumption out of the peak hours. Government has been clear in saying that they don’t think people are interested in this option right now.

Q: *Elroy Switlishoff*: Have you analyzed the effect?
A: *Basil Stumborg*: People haven’t been interested. And smart meters are being installed.

**Build and Reinvest More pp. 12 - 16**

Q: *Elroy Switlishoff*: $87 bucks an hour is less than LNG?
A: *Basil Stumborg*: No it’s not. We did the IRP within the context of our provincial policy. One of the restraints the government has put on energy policy for the province is that at least 93% of our energy generation has to be clean. There is not a lot of room to have gas powered plants providing energy. While LNG would be cheaper than Site C, the policy doesn’t give us that option.

C: *Elroy Switlishoff*: So we are extracting all this natural gas to send to someone else to use for generation. That’s political.

Q: *Unknown*: Did you say 5,000 GW for Site C?
A: *Basil Stumborg*: 5,100 GWh and 1,100 MW\(^6\).

Q: *John Duncan*: What about the farm land? It’s very valuable and how much are you going to destroy?
A: *Basil Stumborg*: Site C is going to inundate the valley and there is some high grade farmland there. Within the IRP, we looked at the amount of land inundated because if you don’t do Site C you have to do something else. That something else will require footprint, diverted river and transmission lines. We try to add up to understand what the difference of that impact will be. Site C still has to go through the environmental assessment process. There is a joint provincial and federal process and that is being done right now.

Q: *Elroy Switlishoff*: Why 93%?
A: *Basil Stumborg*: I’m not sure where that number came from.

Q: *John Duncan*: Where is Site C being proposed?
A: *Basil Stumborg*: Site C is in the Peace region. It’s the third project on the Peace River; there are two dams upstream of it.

\(^6\)MegaWatts
Q: *Larry Gray:* The refitting of the turbines can up your capacity considerably. Is that what you are talking about here? It might take capital investment, but you can increase the output by 50%.

A: *Basil Stumborg:* I’m talking about filling in the empty with new stuff. After that, BC Hydro will move that capital. We have a long list of resource smart projects and we will be keeping track of what we will do next. Part of the consideration is the cost effectiveness.

Q: *Gord De Rosa:* It sounds like there is a lot of frivolous use of electrify for auto-door openers and people movers. I’ve noted that residential services have gone up too. The line services where I have lived in Burnaby can’t serve. The panels are using up to 600 amps per residence. Does the BCUC have any role in regulating this?

A: *Basil Stumborg:* When BC Hydro is looking at DSM measures, we are looking at working with the local, regional and provincial governments to change the codes and standards for building. That will help guide what materials and things are used when you build a new home. Apart from that, there is a lot of choice for people to how much energy they can consume. If people want lots of flat screens they can have them.

Q: *Mike O’Connor:* 600 amps in a residential house – how is that even allowed?

A: *Basil Stumborg:* We are getting down to a level of detail that’s beyond me, but when people hook up if they are large they draw a lot of electricity. When we have electric vehicles coming in that is what we are keeping in mind as well. If you get a DC charging kit you can charge your car in 30 minutes. People want things to be charged faster and have all the gizmos. That increases our demand too.

Q: *Unknown:* Why wouldn’t you use the entitlement as your primary?

A: *Basil Stumborg:* On an operational basis, whether we go to the market or use the Canadian Entitlement will be determined on a short basis.

Q: *Llewellyn Matthews:* There is something in here about transmission restriction. I thought there was an obligation to deliver it?

A: *Basil Stumborg:* From a planning point of view we want to be absolutely sure we can get the power. We are confident we can get up to 500 MW. We said let’s put in 500 MW from the market and if we can get more then it’s great. We capped it because we were not absolutely sure we could get more.

Q: *Llewellyn Matthews:* Can you use that as a lever to get transmission improvements in the USA?

A: *Basil Stumborg:* I’m not sure but given that this is a short-term situation that we are dealing with, Transmission is expensive all throughout the project. That’s a good comment.

Q: *Llewellyn Matthews:* What about sending electricity to Alberta?

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7BC Utilities Commission
A: Basil Stumborg: Trade with Alberta is tricky because those lines that we have are almost fully loaded. Our market is structured it’s difficult to create mark up.

Buy More pp. 17

Q: John Duncan: Do you refer to that in capacity or overall need?
A: Basil Stumborg: There is both energy and capacity shortfalls and this is because the intermitted projects don’t bring a lot of capacity, it is mostly energy.

Q: John Duncan: Right, so these clean energy producers don’t help our capacity at all?
A: Basil Stumborg: They help a little bit but are mostly an energy resource. They don’t bring a lot of capacity but they do bring some which we include when we do our modeling when we do our calculations.

Q: John Duncan: Does that mean you will you be encouraging more run-of-river projects?
A: Basil Stumborg: Yes, we will go out to the power community asking for more power.

Q: Frank Wszelaki: How much energy do you currently purchase from IPP’s?
A: Basil Stumborg: Currently, it’s about 55,000 GW hours, I think about 10,000 MW hours of that comes from IPPs. This will be growing a little bit over time.

C: John Duncan: The contracts we’ve signed with those run-of-river projects actually increase our rates because their contracts are for 40 years meaning a higher price than you going out and buying from somewhere else.
A: Basil Stumborg: In BC with our large river systems, our cost to produce electricity has been really low. All new electricity will cost more. So yes, it will seem like it’s pushing our rates up. We didn’t look at purchasing on the spot market from the USA as a way of meeting our long-term needs. We wanted to lock in long-term commitments.

Q: Brent Hancock: How do you go about selecting the preferred projects? What is the credibility?
A: Basil Stumborg: So, that’s right. There are some significant economies of scale to produce smaller projects. Due to the fact that they are small, they will be more expensive than our existing system. As a demand grows, we do need to get the power from somewhere. In our procurement processes, we look for companies that have a proven track record. Throughout energy planning we want to know that energy is coming online when they say it is. That being said, if someone says they can deliver power, we’ll sign a contract with them and the private sector is taking a risk.

Q: Llewellyn Matthews: I think you are leading us to believe that primary source of closing the gap long-term is Site C. But it looks like Site C is half the long-term gap. The rest has to come from somewhere else. Why wouldn’t you encourage more IPPs in the short-term as a permanent solution?
A: Basil Stumborg: You’ll see in the graph at the back that Site C is a chunky project and we need to manage. You’ll see over the long-term it will even out.
**Q:** Elroy Switlishoff: 2016, you should be starting to build now. Is there a call for this acquisition or is it going to be private placement?

**A:** Basil Stumborg: Our acquisition group analysis is talking with IPPs to figure out what the best way is. Whether it will be open call or not it will be determined.

**Q:** Elroy Switlishoff: This is only an energy deficit – not a capacity deficit solution?

**A:** Basil Stumborg: The way we price our projects looks favorably on capacity as well as energy. We’ll price things that encourage capacity. The need is both capacity and energy. So Action #6 was capacity and Action #8 was energy. If IPPs came in with energy rich projects we’d be very happy.

**Q:** Elroy Switlishoff: But you always have Burrard to backstop. Your unresolved solution requires something for energy.

**A:** Basil Stumborg: Right, but if you look at our capacity solution, part of it is going into the market. We’re going to be much more comfortable if someone came into the project and said that it’s a capacity rich project, we would be interested in that. Then we would have to lean on Burrard less and lean on the market less.

**Prepare for Potentially Greater Demand pp. 18 – 20**

**Q:** Larry Gray: Since the 93% clean decision, it means that you are limited in your clean energy amounts. 93% of energy has to be clean energy?

**A:** Basil Stumborg: The 93% limits are thermal. We can have more than 93%.

**Q:** Larry Gray: LNG will not be classified as clean right? As you increase you clean energy capacity in the province that also drives up the other up as well. If you increase your amount of energy produced, then that leaves you more room at the top to add LNG.

**A:** Basil Stumborg: Yes. As demand grows, the number of gas plants we can put in fits into that level of calculation. We have to track if we are going to use gas plants as a capacity resource and how many we can fit in.

**Q:** Elroy Switlishoff: The 5,000 GWh in Kitimat, what are the expected demands?

**A:** Basil Stumborg: I think Kitimatis 4,300 GWh and the other is 500 GWh. That is energy. I don’t know the capacity. The third one will be almost 12,000 GWh.

**Q:** Elroy Switlishoff: So, what is your obligation to serve for those loads?

**A:** Basil Stumborg: Right now, government and BC Hydro are in discussion with these plants. The government is interested in making sure that these plants use electricity. The permits are set up to use electricity as opposed to self-generation.

**Q:** Elroy Switlishoff: Right now it’s simply a commitment from government that says these two plants will use electricity to run the compressors as opposed to natural gas. There is no other legislation that prevents the use of natural gas at this time. There is nothing in the CEA that prevents an individual user from generating non clean energy for their own use.

**A:** Basil Stumborg: The 93% is a provincial target.

**C:** Nan Dai: The 93% applies to utilities.
C: **Basil Stumborg:** When a new customer comes to Hydro, the new customer has to pay for some of the incremental costs as well. We are figuring out if that is included in the incremental cost is it distribution, transmission or all impacts to the system.

Q: **Hanne Smith:** Partly a comment, I find it interesting that we would be using electricity for these three LNG plants for export. So we have demand in our own province, but we are using our capacity to fuel plants that will eventually export energy resources. I’m wondering where the decisions are made for how that balance works. Who decides how quickly to bring on the LNGs before we have the ability to meet our own needs?

A: **Basil Stumborg:** As the electric utility in the province, we are involved in the discussions so we know what the implications are. We are there to provide that information. Government is in talks with the LNG producers so they can ensure that it doesn’t have a large impact on rates. They are looking to provide jobs, tax revenues. They are looking at it from a broader perspective and Hydro is providing the technical ability.

C: **Hanne Smith:** Sounds like a political decision.

Q: **Llewellyn Matthews:** The two projects are large key accounts. Is the rate they get charged approved by BCUC? Is that rate based on a marginal cost of the new production or average cost, or political cost?

A: **Basil Stumborg:** I think that’s still in discussion. How it’s determined and the regulatory framework are still under discussion. I think that’s still up in the air.

Q: **Frank Wszelaki:** There was a good article on June 19th in Business in Vancouver. It talks about how many billions are put back into the province, are the credits worth it, and how much it would cost to build your own plant. It’s a good article and I’ll leave it here.

Q: **Brent Hancock:** What are the environmental requirements for the projects in the north? Will they streamline the process in particular the projects in the north?

A: **Basil Stumborg:** We are doing a little out of the IRP, but whether they generate on their own or whether we build transmission lines, all of those projects are large and they will have to be permitted. They will go through provincial and federal regulatory processes.

Q: **Llewellyn Matthew:** Have you looked at the mines that will be coming into the province?

A: **Basil Stumborg:** When we do our load forecast, we look at project by project estimates. We have a list of mines that are in development and we keep an eye on them.

C: **Frank Wszelaki:** Alcan is looking at changing their plants. Have you had conversations with them for how they are working through the hurdles?

Q: **Alex Love:** Do you have a sense of the value of the pump storage capacity like if you had a dispatched storage?
A: *Nan Dai*: Right now, the spread is not really supporting pumped storage. Right now, the market price doesn’t make it worth it. The cost of gas forecast scenarios is about $70-120, depending on the price. That’s kilowatt per year.

C: *Basil Stumborg*: That’s a hurdle that pump storage planning would have to get around.

Q: *Hanne Smith*: I wonder if BC Hydro is looking at some of the alternative energy producing things like tidal. The other thing is we’ve got a lot of towns on hills, have you thought about water flow in municipal water systems?

A: *Basil Stumborg*: Within the IRP we have the Resource Options Report. We canvassed power producers to ask what is out there. We do identify some tidal and wave power projects and we know how large and how much they would cost. We didn’t find anyone using them as a utilities scale. We know in the future, we will have to think more creatively because there are not a lot of other resources.

Q: *Hanne Smith*: In terms of how a society would get there, would it be BC Hydro’s responsibly? Or will it be government directed? Or people standing up?

A: *Basil Stumborg*: The provincial government has been clear that if there are new projects they’ll come from the private sector. That’s what the provincial government laid out in the *Clean Energy Act*.

C: *Alex Love*: If I could weigh in, in terms of your question about recovering energy from water systems, it’s called PRB generation. That is an opportunity from a municipality, they could become an IPP. It’s a tough one in terms of the numbers as we’ve crunched them.

Q: *Gord De Rosa*: The use of capacity water is that not dictated by the Columbia River Treaty?

A: *Basil Stumborg*: There are a lot of restrictions with that and that would be determined by the constraints around it. There would be additional permitting.

Q: *John Duncan*: Where is the power from the Pinkston River going? We’ve destroyed a river valley. But the middle of July there will be a trickle.

A: *Basil Stumborg*: We have a grid that spans the province. It’s not directed any particular way. It just adds to a general system. That’s the risk with building small power projects.

C: *John Duncan*: We get no capacity and what did we do it for. It breaks the valley for what? It seems like it’s not very clean.

C: *Madelaine Duke*: I encourage you to put that in your Feedback form.

C: *Brent Hancock*: The plans are predicated on the legislation. It could change in 8-10 months.

A: *Basil Stumborg*: The 93% restriction depends on how the definition of clean is laid out, like not burning fossil fuels and it formed a lot of what you are seeing here.

Q: *Elroy Switlishoff*: Burrard Thermal is built and has the potential to generate 6,000 MW. But legislation prevents its use and there is just the marginal cost of gas because all the operators are there.
A:  *Basil Stumborg*: Yes, that’s correct.

### Additional Comments

Q:  *Elroy Switlishoff*: Have you been granted the flexibility?

A:  *Basil Stumborg*: This is a draft plan and we will put it forward to the government as our recommendation.

Q:  *Gord De Rosa*: How many of these presentations have been made and over what period of time?

A:  *Madelaine Duke*: The consultation period is May 28 – July 6. We have had this Discussion Guide online for the full length of time. We’ve had 2 webinars, 13 stakeholder meetings and five open houses. We encourage you to submit your feedback before July 6th.

Q:  *John Duncan*: Are you aware of storage technology?

A:  *Basil Stumborg*: Yes, there are technologies but it tends to be expensive.

Q:  *Gord De Rosa*: I guess there is no way we are going nuclear?

A:  *Basil Stumborg*: The government has legislated we are not doing nuclear.

*Basil Stumborg* wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.

The record notes the meeting ended at 12:00 p.m.
**MEETING DETAILS**

**BC Hydro Integrated Resource Plan**  
*A Clean Energy Plan to Meet B.C.’s Future Electricity Needs*

Victoria – Multi-Stakeholder Meeting  
June 20, 2012, 1:00 p.m. – 3:00 p.m.

Hotel Grand Pacific – Vancouver Island (East/Centre)  
463 Belleville Street, Victoria, B.C.

**PURPOSE**

Notes from a multi-stakeholder meeting for the BC Hydro Integrated Resource Plan held with Stakeholders and representatives of the Integrated Resource Plan on June 20, 2012 at the Hotel Grand Pacific, Victoria, B.C.

**FACILITATOR**

Nancy Spooner, Kirk & Co. Consulting Ltd.

**PRESENTER**

Randy Reimann, BC Hydro

**ATTENDEES**

Glenn Brenan, University of Victoria  
Jon Coleman, Jon-Co Contractor  
Judith Cullington, City of Colwood  
Donna Dorey, Cowichan Valley Regional District  
Mel Dorey, Cowichan Valley Regional District  
Tom Duncan, City of Duncan  
Mervyn Lougher-Goodey, Councillor, Town of Sydney  
Tom Hackney, B.C. Sustainable Energy Association  
John Horgan, M.L.A. Opposition Energy Critic (NDP)  
Maurine Karagianis, M.L.A. (NDP)  
Erik Kaye, Prov-Geo B.C.  
Bruce MacKenzie, B.C. Sustainable Energy Association  
Michelle Mahovlich, City of Langford Engineering  
Chris Midgley, Regional District of Nanaimo  
Moralea Milne, District of Metchosin  
Ken Olson, Corporation of the District of Oak Bay  
Peter Ostergaard, Consultant BC Energy Ministry  
Paul Sadler, Nanaimo Forest Products Ltd.  
Lloyd Skaalen, I.T.O.  
Jim Spafford, Archaeology Branch of Government  
Keith Stemkens, D.N.D.  
Dan Telford, Capital Regional District  
Per Wallenius, Prov-Geo B.C.  
Rob Wickson, Electricity Conservation & Efficiency Advisory Committee

**BC HYDRO INTEGRATED RESOURCE PLAN PROJECT TEAM**

Lindsay Fane, BC Hydro  
Kenna Hoskins, BC Hydro  
Ted Olynyk, BC Hydro  
Mike Savidant, BC Hydro  
Paul Stanley, BC Hydro  
Susan Campbell, Kirk & Co. Consulting Ltd, Meeting Recorder
**AGENDA**

1. Introduction  
2. Draft Integrated Resource Plan Overview  
3. Consultation Topics – IRP Recommendations  
4. Question and Answer  
5. Feedback Form

**KEY THEMES**

- Several participants asked why the IRP did not offer more support for local conservation initiatives and innovative generation programs.
- Some participants acknowledged BC Hydro conservation incentives for large growing businesses but suggested that the programs could be improved by providing greater rate stability and a better working process.
- Some participants raised concern about several constraints to BC Hydro dictated by the *Clean Energy Act*, such as restricting the use of Burrard Thermal and the requirement to be self-sufficient by 2016.

**DISCUSSION**

*The record notes that the meeting was called to order at 1:00 p.m.*

*(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)*

1. **Nancy Spooner – Welcome and Introductions**  
   Nancy Spooner welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Nancy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. **Discussion Guide Overview**  
   The discussion guide was reviewed by Mr. Randy Reimann, BC Hydro and participants asked questions throughout the presentation.

   **Introduction pp. 1 - 9**

Q: *Mel Dorey*: In your goals it seems that they are pretty minimal because they are looking for average or moderate just to take care of the needs. British Columbia has some of the greatest resources in terms of water power and we have a great shortage of money for hospitals, education and all kinds
of things. Don’t you think you should have something in the goals to generate further revenue; sell it to the Americans and decrease the prices to the business if you have an oversupply? Is that part of your goals?

A: **Randy Reimann**: There was a requirement under the *Clean Energy Act* to explore exports. What happened was from the time the act was created to today there has been the introduction of shale gas. With that, natural gas prices have come way down, which drops electricity market prices. In addition, we were looking to sell the attributes of clean resources to US customers. At the same time, the USA is building up their clean resources and they have a fair surplus now. While our resources were competitive in B.C., they were at the far end of the big market, that being California. For us, we are at the end of the line, so we ended up with some cost disadvantages there. The US has had a fair number of tax incentives for clean energy production in their jurisdiction and that’s dropped the cost of their producers to deliver energy. We looked at all of that and concluded that in the foreseeable future there is no opportunity for us to export clean energy at a profit.

Q: **Tom Duncan**: At some point in the past California owed us a significant amount of money. Have you collected that yet? I thought it was around $300 million? I think I asked this last time too.

A: **Randy Reimann**: This is an on-going issue and we continue to have lawsuits from California seeking to get money back to B.C. If you remember there was some manipulation of the markets in 2000-2001 and the State of California have pursued those people. We had a huge opportunity there. There was huge difference between peak and off-peak prices, but they were inflated. We would buy high-priced power overnight, but be able to sell it for even more over the day. I think we ended up with a margin of somewhat over $1 billion dollars, but we didn’t collect on all of it. The US subsequently looked at some people manipulating the markets and is still trying to make the argument today that they should be clawing back some of those profits. So far everything they’ve done has resulted in a US court saying there is no case there. It’s still not ended today.

C: **Tom Duncan**: I want to restate my position from last time. I pay my bills, the City of Duncan pays its bills and I don’t think that BC Hydro should accommodate that market until they pay their account.

Q: **Erik Kaye**: You said that there were two LNG\(^1\) plants that are incorporated, but I believe there are three, possibly more. So why are you only incorporating two into the load forecast?

A: **Randy Reimann**: There are three plants; the Douglas Channel, the Apache (Kitimat LNG) and a third future LNG, potentially could be the Shell Plant. The first two are reliant on BC Hydro for the supply of electricity in their permits. They had all their permits in place and since they had everything lined up they were included in our forecast. The third LNG facility we have included in our load scenario and we looked at some actions that would drive that.

Q: **John Horgan**: Charles Reid said to me the criteria were export permits. You planned for two plants, but I have just learned that there are actually six. About an hour ago, I learned about the sixth plant, Mitsubishi; so there is an increased demand for electricity as a result of that. But the market will

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\(^{1}\)Liquefied Natural Gas
determine which LNG plants will come on-stream. In your annual energy forecast, what’s your success rate for meeting targets in the past 10 years? What did you project in 2001 and 2006? How close did you come to meeting that?

C: **Randy Reimann**: In terms of whether the load forecast was accurate?

Q: **John Horgan**: It’s 59,000 Gigawatt hours. It is my understanding that you missed over the past 10 years by about 9,000 Gigawatt hours from what you proposed in 2001 and what we saw in 2010. This document starts this year, so we don’t have anything to check your accuracy. Do you have that information and will you provide that information to the public?

A: **Randy Reimann**: We have produced what we call a ‘feather duster’. There are times when the economy is hot and we will forecast higher rates and need to be in a position to meet those loads. Typically, there’s an adjustment in the market and we will forecast low. On average, we have done pretty well and start going out many years. We try to say how far and say what’s in the future, but you can start to miss on those. For that reason, with the Integrated Resource Plan, we try to commit to those actions that we need to today and ensure we can meet our future customer’s loads while trying to keep as many options open to allow us to address changing conditions.

Q: **John Horgan**: That doesn’t address how accurate your forecast has been over the past 10 years so we can better assess how this 20 year forecast is going to be.

A: **Randy Reimann**: I don’t have a percentage to pull, but generally pretty well. More successfully in the near term and less as you get further out. That’s why we are trying to look at a range of scenarios, different levels of loads that could be added.

Q: **Mel Dorey**: You mentioned earlier about natural gas prices and that shale gas bringing the price of gas down. When the lines are open to the orient with pipelines etc., they are predicting that gas prices will go up because we have three markets when we only had two. Are those calculated into the forecast as to the profitability of electricity?

A: **Randy Reimann**: Yes, when we started off the Integrated Resource Plan we had a range of five market scenarios that had ranges of prices for gas, electricity, green house emission costs and high to low. As time evolved the impact to shale gas became more apparent and we have re-weighted those. One of our lowest price scenarios became one of the most likely now. The price we are forecasting is somewhere in the $4.00 to $5.50 dollar ranges. What we found is that the prices dipping to around $2.50 per MMBPU which is lower than what we forecast. We forecast over 20 years and look at what is the trend. We think the range of $4.00 to $5.00 is a pretty good estimate. What happens now is that gas is oversupplied the producers aren’t able to produce the shale gas and make a profit on it and it’s slowing down production. With the LNG and eventually domestic markets will eat through that surplus. It will eventually get back up to around the cost of the production of shale gas, that being $4.00 or the $5.50. Those gas prices then drive the electricity prices and we’ve linked those.
**Conserve More pp. 10 - 11**

**Q:** Tom Duncan: In the City of Duncan, there is a high population of seniors living on fixed incomes and it’s very hard to consider doing upgrades to meet the conservation targets. When you talk about conservation measures will BC Hydro have financing available to assist? This is a concern for us and in the municipalities we have a mechanism to defer property taxes - this is our concern and can you see if you can work that in?

**A:** Randy Reimann: I am not exactly sure how it will work but we have looked at it. We looked at having the savings kept with the building so that it would carry from person to person to help with the ability to finance it. We are working on it.

**C:** Erik Kaye: At the Ministry of Energy and Mines, and Responsible for Housing, we passed legislation last year to look at financing and I will talk to you more about that off line.

**C:** Lloyd Skaalen: I want to follow up on the idea of incentives for reduction in energy consumption. I think we need incentives for developers as well as current building owners to reduce their own energy consumption including painting the top of roofs white to avoid the interruption of sun rays. You could use solar panels or wind energy for commercial operations in particular and for major apartment owners to help take care of their own requirements and maybe sell that energy back to BC Hydro. Those incentives are important.

**Q:** Tom Hackney: I’m with the BCSEA. The point I want to address is that the question of demand-side management target meeting the 66% requirement that the government has in the Clean Energy Act. It is my understanding that, as noted on Page 10 of the Discussion Guide, current demand side management measures would meet 78% of the incremental demand but before the LNG^2 plants come on into the demand. If those LNG plants materialize and add to the load, then this current plan will not in fact meet the 66% target, correct?

**A:** Randy Reimann: Yes, that is correct. In this plan, we looked at five DSM options. Three of them would use the more traditional codes and standards changes. Option 3 would be codes and standards was as high as we could go and maybe more mandatory codes and standards in trying to drive behaviors and more aggressive rates; however, it is too early to count on savings. We are working with government with their proposed energy and water efficiency act and trying to work our way through increased machinery efficiency. In a nutshell - yes by 2020 and one of the objectives is to meet the 66% requirement. The target was set before large LNG facilities were contemplated and this is as far as we can come.

**Q:** Tom Hackney: Has government actually signaled that they will approve the plan that doesn’t meet the requirement?

**A:** Randy Reimann: We are hopeful that the plan will be approved because it’s all we can achieve.

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^2 Liquid Natural Gas
C: *Judith Cullington*: I am from the City of Colwood and we have incentives through the ECAP program and that program is the BC Hydro Energy Conservation Program to reduce energy consumption in part and local generation of energy in the second part. BC Hydro is our partner and has provided incentives for heat pumps and it is very successful and energy use has gone down and those incentives were very important. The other piece is around solar hot water systems and the use of electric vehicles and they will add to the energy load over time. One thing we are doing is a solar program that will get a small amount, but is one that is ready and it will get bigger incentives as solar panels get out there and that could drive down energy use and conserve local energy generation. I want to see this reflected.

Q: *Mel Dorey*: I want to reduce what I call my energy trap. I used to have wood heat and oil heat. I have used wood and now you are pushing heat pumps and in very cold weather my electric furnace kicks in but because I am on a graduated rate scale for charging customers. If I use more then I pay more and so on very cold nights I light up my wood stove to keep the furnace from coming on. So anyone with smart meters, to further graduate the scale so that homeowners have to pay more at certain peaks times? Do you have anything at energy consumption higher levels so ordinary people won’t feel like they have been taken advantage of?

A: *Randy Reimann*: I believe you are referring to time-of-use rates and I would like you to please turn to Page 10, middle column, and note that the government has directed us to not use time of use rates rather we are looking at shifting consumption to off peak periods.

Q: *Bruce Mackenzie*: I am curious how you evaluate the effectiveness of DSM³ programs and how many gigawatts hours are avoided and how you measure that?

A: *Randy Reimann*: At BC Hydro we have a group that looks at measurement verification and evaluation and whether we have achieved savings and we continue to work and analyze to see how loads are reflective of trends but during the economic downturn it distorted the longer term trends however we are optimistic that we are having impacts and that actions are being followed up on.

Q: *Bruce Mackenzie*: Is that information online?

A: *Randy Reimann*: I couldn’t honestly tell you. I think some of that might be on the revenue application.

Q: *Tom Duncan*: I think you are referring to tier pricing and recently I upgraded the power to my house and a smart meter was installed and before all this I was paying about $105 a month and somehow my bill went up to $300 a month and then it now has dropped back to $136 a month and I understand that lots of people have had issues and that some of the issues have gone to the MLAs around tiered pricing — is there an issue with billing on smart meters with the tiered system when you first install them?

A: *Ted Olynyk*: I believe you are referring to two-tier pricing rather than time-of-use. With the use of smart meters customers still pay the same price and I would invite people with issues with their bill

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³ Demand Side Management
to contact us and we will look at it. We look at it and usually we find there is not difference but rather it is that the rates have gone up we investigate everyone that comes to our attention. Rates have gone up and then it appears the customer pays and then the bill settles down. It could have been a misread or an estimate. We’ve had some changes in programming.

C: *Ken Browman:* We have enjoyed a lot of upgrade opportunities and upgrade programs at UVIC that have been very helpful to us. We had an aggressive energy conservation program on campus and a baseline was established for the rate structure but it is a growing campus and we are having a hard time getting the baseline adjusted upwards so that is a challenge and BC Hydro needs to gain an understanding about growing inventory. With respect to the BCUC⁴ rate application for increases, we need stability and when the rates were fluctuating violently it was very difficult to budget, we request stability and we need to know five years out for stability and reliability of budgeting purposes. We’re probably one of the largest power consumers in our community.

Q: *Jon Coleman:* How do you track Aboriginal usage through reserves in B.C., what about incentives for First Nations and how do you plan on bringing down consumption?
A: *Randy Reimann:* In the first consultation, we heard a fair bit of dialogue around opportunity for First Nations to participate and that is something the Power Smart group has taken away and there is a BC Hydro key account manager that helps with First Nations communities.
C: *John Horgan:* As a first step I suggest that you contact the T’Sou-ke First Nations that have solar panels, it is an outstanding program and that would be a good place to start.

**Build and Reinvest More pp. 12 - 16**

Q: *Jim Spafford:* I am from the Ministry of Forests, Archaeological Branch, and it says at the bottom of the middle column that the Site C portfolio has a greater footprint. Do you have any numbers available for that?
A: *Mike Savidant:* It depends on which market and load scenarios you are looking at. Site C we treat it as a land footprint in the IRP and we compare that to what the wind and other IPP’s can replace in capacity. In mid gap and low market we see 1,500 to 2,000 hectares and in cases there is less and some more and it is all depending on mix of IPP resources, the portfolio and the mix of energy resources.
Q: *Jim Spafford:* Is transmission factored in?
A: *Mike Savidant:* Yes, transmission is included. At the point of connection which is at Peace Canyon and we don’t anticipate additional lines but there will be upgrades to the line past the point of connection. There will be no new footprint.
Q: *Keith Stemkens:* Has BC Hydro looked into geothermal? Have you looked at it or spent time looking at it?

⁴British Columbia Utilities Commission
A: **Randy Reimann:** Yes we have. We started with the Resources Options Report that came out fall 2010 and canvassed what was available in the province and it looks like a lower cost but there is a big variable associated with the drilling for finding the hotspots and whether you can contain the water. We analyzed future costs and options and people are free to bid in. The South Meager Creek Project was one we looked at but while it was one that looked promising it ran into problems and didn’t bid in. With respect to geothermal we like them, they turn on, are clean and provide good capacity and we are working with government to look at ways of permitting or providing ability to explore and develop and incent that. There is not a lot of activity. We would like to advance geothermal and would love it but the big question is who will take the risk and if you drill and don’t get the resource then it’s a lot of money spend to for nothing. It is a tough question.

C: **Keith Stemkens:** Well when you look at Site C and its footprint compared to geothermal it is significant.

Q: **Erik Kaye:** On Burrard (Thermal), didn’t the Clean Energy Act restrict its use in planning?

A: **Randy Reimann:** We can only use Burrard in case of emergency or allowed by regulation. We can rely on it until Revelstoke 5 and 6 is completed, the Lower Mainland line is complete and Coast Meridian Line, but we would need to extend it until Revelstoke 6 is completed in the 2016 timeframe. We rely on the market and only use Burrard as a backup. This wouldn’t meet self-sufficiency and it is a cost-effective solution and a good trade-off.

Q: **John Horgan:** Two things, with respect to Canadian Entitlement, that is a provincial asset and that power is sold in the US and what prohibits BC Hydro from bidding on that entitlement and just paying cash as users in the US do? What is the additional energy required for purchase because government policy restricts your ability to factor in 1,000 megawatt plant?

A: **Randy Reimann:** The self-sufficiency requirement and the fact that the Columbia River is not a resource in BC.

C: **John Horgan:** Even though it’s owned by the Province of B.C. by treaty but you can’t rely on that? I’m guessing you don’t want to touch on that, just let it hang there?

A: **Randy Reimann:** By the Act it needs to be a resource in B.C.

C: **John Horgan:** So we’ll just leave it hanging out there. The second point would be not being able to plan based on having a 1000 megawatt plant in the Lower Mainland. How does that affect this IRP?

A: **Randy Reimann:** In this IRP we have sufficient energy in the system to meet the first two LNG plants and we are planning on a proposed call for clean energy of 2,000 gigawatt hours in the 2016-2018 timeframe.

Q: **John Horgan:** You’re going to purchase power and need new supply even though you have a Crown asset. It is a crown asset in the heart of the base load and you are going to ignore that and purchase high-priced power to meet the short term gap? Correct?

A: **Randy Reimann:** We are proposing a 2,000 gigawatt hour clean call in 2016.

C: **John Horgan:** You have 2,000 gigawatts of high priced power that you will have to sell into the Lower Mainland and yet you are not taking into account the asset of Burrard, are you going to comment or should I just leave that as a dangling comment.
Randy Reimann: The Act requires us to only use Burrard in case of emergency. If we couldn’t meet the load then we would run it (Burrard Thermal). We need to consider the economics of it and how much we can rely on the market for supply and we are trying to limit our reliance to 4,500 to 6,500 gigawatt hours.

Judith Cullington: I see that the reference here is to electricity that is available during the coldest hour but what about peak shaving and asking a large industrial user during extraordinary peak period to voluntarily reduce their consumption so that the peak drops. This is a little like building a highway designed for a certain number of cars but most of the time the highway is empty. I think that needs to be part of this plan as well.

Randy Reimann: Going back to Page 11, there are two parts to this and one is load shedding with large industrial users and we have worked with individual industrial users on this for about 15 years and we want to formalize it more and we are still in early days and working with other commercial users. In addition to industrial load curtailment we are looking voluntary commercial and residential reductions. We don’t know what we can rely on but we are investigating to see what can be done.

Mel Dorey: From time to time you decommission dams or take something out of the system and depreciation is a problem across Canada, but I don’t see capital depreciation in here. Is that all figured into the plan?

Randy Reimann: Under the base assumption of the plan, we maintain our base heritage assets. Where it is cost effective, we continue to maintain our facilities and that typically happens in the revenue requirement process and this plan is about new facilities over and above the existing system.

Mel Dorey: What about ‘quakes’ because that could affect a dam or two?

Randy Reimann: Certainly, we are looking at our dams for seismic issues and we are upgrading where we need to. We just did Ruskin and working on John Hart now.

Tom Duncan: One of my biggest concerns is government’s restriction on BC Hydro and those restrictions force hydro to buy power at higher rates and my concern is coming up to the next provincial election and likely we will see a change in government we’ll likely see a change in policy. I think that BC Hydro shouldn’t sign a bunch of deals with IPPs that we will be stuck with after the next provincial election.

Lloyd Skaalen: There are limitations of transmission lines and the loss for every mile travelled and Site C is one of those resources that will lose a lot in transmission in getting to where it is going. What is the trade-off in building a resource closer to the load?

Randy Reimann: That is a good question and when we run portfolios we look at the clean resources and we also look at what is inherent within that portfolio and that includes losses to the load.

5Independent Power Producers
center. When we do IPP acquisitions, we do an evaluation process that will look at loss for delivery and try to buy the least cost.

Q: Mel Dorey: When it comes to transmission, there has been some talk that direct current is more efficient than AC and since you are building a new line to Terrace, what are the complications and what about direct versus alternating current?

A: Randy Reimann: This recommendation here is to upgrade the existing line and that is why we are proposing a third line for the third LNG facility. A high voltage line is a consideration but the downside is on the receiving end. AC versus DC strength it is stronger with AC so if DC we have to add other devices to make the line stronger. The other aspect of DC is every time you are on or off the line you need a convertor station and that is expensive and you can’t go in the middle of the line without adding an expensive station but from point A to B it is great.

Q: John Horgan: The NTL has a $563 million capital cost to the corporation, which we will pay for, but how many customers will be serviced by that when we complete that line? You are proposing building lines for mines that may or may not come on line. Building for market sources that will extract and send to market and what will the impact be on rates and what if the price of copper, for example, falls and coal becomes a fuel that is no longer viable? How much money will be spent on infrastructure for additional activity that won’t take place?

A: Randy Reimann: Let me refer you to Page 18. For LNG development the government asked that they are competitive in LNG markets, that they are leaders in climate change and to keep energy rates affordable and that is driving us to and, as part of the negotiation we are looking to them to carry the cost of supply. They would pay for part of the cost. With respect to the transmission line and to minimize dollars the LNG proponents are paying the carrying cost and we are minimizing costs until we know they are going ahead when we have a contract.

Q: John Horgan: What about the NTL?

A: Randy Reimann: The NTL is moving forward to service proposed mines in the area. There is a cost-sharing agreement, but I am not familiar with all the details of that.

C: John Horgan: “Proposed” (mines) being the operable word.

Buy More pp. 17

C: Chris Midgley: I am curious from the perspective of local governments — would you consider them local power producers through their waste water plants, for example, because I would encourage strong partnerships to make the processes run smoothly. I know that it is small through a waste water plant but you could chip away at the gap and I think that there is an opportunity there.

A: Randy Reimann: We have a standing offer program available for projects under 15 megawatts and anything over that we would want to look at time the delivery of those because they have to have larger impacts.

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*Northwest Transmission Line*
C: **Paul Sadler:** I run a pulp operation south of Nanaimo and I would like to encourage BC Hydro to continue on their successful path with respect to power offer programs because they are well received. The forest industry in B.C. has enormous opportunity to generate power and generate more and more power and to contribute to the gap. I think you should encourage pulp producers to continue and BC Hydro has been very cooperative but they put a lot of risk on producers of power and there is opportunity lost around that and in our case the risk involved in business tends to make us conservative in our designs and there are lost opportunities because of that. BC Hydro has managed to encourage the pulp producers and have a pretty good program in the last couple of years.

Q: **Bruce Mackenzie:** The price of solar panels has come down. Now, you are encouraging people to buy electric cars and put a solar panel on their roof so this may be the start. While solar is not a reliable supply because it goes up day and night. However, it should be a factor in planning going out 20 years and prices are coming down.

A: **Randy Reimann:** We are thinking about that and tracking the prices as they are coming down so customers can save money. The integrated community approach may be the way to go. Still, this is something we are looking at. We have net metering but maybe they (solar panels) are not cost effective at this point, but we are sending a price signal on clean sources.

C: **Bruce Mackenzie:** When you are talking about price pay-back I don’t think it factors into a lot of homeowner’s decisions when they make decisions based on granite counter tops and plush carpets. We hope it comes to a point where people factor this in.

C: **Tom Duncan:** I like the way Nanaimo does it with the profits coming back to their own rate payers and I think that part of the onus should be on BC Hydro to lobby government to start producing their own power. Why isn’t Hydro doing wind farms off the coast and I know the answer to that question because it is in the legislation but I want to ensure long-term sustainability for my granddaughter and there are long term benefits for Hydro to produce the power and gain the benefits instead of buying from expensive IPPs.

**Prepare for Potentially Greater Demand pp. 18 – 20**

Q: **Erik Kaye:** To clarify, to be backed up by gas, how does that factor into the 93% requirement?

A: **Randy Reimann:** There is enough room within requirement to meet the LNG facility with clean resources and be within the 7%.

Q: **Erik Kaye:** Same question as before then; that additional gas resource would still be in constraints of targets?

A: **Randy Reimann:** You start to layer on and if you had LNG3 come on and you met that load with gas backing up clean and then you had contingency of domestic load on top, at some point you run out of room.
Q: *Lloyd Skaalen*: I guess that I need a definition of clean energy – natural gas is not renewable and there is evidence that the fracking procedure is dangerous and there are environmental hazards from getting gas from some of the places that it is available at and in one of our previous meetings I asked why is nuclear energy not considered? The answer was that it was not permitted to be talked about by the BC Government – is that still the same because the technology has changed and it is a resource far more suitable than pumped energy and losing 30% or whatever it is. There are modular nuclear units that are available to serve up to a 3,000 population and they are completely secure so why are we not considering it for emergency or back-up?

A: *Randy Reimann*: We heard the same information about those modular units and I am not sure how long the modular units have been around and maybe they have progressed to be relatively safe but government policy bars us from considering nuclear energy.

Q: *Jon Coleman*: Government bars you just at your level? Because what is available for business, why couldn’t we take this and formulate as back up on a reserve where the community is not governed by the same rules?

A: *Randy Reimann*: That maybe a possibility but you still might have to go through environmental regulations and processes.

C: *Lloyd Skaalen*: There are blinkers around government rules, blinkers.

**Additional Comments**

Q: *Mel Dorey*: Does BC Hydro ever do run-of-river projects or is it all IPPs that do it?

A: *Randy Reimann*: It has been government policy since 2001 or so when the energy plan left development to the IPPs.

Q: *Chris Midgley*: From my region there is a high level of resident interest in distributed generation and I imagine that is just a sliver of pie on the graphs but do you have any thoughts on what distributed generation could provide?

A: *Randy Reimann*: There is lots of potential but there is a cost to provide and whether Hydro would subsidize and so far we’ve chosen the least cost clean resource. The net metering program is out there and we participate with communities but we do more to inform and educate however I would invite you provide written feedback around that.

Q: *Bruce Mackenzie*: This plan is all about electricity and electricity is about heat so another way to think about it is moving heat but is BC Hydro prohibited from looking at heat utilities as opposed to electric? Fortis BC is moving in that direction, a district heat system.

A: *Randy Reimann*: I don’t know that it is prohibited, I think we looked at electrification to reduce GHGs\(^7\) and we looked to see how more broadly and there is a potential but it comes with high cost but we are looking at it and working through.

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\(^7\)Greenhouse Gases
Q:  
*John Horgan:* Does the independent BCUC\(^8\) review the plan or is it approved by Cabinet?

A:  
*Randy Reimann:* By the CEA\(^9\) this plan is filed with government and then the Commission needs to consider it and be guided by it as it looks at future approvals.

C:  
*Tom Duncan:* Recently, wasn’t there a district heating plan working with the City of Prince George? I heard about it at a recent meeting and they might have some indication but it got derailed by a recent fire, but it was working with the City. Perhaps that is something BC Hydro could be involved in.

Q:  
*Mel Dorey:* This plan is not only power generation but about power costs as well with BC Hydro so what are the costs of administration compared to other utility companies in North America? In the province we know that hospital costs are high and education is high. Why should this be any different? It seems like there are a lot of managers and public relations people. Have you any comparison on the cost to managing this utility as to say managing a utility in Ontario?

A:  
*Randy Reimann:* I haven’t looked at that within the IRP and I am not able to speak to it.

C:  
*Mel Dorey:* Well there was a detailed government review and a number of positions were eliminated.

C:  
*Tom Duncan:* It was about 300 unionized staff positions.

A:  
*Ted Olynyk:* No, it was a cross section of union staff and there more management positions.

C:  
*Tom Duncan:* I am just retired from ICBC and generally costs are being looked at in the Crown corporations.

*Randy Reimann* wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.

*The record notes the meeting ended at 2:45 p.m.*
<table>
<thead>
<tr>
<th>MEETING DETAILS</th>
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| BC Hydro Integrated Resource Plan  
A Clean Energy Plan to Meet B.C.’s Future Electricity Needs  
Kelowna – Multi-Stakeholder Meeting  
May 29, 2012, 2:00 p.m. – 4:00 p.m.  
Delta Grand Okanagan – Vaseaux-Kootenay  
1310 Water Street, Kelowna, B.C. |

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<td>David Ince, BC Hydro</td>
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<th>ATTENDEES</th>
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</table>
| James Baker, District of Lake Country  
Michelle Cook  
Doug Findlater, Mayor West Kelowna  
Mirjam Glass, District of Peachland  
Brad Minnes, Urban Systems Ltd.  
Harold Shock, School District 23  
Bonnie Wilkes, Avalon Alliance Inc.  
Laurel Zaseybida, Avalon Alliance Inc. |

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<th>BC HYDRO INTEGRATED RESOURCE PLAN PROJECT TEAM</th>
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| Kevin Maxwell, BC Hydro  
Dag Sharman, BC Hydro  
Tim Lai, Kirk & Co. Consulting Ltd, Meeting Recorder |

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<th>AGENDA</th>
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| 1. Introduction  
2. Draft Integrated Resource Plan Overview  
3. Consultation Topics – IRP Recommendations  
4. Question and Answer  
5. Feedback Form |

<table>
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<th>KEY THEMES</th>
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| - Some participants expressed concern that BC Hydro is planning to provide electricity to LNG plants instead of demanding that LNG plants provide their own power with natural gas.  
- Some participants said that BC Hydro should give more consideration and put greater emphasis on geothermal and solar generation, instead of more traditional generation forms such as gas and hydro. |
• Some participants expressed a desire for BC Hydro to consider more distributed generation of power, and to generate and deliver energy supply by region, with options that were a good fit for the specific regions.

DISCUSSION

The record notes that the meeting was called to order at 2:05 p.m.

(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. Judy Kirk – Welcome and Introductions
   Judy Kirk welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Judy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. David Ince – Consultation Discussion Guide
   David Ince reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

   Introduction pp. 1 - 9

Q: Brad Minnes: If the goal is to have two-thirds of energy met by conservation, are these forecasts generated using that thinking?
A: David Ince: Yes, indeed.

Q: Harold Shock: When you talk about generation, you can only talk about it when it’s windy. You have a large reservoir where you can turn on and turn off as demand varies. Because wind can’t be turned on and off, wind should be the value provided to customers whereas water should be counted as storage.
A: David Ince: That’s what we do right now. BC Hydro is an amazing utility with an amazing storage asset. You can’t really follow the load because you can turn it on and off almost instantaneously. But in the other hand you had a large wind farm, you would have to have the equivalent amount of storage for backing that up. If you have 100 MW of wind, you’re going to have to have 100 MW of something else to back that up.
C: Judy Kirk: When the wind isn’t blowing you have something else to keep the power going.
C: Harold Shock: And the dams do that.
C: David Ince: If all of it was hydro power and you had the ability to follow your load and you go into a surplus of generation, you could trade that and sell it into the U.S. I’m not saying this is what we always do, but we could. But on the other hand, if you have to keep that storage for shaping wind
power, then that’s lost to you in terms of trading ability. You’re using up much of your system capability to back up these intermittent resources.

Conserve More pp. 10 - 11

Q:  
   *James Baker:* So 66 per cent of energy will be met by conservation. What if everyone buys an electric car and you need more energy? 66 per cent seems very ambitious.

A:  
   *David Ince:* Yes, that’s ambitious.

C:  
   *Judy Kirk:* James, to be clear, that 66 per cent is for new growth, not for total demand of energy.

Q:  
   *James Baker:* How are you going to serve that by conservation? You’re making enough cuts to serve 66 per cent of new growth?

A:  
   *David Ince:* Yes, we’re going to be making cuts in terms of existing demand and future demand. All sectors will have to play a part in that conservation.

Q:  
   *James Baker:* When you started smart metres, you were talking about step rates?

A:  
   *Dag Sharman:* You’re referring to time-of-use rates, but that’s not a part of this – when you have different rates for different times of the day.

Q:  
   *James Baker:* What’s a step rate?

A:  
   *David Ince:* It’s where large consumers pay for their last increment of power a higher rate. For the first block, it’s a lower rate and it jumps when they reach a certain threshold. It’s 1350 kWh for every two months.

A:  
   *Judy Kirk:* Simply, you can use a certain amount of power at a lower rate and if you go over that you’re charged higher rate.

A:  
   *David Ince:* Our rate is very good in that it’s revenue neutral. If you look at all the customers, the lowest tier was reduced. And offsetting that, the highest consumer paid more. That rate and range could be expanded between the highest and the lowest.

C:  
   *Judy Kirk:* One of the things we heard last year was that people wanted a more proactive approach to conservation. But they had a caution for BC Hydro. They were supportive of voluntary programs, but cautious about mandatory codes and standards.

Q:  
   James: In our experience with water conservation, it’s not that effective yet. There are still lots to be done.

A:  
   *Judy Kirk:* Having been a part of the Greater Vancouver Regional District’s water conservation program, they’ve seen terrific results after a decade and a half.

C:  
   *James Baker:* Mayor Findlater has his community down 25 per cent for water, but it’s not 66 percent.

C:  
   *Judy Kirk:* I just want to be clear that it was down 25 per cent in total.

A:  
   *Doug Findlater:* Yes.

A:  
   *Judy Kirk:* We’re talking 66 per cent reduction in growth.

C:  
   *David Ince:* Let’s say we forecast the growth to grow by 3 per cent, we would reduce that growth to 1 per cent.

Q:  
   *Doug Findlater:* So you’re bending the growth curve down.
A: *David Ince*: We’ve love to achieve a 25 per cent reduction in growth, but that would be even more ambitious.

Q: *Harold Shock*: Why does BC Hydro have to get the business of supply power to LNG? It’s just compressors. Why don’t they use their own gas and become a service provider?

A: *David Ince*: We’ve got vast new resources with natural gas and shale gas. In North America, the average price is about $3/gJ, whereas that’s about three times that in Asia. It’s opened up a lot of people’s eyes to getting that power to Asia. There’s a huge price spread.

A: *Harold Shock*: Why don’t they become their own utility? I see the sector spiking because of LNG – it’s just compressor, just use gas.

A: *David Ince*: In order to liquefy it, it’s not much more than your refrigerator at home. The technology is just like motoring the fridge. You can serve that fridge with natural gas or you can serve that with electricity. Proponents have come to BC Hydro to talk about serving that demand with electricity.

C: *Judy Kirk*: The question was why not self-supply?

A: *David Ince*: It’s a matter of economics, greenhouse gases, the risk to the environment, emissions tax. Those are complex decisions.

Q: *Harold Shock*: All PSOs will pay for more greenhouse gas offsets. Rather than have hydro dams, which are very clean, we’re going to have to supplement this extra electricity demand or buy it from the U.S. Take the demand off.

A: *David Ince*: That’s an option for other project proponents. Every other place in the world uses natural gas directly to serve their own projects. They may go via electricity.

C: *Harold Shock*: If you keep this route, you’ll incur more costs in greenhouse gas offsets.

**Build and Reinvest More pp. 12 - 16**

Q: *Laurel Zaseybida*: There seems to be an emphasis, first, on run of river, then wind, and a little bit about biomass, very little about geothermal and very little about solar. For example, Germany just achieved 50 per cent of its national energy through solar; Iceland and the US are streaking ahead on geothermal; and lots of countries have net zero buildings and structures. What are the obstacles for not choosing these better options and why are we supporting these lesser options?

A: *David Ince*: BC Hydro is winter peaking utility. We are flush with power in the summer time. The power we could get in the summer isn’t the power we need. We would need to store it and we’re reaching the limit of our storage. We need power in December at 6:00 p.m. and you know what that’s like. Solar is great where it’s sunny and I think there’s going to be a revolution in the US southwest.

Q: *Bonnie Wilkes*: In Germany, the solar, they say will eliminated 20 nuclear plants. There needs to be a political will to promote system where businesses can sell back into the system. You see in

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1Liquefied Natural Gas
California that these businesses can reduce costs over time through government programs. Right now, it would be incredible time to buy solar because it’s inexpensive.

A: David Ince: I’ve been involved in all the calls for energy and there hasn’t been a geothermal bid coming through. We don’t know why, but it could be the risk in technology. We only had wind, bio energy, those kinds of projects submit bids.

Q: Laurel Zaseybida: But you’re not opposed to it? I think there are a lot of geothermal projects in development but they’re getting blocked by lack of government support. There are countries developing this and Canada is at the bottom of this list, and yet, we have some of the greatest resources here in B.C.

A: David Ince: We’d love to have geothermal.

Q: Laurel Zaseybida: There’s probably a block from the oil and gas industry. Geothermal could power a whole region.

A: David Ince: It’s a very attractive resource, it’s not intermittent. We’d love to see a geothermal project bid in.

C: Laurel Zaseybida: That’s good to hear that there doesn’t seem to be resistance from BC Hydro, but maybe from government and other interests.

C: Dag Sharman: BC Hydro is very open to geothermal.

C: David Ince: Actually, the price was very attractive to geothermal.

C: Laurel Zaseybida: Also, I see such great potential in the design and retrofitting of new developments. Some of these buildings and having these green standards, has allowed for net zero or energy plus. Homes and building are becoming generators. We’re not getting near to that and other parts of the world are getting there. We’re looking at superficial things, such as light bulbs, not systemic changes. I’m hoping BC Hydro becomes a leader in conservation, not just light green ones.

C: David Ince: I think we’re a leader that 93 per cent of our generation going forward must be clean. It’s almost an unprecedented goal around the world.

C: Laurel Zaseybida: My concern with some of these run of river projects is that it’s not like they don’t have an environmental impact. I think when you’re calling that clean, you’re lumping that with some superior technology, and it would have much less impact. Not all of them have the impact of clean. In every region, you’re going to have more preferential options. And in some options, you’re not going to have geothermal and in others you’ll have to work more with hydro. You always want to be shooting for the least environmental impact.

Q: Michelle Cook: What lands are going to be flooded with Site C?

A: David Ince: It’s the Peace River valley that’s going to be turned into a reservoir, about three times wider than the current width. I don’t know the hectares.

A: Kevin Maxwell: It’s farmland and forest.

Q: Michelle Cook: Is it private, Crown, First Nations?

A: Judy Kirk: It’s predominantly Crown land.

Q: James Baker: Doesn’t Site C take up as much Crown land as private land?
**Meeting Details**

BC Hydro Integrated Resource Plan  
A Clean Energy Plan to Meet B.C.’s Future Electricity Needs

Kelowna – Multi-Stakeholder Meeting  
May 29, 2012, 2:00 p.m. – 4:00 p.m.

Delta Grand Okanagan – Vaseaux-Kootenay  
1310 Water Street, Kelowna, B.C.

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A: Judy Kirk: I don’t think that’s true. Dag, could you please check that now? I believe it’s a very large percentage of Crown land.

C: James Baker: There are a lot of signs up there that say otherwise.

Q: Michelle Cook: And First Nations land?

A: Judy Kirk: Yes, I believe First Nations have claim on all the land, but I’m not an expert.

Q: Harold Shock: Your dams were built in the 1950s?

A: David Ince: The last dam, Revelstoke, was built in 1984.

Q: Harold Shock: Has the technology changed since the 50s?

A: David Ince: Not dramatically, but out of the newer turbines, you can get maybe 5-10 per cent more, at most.

Q: James Baker: Didn’t you add generation to Keenleyside dam?

A: Kevin Maxwell: Keenleyside Dam isn’t owned by BC Hydro, but run by Columbia Power, another Crown corporation.

Q: James Baker: When did that happen?

A: Judy Kirk: Years ago, as part of the Columbia River Treaty.

Q: James Baker: The Keenleyside Dam was built for flood protection and there was no generation for 30 years. But wasn’t it a BC Hydro project?

A: Kevin Maxwell: It’s with Columbia Power, which is a separate Crown corporation.

Q: James Baker: So it’s not part of your generation system?

A: Kevin Maxwell: No.

Q: James Baker: All the other dams above it are BC Hydro like Mica and Revelstoke?

A: Kevin Maxwell: BC Hydro owns and operates Mica and Revelstoke. The Keenleyside Dam is operated by BC Hydro, but the generating station beside it is operated by Columbia Power.

C: Judy Kirk: It’s a complicated arrangement between the Americans and the Canadians.

Q: Brad Minnes: Are the recommendation in a priority?

A: Judy Kirk: Yes, it’s what David would call stacking.

C: David Ince: In terms of cost, environment and other considerations, I’d put conservation first and then move up.

Q: Brad Minnes: I understand that there was an open call before, but as we approach this gap, there’ll be another one?

A: Judy Kirk: Yes, that’s down the line.

Q: Bonnie Wilkes: What’s the capital cost for Site C?

A: David Ince: It’s $7.9 billion.

Q: Mirjam Glass: Is BC Hydro making financial plans to fund the expansion, to build the infrastructure? Has it already started?
A: **David Ince**: Not in any major way. We may be doing studies and consulting, but we’re not committing anything other than conservation. There are detailed project plans and estimates. We are not putting construction money aside.

A: **Judy Kirk**: Tell me if I’m wrong, costs are deferred for Site C until it’s in service. That’s the financial model and once it’s in service, rates will then pay for Site C.

Q: **Harold Shock**: Regarding Site C, I know there’s environmental impact and people losing their homes. It may not be as invasive because the area isn’t as populated. B.C. has a legacy of dams and hydro power and we’re pretty proud of that. If we don’t proceed with Site C we have to fill up the short fall with other means. We’re enjoying the lower rates because of decisions made and sacrifices in the past. If people understand the impact of what Site C can provide and it leads us in that hydro generation path, we should continue that instead of going to coal and generation methods in other provinces.

C: **Doug Findlater**: I have a transmission issue and here is some shameless self-lobbying for West Kelowna’s interests. It’s about power security for us, West Bank First Nation and Peachland, which is about 50,000-60,000 people. We have a single radio line coming from Merritt, no redundancy. This was largely unknown until a by-election, which there was a power outage for 10 hours. A fire in one of the towers caused this outage. Ever since that time, it’s a priority for council. We’ve met with BC Hydro several times and Dag knows about this. We keep trying to raise the profile of this. What’s the redundancy plan or rescue plan if there’s a forest fire or ice storm, or terrorism? We were told that people could power down and they could bring in generators from the oil sands and that didn’t sound like a really good plan. There has been some movement as there was funding from the BCUC to do some engineering studies. They’ve been looking at three options. The best option I heard was to go west. We thought something was going to happen but we haven’t heard much. I see that transmission takes a long lead time. We know it’s not going to happen next year and now we’re hoping for 2016. I’m here to get it on your list. We show up everywhere we can - don’t forget us. I know there’s mitigation done such as tightening the lines. If you’ve been in firestorm, it doesn’t help. We know this costs money, so where are we in the priorities? Do rates structures push us further down the list? We’re the largest population area served by single radio line. It’s a dynamic area.

A: **Dag Sharman**: I’m working with our system folks who will be coming out to West Kelowna. I don’t have a date yet, but I’ve spoken to Shelly. Thermal upgrades done to the lines – poles were replaced and extended. While it was done to help security, it was mainly done to increase capacity. There was work done at the substation. I know there’s mitigation done such as tightening the lines. If you’ve been in firestorm, it doesn’t help. We know this costs money, so where are we in the priorities? Do rates structures push us further down the list? We’re the largest population area served by single radio line. It’s a dynamic area.

Q: **Judy Kirk**: Dag, regarding Site C land?

A: **Dag Sharman**: 93 percent is either Crown or BC Hydro land, 7 per cent is private land.
**Bonnie Wilkes**: When I think about the negative response of running pipelines from Alberta to Kitimat, what’s the response of the people in those areas? Not supportive, generally?

**David Ince**: It’s a completely different outcome. If there’s a pipeline rupture, the gas goes into the air and dissipates fairly quickly. It doesn’t leave the residue on the ground. If you have incident with LNG, it would dissipate fairly quickly. You would have a band, but not oily residue.

**Bonnie Wilkes**: This sounds like a revenue producer for Asian markets. You’d be looking at the same problems of high frequency transport. I’d be surprised if they would supportive of that.

**Judy Kirk**: In the Prince George, Fort St. John and Dawson Creek region, they prefer gas, from what we hear from them. Their economy is sitting on a foundation of gas. They talk about concerns of shipping oil, but not with gas.

**Laurel Zaseybida**: What are the known impacts of shipping of gas?

**David Ince**: In the worst case scenario, where you have a breach on a ship, the gas either dissipates into the air, or there’s an explosion. There’s no residue or contamination. The LNG would float on the water until his vaporized.

**Laurel Zaseybida**: So there would be significantly less impact?

**David Ince**: Absolutely. Also note that the biggest LNG plant is proposed to be on Haisla land. There’s a lot of First Nations that have bought into LNG.

**Michelle Cook**: I think we’re doing pumped storage in Glenmore-Ellison. It’s just being built at a pump station right now and the plan is to do this. You’re still using energy and it’s not net zero.

**David Ince**: It’s relatively new technology and we’d want to follow up.

**Michelle Cook**: They used to be on the creek and now they’re on the lake. They’re looking at pumping it up to the station. It’s the Kelowna joint water commission.

**Brad Minnes**: In past calls, were they calls as revenue generating exercises or to meet previous plans? What drove a need to a call in the past if there wasn’t an identified gap?

**David Ince**: It was always around a gap. Our last solicitation was for $130/MWh. Our highest rate is about $70/MWh. Typically, it costs us about double to procure power. It’s an odd business model, but the BC Hydro system was built from the 60s-80s and it’s depreciating like an old car. Anything new that we build or buy is going to be more expensive. We don’t look for profit; we’re not building to sell to adjacent markets. It’s too expensive to do that. We’re building to keep the lights on.

**Brad Minnes**: It must’ve been a timing gap?

**David Ince**: Our load grows about 1000 GWh a year. In previous calls, we were energy restrained. We only had so much water coming into the reservoir and we need to augment that with IPPs. First time ever, we are constrained to meet peak December load. We’re looking for something new.
Q: **Laurel Zaseybida:** What are the most viable types of biomass in the buy more scenario? What’s the viability of sawdust waste from saw mills? Compared to others, it doesn’t seem like a significant sector.

A: **David Ince:** I don’t want to talk about specific projects or regions, but generally, larger is usually better. With economies of scale, you can bring prices down. It’s good to have existing facilities, what they call brown field site, not green field site. Having a fiber supply is becoming increasingly important. With the pine beetle, we have allowable cut issues. Also, it’s good to have a high mountainous terrain of timber that you control.

**Additional Comments**

Q: **Bonnie Wilkes:** With Site C, is the area mountainous, wide?

A: **David Ince:** It’s a river valley that’s relatively shallow. There are not a lot of trees.

A: **Judy Kirk:** And then bench land.

Q: **Michelle Cook:** Is there a big push back from the agricultural land reserve?

A: **Judy Kirk:** There’s some ALR, but I don’t have the exact numbers. You can go online to find it.

Q: **Laurel Zaseybida:** One concern I have is that the major settlement area is in Lower Mainland. You have these areas where all these resources are funneled there. This is probably beyond the scope of BC Hydro, but what are the chances of regions being more self-sufficient in generating supply. Why can’t we have smaller scale solutions?

A: **Judy Kirk:** We heard that quite often in last round.

A: **David Ince:** Seems unfair in other parts of the province. In terms of efficiency, it’s bigger than a B.C. issue as we’re connected through the western North America. With a bigger area, the more efficient and more secure the area. If we had a problem, we could lean on Alberta or Pacific Northwest. Regional self-sufficiency is generally less efficient and less secure. Regarding Lower Mainland, we’d have to dig very deep to come up with a solution to be self-sufficient. We’d have to re power Burrard and do more pumped storage in the North Shore.

C: **Laurel Zaseybida:** There has been very good dialogue for the relocalization movement. It could be food supply; just the same way it applies to power and water. There’s a valid argument for more regional responsibility. But you’ve already invested in this massive infrastructure.

C: **David Ince:** I’m not married to any solution. If there was revolutionary technology like solar in the U.S. southwest, that could be huge there as a smaller-scale solution. If they were pumping out solar panels for $1,000 per kW, you’d be onto something there.

C: **Bonnie Wilkes:** Near San Francisco, they’ve creating their own solar grid. We’re a fog zone but it’s very doable. It’s just about reaching more rooftops.

C: **David Ince:** I want to see more distributed solution and making it integrated and cost-effective solutions.

Q: **Harold Shock:** Is there any interest in diverting the Fraser, not damming the Fraser, and doing proper investigation to utilize it without wrecking the environment?
David Ince: No, I haven’t heard that. In Atlantic Canada, they talk about tidal power in the Bay of Fundy. That’s expensive and I don’t know what it would do the salmon.

Harold Shock: I’m talking about allocating some river flow of the Fraser through a turbine. There’s a lake close to Vernon where there’s a huge fall. They put a turbine in there to slow it down.

David Ince: It’s Lake Country that does that and they sell it back to BC Hydro.

Harold Shock: That’s a small unit. The Fraser has many falls. It’s something that should be looked at, at least. But I know there are impacts to fish.

David Ince: We haven’t looked at that, but I appreciate your comments.

David Ince wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.

The record notes the meeting ended at 4:00 p.m.
| MEETING DETAILS | BC Hydro Integrated Resource Plan  
A Clean Energy Plan to Meet B.C.’s Future Electricity Needs  
Kamloops–Multi-Stakeholder Meeting  
May 30, 2012, 10:00 a.m. – 12:00 p.m.  
Hotel 540 – Rivers South  
540 Victoria Street, Kamloops, B.C. |
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<tr>
<td>FACILITATOR</td>
<td>Judy Kirk, Kirk &amp; Co. Consulting Ltd.</td>
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<tr>
<td>PRESENTER</td>
<td>David Ince, BC Hydro</td>
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| ATTENDEES | Barry Banford, District of Clearwater  
Kaitlin Boyd, Thompson Rivers University  
Arnie Budd, Sun Peaks Resort  
Donovan Cavers, City of Kamloops  
Ken Christian, City of Kamloops  
Armand Cordonier  
Brad Gerow, International Union of Operating Engineers  
Leslie Groulx, District of Clearwater  
Jim Gudjonson, Thompson Rivers University  
Bernie Hart  
Maurice Hindle, MCC/Kamloops Chamber of Commerce  
Bill Humphreys, District of Barriere  
Peter Milobar, City of Kamloops  
Tom Owen, Thompson Rivers University  
Tim Pennell, Thompson-Nicola Regional District  
Andrew Peterson, Agriculture  
John Sternig, Thompson-Nicola Regional District  
Jackie Tegart, Village of Ashcroft  
Charlie Weir, District of Logan Lake |
| BC HYDRO INTEGRATED RESOURCE PLAN PROJECT TEAM | Kevin Maxwell, BC Hydro  
Dag Sharman, BC Hydro  
Tim Lai, Kirk & Co. Consulting Ltd, Meeting Recorder |
| AGENDA | 1. Introduction  
2. Draft Integrated Resource Plan Overview  
3. Consultation Topics – IRP Recommendations  
4. Question and Answer  
5. Feedback Form |
KEY THEMES

- Some participants expressed concern that the two-tier residential rate penalizes those who do not have a secondary energy option, such as gas.
- Some participants expressed strong reservations about pursuing voluntary conservation to reduce consumption during peak periods. Most participants said they want BC Hydro to be transparent if it is considering any form of time-of-use rates.
- Some participants said BC Hydro needs to prioritize transmission upgrades in the North Thompson because transmission limitations are creating constraints on new industry in that region. They indicated that the consideration of transmission improvements in northern B.C. shows a quicker response to business development in those regions.
- Some participants were concerned that bulk discount rates to new and large industrial users such as LNG would result in residential ratepayers subsidizing these industries; participants suggested that LNG self-supply its power needs.
- Some participants were concerned that BC Hydro conservation programs are being reduced, which could impede BC Hydro in meeting its conservation targets.

DISCUSSION

The record notes that the meeting was called to order at 10:00 a.m.

(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. Judy Kirk – Welcome and Introductions
   Judy Kirk welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Judy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. David Ince – Consultation Discussion Guide
   David Ince reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

   Introduction pp. 1 - 9

Q:  
   Tom Owen: Do you have the percentage of growth in each customer group in terms of the supply gap?
A:  **David Ince**: The expected growth for residential is about 1.5 per cent before conservation, 1.5-2 per cent for commercial before conservation and 1-5 per cent for large industries, which would depend on natural and LNG\(^1\) needs.

Q:  **Tom Owen**: Do the growth numbers include LNG?

A:  **David Ince**: Yes, you see a hump over 2017 and that’s caused by potential mining, natural gas and LNG.

Q:  **Tom Owen**: In percentage terms, those three categories groups about the same now. What will natural gas add to that?

A:  **David Ince**: LNG would be 5,000 GWh\(^2\), which would be 10 per cent of BC Hydro’s current load.

Q:  **Barry Banford**: Does the supply include existing sales agreements or project agreements to customers outside B.C.?

A:  **David Ince**: This is all for domestic only. We have some very small export agreements that are treaty agreements. We don’t have any firm long-term export contracts.

### Conserve More pp. 10 - 11

C:  **Tim Pennell**: I have a problem with tiered billing because it penalizes people more in north than south, especially communities that don’t have the option for natural gas, like the North Thompson. Since we don’t have that option, we have to use more electricity to heat our homes. We get into air quality issues, but we have people burning wood. If you were to do more of that in the North Thompson, you’d get more objections to it.

Q:  **John Sternig**: I see 34 per cent goes to industrial and large customers, so has BC Hydro sent engineers to them? If you get those 166 companies to conserve to the maximum, that seems like the easiest route for me. Have your engineers gone through their operations to maximize conservation? We know most of them are getting the most beneficial rate, but would their rates go up if they don’t follow those measures?

A:  **David Ince**: Yes, that’s a long-standing program we call key accounts and they have key account managers. For large accounts, they have a dedicated representative who knows their process and knows where the energy savings could be. If it’s cost effective, programs may be struck, BC Hydro may provide incentives to install better equipment.

Q:  **John Sternig**: I know there are contractual agreements, but could you get to a point where you have penalty clauses for non-conservation measures?

A:  **David Ince**: I’m not aware of any penalties – it’s more a carrot than a stick approach.

\(^1\)Liquefied Natural Gas
\(^2\)GigaWatt hours
Q: **Peter Milobar:** In spite of all the talk around smart meters, it sounds like you’re suggesting time of day billing, which is what everyone was worried about. It’s hard to cook dinner when you’re calling that peak demand time. How do you reconcile this?

A: **David Ince:** The difference is that this is voluntary and it would only apply to certain end uses.

A: **Dag Sharman:** To be absolutely clear, time of use is not part of this. Through smart meters, we’ve said that there is no plan to bring in time of use.

Q: **Peter Milobar:** But if you’re going to give me a discount for not using during peak times, what’s the difference?

A: **David Ince:** It’s possible to do that, but that’s not part of the recommendation.

Q: **Peter Milobar:** What about getting bonuses during non-peak times? Anyone who doesn’t is still paying more. It seems like a different way of calling time of use.

A: **Dag Sharman:** This would be voluntary and only apply to certain technologies. Details have not been worked out. The key motivation is to shave load and peak. That could apply to residential, commercial and industrial. The main group would be industrial because they have very large loads and there’s one point of contact.

Q: **Tim Pennell:** All you’re doing is rearranging the spots on a leopard, but it’s still a leopard. You’re talking about peak time billing and you’re saying it’s a rewards program, instead of a penalty program. On the industrial side, it doesn’t make sense to ask industrial customers to shut down for hours as a time – idle equipment doesn’t make money.

A: **Dag Sharman:** To be clear, we’re not talking about mandatory time of use rates. What we’re talking about is a contract with an industrial user to provide incentives because a business is not going to stop production to help BC Hydro.

Q: **Ken Christian:** What does it look like 2017 if we do nothing on that December afternoon and we have no power? What’s the contingency for browning out?

A: **David Ince:** We’ve got some measures that we’re going to talk about such as the Canadian Entitlement, running Burrard Thermal. We have contingency plans.

C: **Judy Kirk:** Correct me if I’m wrong but if there’s anything that approaches something like time of use, you don’t want to see it. That’s the message I’m getting here.

C: **Tim Pennell:** I’m not opposed to it, but be up front about it. It reminds of the HST and look at end result. Time of use may be applicable with technological chances, but be up front about it. Do try to do it like you’re rearranging the spots.

C: **Peter Milobar:** I’m worried about time slots. Will it be reasonable, will it be during dinner or when people have the option and have 6 TVs on.

C: **Barry Banford:** It’s like washing and drying clothes. If you do it, do it during reasonable hours.

Q: **John Sternig:** I understand the some dams have released water this year – is it because they’ve reached capacity? Sometimes Revelstoke doesn’t need to generate power. I’ve heard of Lake Country building a battery, like pumped storage. If we’re releasing water, is it possible to support these natural batteries?

A: **David Ince:** We have a section coming up on pumped storage shortly. It’s a great concept.
Q:  **John Sternig**: Are we releasing water due to over capacity?
A:  **Dag Sharman**: There has been some release of water at Revelstoke not because of over capacity but because of the Columbia Water Use Plan. When we are not generating power, we have to release minimum for fish habitat. In the north, we are considering releasing due to market conditions as we don’t pay others to store our power. The high snow pack is also making us consider spilling in the north. We’ll see what the weather brings. We could spill at Mica.

Q:  **John Sternig**: If we have natural batteries, we can stop that release.
A:  **David Ince**: Storage is a fantastic asset for BC Hydro. I’ve worked at a number of utilities and our flexibility for storage is the best I’ve seen. We are running up to the limits of our storage.

**Build and Reinvest More pp. 12 – 16**

Q:  **Tom Owen**: If you want to build Site C, just say so. I have some reservations about it since Alberta couldn’t build it on their side. I haven’t seen detailed engineering, but I find that it’s safe to assume it’ll go through.
A:  **David Ince**: BC Hydro is recommending it be built.
Q:  **Tom Owen**: What about engineering issues such as ground sloughing?
A:  **David Ince**: I’m not an expert on geotechnical issues for Site C.
C:  **Judy Kirk**: We just wrapped up a consultation in April and impact lines and those geotechnical issues were a topic. There is lots of information online about that issue and many others.

Q:  **Ken Christian**: I don’t have problem with Site C, but I’m wondering about line load loss due to distance between the Peace and Lower Mainland. Would you change grid patterns?
A:  **David Ince**: It’s a very significant issue. We lose about 10 per cent to total supply and 7 per cent transmission losses. When we consider Site C, while it’s remote from the Lower Mainland, it’s still a lower cost when compared to other, even when you factor in load loss.

Q:  **Judy Kirk**: Would you consider another type of transmission?
A:  **David Ince**: There’s a project called ILM – Interior to Lower Mainland – which would take more power, some of which would be from Site C?
Q:  **Peter Milobar**: What was the line loss 15 years ago?
A:  **Kevin Maxwell**: It hasn’t really changed. It would go up if you push more power through.
Q:  **Peter Milobar**: With innovation improving things, it seems overall that you’re losing the same amount as you’re generating with Site C.
A:  **David Ince**: There’s no revolutionary technology out there. There’s high voltage DC, but it comes at a very high cost.
A:  **Kevin Maxwell**: You could double the lines and you’d lower to line loss by 1 per cent and you’d spend billions.

Q:  **Brad Gerow**: I understand Rev 5 is done and Mica 5 and 6 will be done and then Rev 6 will be done. I don’t see it as a recommendation, but are coming to fruition?
A:  **Kevin Maxwell**: Rev 6 isn’t approved yet, but we’re recommending it go through.
Q: **Brad Gerow**: We’ve been told that once you’re done with Mica, you’ll do Revelstoke.
A: **David Ince**: Revelstoke isn’t coming big like Site C, it’s for completeness.
C: **Tim Pennell**: These projects will require lots of improvements including upgraded transmission; something that we want to ensure is on the record.
C: **David Ince**: Yes.

Q: **Tom Owen**: Is the Columbia River Treaty up for renegotiation?
A: **Dag Sharman**: It expires in 2024, and it can be terminated, but you have to give 10 year notice. We would have to state our intention by 2014. It’s currently under review to terminate.

Q: **Tom Owen**: What’s your crystal ball say?
A: **Dag Sharman**: I can’t go there.

Q: **Tom Owen**: So it’s a possibility that it couldn’t be there?
A: **Dag Sharman**: Yes.

Q: **Tim Pennell**: I’m looking at the Mica to Nicola substation at Seymour Arm and a new line to Varen bylines. You need to expedite transmission improvements for the North Thompson. We have some big reliability issues. We were deferred three years and then deferred 1 year, which takes us to 2016. This delays us a year for a large industrial project on the region.

Q: **Barry Banford**: For communities without the option of natural gas, it’s very difficult. We need to have energy sources to invite businesses in the region. For us, I think you should pick one option instead of looking at three options which was what was discussed and do environmental assessment to get power to North Thompson.
A: **Dag Sharman**: An environmental assessment would take place for one of the options, but we have to do the studies and justify which is the best option and cost to the BCUC, which requires a full investigation. The most likely line would be one from Mica.

C: **Tim Pennell**: Since the project would be over $100 million, it would require a full environmental project.
C: **Dag Sharman**: We do hear from communities that they need power to attract businesses. We plan for normal growth. However, we can’t build to spot loads like mines or natural gas loads if it means that we could have stranded assets that are not utilized. That would cost ratepayers. It’s a challenge we face to meet these timelines.

Q: **Peter Milobar**: The struggle we have in the south here is that it seems like all the new lines are going north, and it would create projects along that line, but those lines don’t reach the south.
A: **Dag Sharman**: We would need an anchor tenant, like a new mine.

**Buy More pp. 17**

Q: **Tom Owen**: The province in its wisdom has been looking towards natural gas as a great energy source. Will your strategy be looking at natural gas?
A:  **David Ince**: We have a 93 per cent clean standard, which includes hydroelectric, wind, run of river and solar. That standard has not been changed to include natural gas. Coal is in the same situation.

Q:  **Tom Owen**: So you’re saying you’re sticking the traditional definition of clean?

A:  **David Ince**: Yes those are our instructions.

Q:  **Brad Gerow**: Where does run of river fit in with your purchasing plans?

A:  **David Ince**: Yes, in purchasing, we did a call in 2008/2009. The next call would include run of river.

Q:  **Brad Gerow**: Are there plans to buy from those?

A:  **David Ince**: Projects that received contracts are in construction. We will buy up to 2,000 GWh.

A:  **Judy Kirk**: In the call, it could also include wind, bio mass, run of river.

Q:  **John Sternig**: Referring back graphic on page 7 and the two channels Mica and Revelstoke, with each generating 500 MW that would bring our capacity from 12,000 to 13,500?

A:  **Kevin Maxwell**: The supply already includes Mica 5 and Revelstoke 5.

Q:  **John Sternig**: Mica and Revelstoke to me are like no brainers. With some smart planning and conservation, I think we can go over the hurdle.

A:  **David Ince**: We think those projects are positive and cost-effective.

Q:  **John Sternig**: You’ve forecasted some mines into the peak demand graph?

A:  **David Ince**: If you look at the pie charts on page 8, there’s a potential gap of 2,400 MW by 2031.

Q:  **John Sternig**: The channels built into the 2031 graph?

A:  **Kevin Maxwell**: Yes, we would have 1,000 coming from Mica and Revelstoke. We would get 900 from DSM⁴ and 1,100 from Site C to get us over the 2,400.

C:  **Judy Kirk**: John, to confirm, I believe you’re making the point that BC Hydro is almost there.

C:  **John Sternig**: I think they’re close. I think getting efficiency from Mica and Revelstoke would be better than building a Site C.

C:  **David Ince**: That’s a fair comment.

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**Prepare for Potentially Greater Demand pp. 18 – 20**

Q:  **Tom Owen**: LNG needs to be part of a larger discussion; it should not be something in a planning document. This changes your philosophy, as this isn’t for domestic uses. It’s providing energy for international users – that’s not part of our mandate. I agree with our rationale about potential royalties. I think the current approach to give bulk discounts to large users is ok, but I’m not sure if giving discount to large offshore users is part of the mandate. There should be consideration of removing this from the plan because it involves major policy issues.

C:  **Judy Kirk**: It’s a good comment, one that we haven’t heard yet. It is an order of magnitude difference here.

A:  **David Ince**: There are a number of options of serving these plants. They may or may not be served at current BC Hydro tariffs. If it’s full cost recovery, if they had to pay everything, that’s an option.

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³Demand Side Management
C: *Tom Owen*: I fully support reducing GHGs, but these plants are scary. That’s why I think it’s more complex than that. They could self-serve. This issue is potentially as broad as other all other issues coming. It’s a quantum leap. I don’t know what the answer is.

Q: *Andrew Peterson*: Was it last year or this year, where Fortis was going to do this, creating a battery, through pumped storage, at Nicola Lake? I never heard what happened.

A: *David Ince*: I’m not aware of that facility. If you have an existing dam, this works the best than starting this from scratch.

Q: *Andrew Peterson*: Would you be pumping into an existing or new reservoir?

A: *David Ince*: You could pump it into an existing reservoir.

C: *Peter Milobar*: They do this in our sister city in Japan. It’s quite bizarre.

C: *Andrew Peterson*: We talk about how this gas is going to get shipped across the ocean. All said and done, the gas gets burned as a fuel source. If you look at whole planet, we’re moving our gas to China, so they can do it there. So it’s ok for them to do, but not ok for us to do it? Since the planet rotates, the atmosphere goes over us, so we’re getting their pollution. It’s an interesting quandary with this gas thing.

C: *David Ince*: That’s a great comment. If we’re to export this, what could it replace – coal in China? That would cut GHG by one-third. That could be a significant net benefit. It could replace the Japanese nuclear fleet. Would this gas be produced anyways? I think this gas would be produced eventually but delayed by a significant amount of time. It’s getting to become a geopolitical issue.

C: *Tom Owen*: It doesn’t matter where you burn it, it’s in our atmosphere. It’s really easy to store natural gas. Whether we burn it here or sell it to somewhere else to burn, there’s a huge economic benefit, but not environmental benefit. We may be being a bit disingenuous by not forcing them to produce the GHGs here. They’ll do it anyways, so let them do it, and let them cost, not as the cost of BC Hydro ratepayers.

Q: *Jim Gudjonson*: Regarding pumped storage, you said it should be near a reservoir, could you contain the run off until the end of the season as storage?

A: *David Ince*: The advantage of pumped storage is that you can do it many times, up to every day.

Q: *Andrew Peterson*: With this, I guess you would want to add in extra channels which we can’t do for more turbines.

A: *David Ince*: It’s a limitation of storage.

**Additional Comments**

Q: *Jim Gudjonson*: When looking back at recommendation 1, at the university, we met a 10 per cent conservation target. In the next 5 years, it’s 20 per cent. When I look at the energy gap, they seem parallel. I can see us getting to 20 per cent and perhaps every 25 per cent, eventually our growth is going to pass that. Have there been any thought that 10 years out, once we’ve conserved as much
as we can, that there may be diminishing returns. At some point, it’s going to cost us way more to get from 20 to 25 per cent than getting to the first 20 per cent.

A:  David Ince: There would be diminishing returns. It would get more incrementally more expensive to conserve and it gets more challenging. You also get the potential for push back.

C:  Tom Owen: Recent cutbacks have cutback too far in trying to support conservation. We’re losing incentives, support systems, and local people. If you’re really serious about conservation, you don’t reduce those elements. We have a great relationship with our key account managers and we’re trying to abide by all the measures, but the support is drying up. It’s hurting the cause and could impede the targets you’re trying to reach.

Q:  Ken Christian: Have you considered producing some of the conservation programs with local government? You could get the public more on your side. Also, why don’t you develop app to link smartphone to smart meters. It would be very useful for homeowners to know your real time use compared to previous days. If they understand their consumption, it’s more likely they’ll practice conservation.

A:  Dag Sharman: It’s in the plan for smart metres. When whole grid is installed, you’ll be able to log onto website account and see your usage rates. You’ll also be able to get a device in your home to get real time energy numbers.

A:  David Ince: I think the first time you see have major appliance off and see that you’re still using lots of energy through lots of plug-ins, it’ll be the start of revolutionary change.

Q:  Tim Pennell: I’ve looked into generation at home to back feed into grid. I’m very disappointed about cost recovery as it doesn’t exist at this time. For a small home system, there was absolutely no cost recovery. Is BC Hydro looking at cost-efficient back feed system?

A:  David Ince: B.C. has net metering tariff where you can send power back into the grid.

C:  Tim Pennell: It’s not cost-effective.

C:  David Ince: Cost-effective for who? We have to balance the cost of generating resources for the system and net metering. Ontario, for example, is paying a lot for rooftop solar. There’s been a lot of push back and extra costs.

Q:  Tim Pennell: Is BCHydro looking to develop more cost effective systems?

A:  David Ince: No.

Q:  Andrew Peterson: The most expensive billing is probably to residential. How much are you paying small IPPs, I hear it’s 10 or 11 cents.

A:  David Ince: During the last clean call, the average was about 13 cents.

Q:  Andrew Peterson: You’re paying more than you can charge for that power?

A:  David Ince: Yes, because the system was built in the 1960s-1980s and the cost to the customer is considerably lower than building new infrastructure.

Q:  Judy Kirk: It’s a blended system of low and high cost to supply demand at that cost.

A:  Andrew Peterson: As a homeowner, I see it as I’m paying 9 cents because you have to pay that guy 13 cents. I’m struggling with the math.
Q: **David Ince**: New supply will cost more than existing because you have to pay off the mortgage, the capital cost.

Q: **Tom Owen**: The University, along with the community, built zero energy home. They get same rate as everyone else. Why are you not allowing homeowners to get same pricing for new generation? There’s an investment component there.

A: **David Ince**: I don’t know net metering tariff.

C: **John Sternig**: On page six, there’s a 1/3 split between the three categories and there’s a graph beside that lumps them together. My recommendation would be to look at these individual sectors and look at their growth. The math of grouping them together doesn’t help me with the math. When you look at residential, even if they don’t conserve, the growth isn’t going to be that significant. The growth is probably going to be in the large sectors. We should also get a graph showing the revenue generated by each sector. I think the cost of the growth should be shouldered by those who are increased the growth. And I think it’s the large customer base.

A: **David Ince**: The entire load forecast document is there on the website. The residential and commercial sectors are growing at 1.5-2 per cent a year before conservation. Historically, it’s steady growth. You’re right, the hump in the 2017 timeframe is LNG and natural gas extraction.

Q: **Andrew Peterson**: Who do you make profits from in those three customers?

A: **David Ince**: We have rate principles that no customer class subsidizes another customer class. The cost to serve those customers is fairly close to serving those customers. The industrial customer pays less but they don’t use the large distribution system that goes out to residential neighborhoods. Almost all the outages are caused at the local level – that’s most of the maintenance costs right there. New customers, because their cost is less than the cost of new supply, we have to increase the tariff when there’s a new load.

David Ince wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.

The record notes the meeting ended at 12:00 p.m.
<table>
<thead>
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<th>MEETING DETAILS</th>
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<td><strong>A Clean Energy Plan to Meet B.C.’s Future Electricity Needs</strong></td>
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<td>Cranbrook–Multi-Stakeholder Meeting</td>
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<td>May 31, 2012, 1:00 p.m. – 3:00 p.m.</td>
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<tr>
<td>Prestige Rocky Mountain Resort &amp; Conference Centre – Fernie Salon</td>
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<td>Denise Birdstone, Tobacco Plains Band</td>
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<td>Murray Chapple, Sterling Lumber</td>
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<td>Dean Chatterson, Wildsight</td>
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<td>Stan Doehle, Isosceles</td>
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<td>Ray Ellis, Lincoln Electric Cooperation Inc.</td>
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<td>Alanna Garrett, Resident District of Central Kootenay</td>
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<td>Larry Hall, East Kootenay Hunters Association</td>
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<td>Chris Hambruch, Town of Golden</td>
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<td>Dwayne Harvie, City of Cranbrook</td>
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<td>Rex Holley</td>
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<td>Bob Jamieson, Columbia Wetlands Stewardship Partners</td>
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<td>Ian Johnston, M.L.F.N.R.O.</td>
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<td>Lana Kirk, Cranbrook Chamber of Commerce</td>
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<td>Chris Lague, Tembec Skookumchuck Pulp Mill</td>
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<td>Graham Mann, Kimberley Rotary Club</td>
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<td>Doug McDonald, Mac Hydro</td>
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<td>Glenn McDonald, McDonald Ranch and Lumber Ltd.</td>
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<td>Ken Miller, Kootenay – Columbia Electoral District Association</td>
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<td>Al Mulholland, City of Kimberley</td>
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<td>Lloyd Sharpe</td>
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<td>Jeannette Sissons, Cranbrook Chamber of Commerce</td>
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<td>Jamie Stark, Lincoln Electric Cooperation Inc.</td>
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<td>Russel Swail, School District #5</td>
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<td>Joe Tank, School District #5</td>
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## MEETING DETAILS

**BC Hydro Integrated Resource Plan**  
*A Clean Energy Plan to Meet B.C.’s Future Electricity Needs*

Cranbrook–Multi-Stakeholder Meeting  
May 31, 2012, 1:00 p.m. – 3:00 p.m.

Prestige Rocky Mountain Resort & Conference Centre – Fernie Salon  
209 Van Horne Street, Cranbrook, B.C.

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## BC HYDRO INTEGRATED RESOURCE PLAN PROJECT TEAM

- Magdalena Rucker, BC Hydro  
- Diane Tammen, BC Hydro  
- Tim Lai, Kirk & Co. Consulting Ltd, Meeting Recorder

## AGENDA

1. Introduction  
2. Draft Integrated Resource Plan Overview  
3. Consultation Topics – IRP Recommendations  
4. Question and Answer  
5. Feedback Form

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## KEY THEMES

- Many participants, both businesses and residential, spoke in support of time-of-use rates and asked BC Hydro to urge government to consider measures that would provide incentives for off-peak use and increased conservation.
- There was a lot of interest among participants in the challenge of meeting the load/demand requirements of the LNG plants, questions regarding the role of industry in covering costs, and questions about contingency planning if planned pipelines are delayed or cancelled.
- Several participants were interested in the extent to which BC Hydro is considering regional or local generation.
- A number of participants had questions about BC Hydro’s plans for Independent Power Producers (IPPs) and the cost of these sources versus the BC Hydro system.

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## DISCUSSION

*The record notes that the meeting was called to order at 1:00.*  
(*Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)*

1. **Nancy Spooner – Welcome and Introductions**  
   Nancy Spooner welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Nancy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. **Basil Stumborg – Consultation Discussion Guide**  
   Basil Stumborg reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.
Q: **Bob Jamieson**: What’s your assumption with expansion in the economy?
A: **Basil Stumborg**: We are forecasting economic growth for the next two decades. We don’t forecast business cycles, so the assumption is that we’re in the bottom of the business cycle. If you assume the cyclical nature of up and down, we’ll still see growth.

Q: **Bob Jamieson**: Is that 2 per cent or 5 per cent?
A: **Basil Stumborg**: It’s 2 per cent.

Q: **Chris Lague**: There’s a big knee in the curve in 2018, which I think is related to LNG. It looks like it represents half the load growth. Why is BC Hydro assuming that energy generated at those plants won’t be used at those plants?
A: **Basil Stumborg**: There is a bend in 2017 and it’s LNG and the mining load. Two LNG plants have come to BC Hydro and requested energy supply, so we’ve built that into our base assumption. It’s not a sure thing and there’s uncertainty in these loads, so part of the plan is dealing with what happens if those come in or don’t show up.

Q: **Graham Mann**: Does your population forecast match StatsCan’s?
A: **Basil Stumborg**: I don’t know.
C: **Graham Mann**: Kimberly is growing more than Cranbrook.
C: **Basil Stumborg**: We rely on other third-party sources, so we go to StatsCan, BC Stats for a lot of these inputs, but to be sure, I’d have to look that up.

Q: **Lloyd Sharpe**: Have you segmented population growth by regions – Lower Mainland, Okanagan, Kootenays?
A: **Basil Stumborg**: In our models, we break down the province into 9 regions. We need to have idea of where demand is coming from and where our supply is being generated, which helps us figure out our transmission needs.

Q: **Stan Doehle**: We were in a Columbia River Treaty meeting and they said that their forecast would have a big impact on what BC Hydro would forecast. Are you calculating that in your forecasts? What’s going to happen with the treaty if its cancelled because you won’t be worried about flood control, it’ll be about generation? Do your forecasts include a scenario with the treaty and one without the treaty?
A: **Basil Stumborg**: Our planning horizon goes out to 2031. If the treaty were cancelled, the earliest would be 2024, at the tail end of the planning horizon. Our assumption is that the Columbia system would be generating the same about of energy towards the tail end of the period.

Q: **Bob Jamieson**: Is it fair to assume that the load is coming from Okanagan and Lower Mainland?
A: **Basil Stumborg**: Those are our load centres?
Q: **Bob Jamieson**: Does the increase come from there too?
A: **Basil Stumborg**: For residential and commercials, that’s where we’ll see the increase. The big one is coming from LNG and the mining projects.

Q: **Bob Jamieson**: Are there any loads coming from our region that are significant? Teck?
A: **Basil Stumborg**: No, nothing that’s hits our radar to the extent of LNG, natural gas and coals projects. We’re really focusing on those three.

C: **Bob Jamieson**: Something to watch for – in Sparwood, they now have to pump the coal dusts over the mountain because there’s no room for it. That uses a lot of power and if that expands you may have to look at that.

Q: **Lloyd Sharpe**: What’s the timeline for Site C because I assume it’s being developed.
A: **Basil Stumborg**: I’ll get to that later in the meeting.

Q: **Dean Chatterson**: Why does supply go down after about 2018 – what accounts for that?
A: **Basil Stumborg**: We have contracts with biomass fuels suppliers and that supply is running out, which is that drop in supply.

Q: **Rex Holley**: How does run-of-river fit into the capacity equation?
A: **Basil Stumborg**: We’re looking at a number of supply-side resources and run-of-river is an example. Because they don’t have much storage and you get energy when the water is flowing, you’re not assured to get it when you need it in the winter.

Q: **Chris Lague**: What’s the policy on electrification?
A: **Basil Stumborg**: We must plug the hedge between supply and demand. We have to look at the resources we have and when some could come online and their costs. But the government also has their own energy objectives – lowering GHG emissions, having only 7 per cent of energy resources coming from thermal resources. Also, there’s promoting economic development. We’ve trying to balance all those objectives, and then meet supply with demand. When you switch from fossil fuels to electricity, your demand is going up.

**Conserve More pp. 10 - 11**

Q: **Doug McDonald**: How far will BC Hydro go to obtain more electricity? In the Grasmere area, we only have a single-phased line and we have a surplus of energy from the streams. From what I understand, it’ll cost a million dollars to upgrade the line as it now creates an imbalance on the single-phase line. Right now, we’re limited to 75kW, we could go to 300 kW if it was a three-phased line.
A: **Basil Stumborg**: I’m not familiar with the area, but that’s an issue that BC Hydro is looking on a distribution level. Do we build another line or do we have more load generation on the other line? Our distribution team is looking into that. Typically, the IRP is one level up, where we’re dealing with the transmission.
C:  
*Stan Doehle:* In our last meeting here, we talked about geothermal and two-tier pricing BC Hydro charges. If you have geothermal in your home, you’re getting penalized by $50-60 monthly by using more energy because you’re using the heat pump, but it’s clean energy. It’s something you promote. I don’t think the government should not penalize a geothermal homeowner.

C:  
*Basil Stumborg:* One of the things we’re looking at is how to do you tie what you pay to the building heat source you use. Do you pay a different rate or rate structure if you’re in a LED building? We’re just starting to think about how to design these things.

C:  
*Stan Doehle:* If you have geothermal, they do an energy audit to calculate the size of the unit. I’d like to see it start somewhere. Everybody would be a winner out there for their energy consumption instead of penalized for it.

C:  
*Diane Tammen:* This is some work we need to do locally. Also, we’re aware of the issue that Doug raised.

Q:  
*Bob Jamieson:* Does majority (of conservation) mean 66 or 80 per cent?

A:  
*Basil Stumborg:* It depends on how you define load growth. It depends. There’s no more room if LNG comes online because that’s a huge growth. Once you factor that in, we’re at about 60 per cent.

Q:  
*Bob Jamieson:* Is LNG driving Site C? Is that a fair assumption?

A:  
*Basil Stumborg:* No.

Q:  
*Chris Lague:* Can we agree that while it may or may not be driving Site C, LNG is driving up residential rates? Can we agree on that?

A:  
*Basil Stumborg:* No, but I’ll get to that.

Q:  
*Chris Lague:* Why not get contractors to produce more during peak and pay them for what it costs?

A:  
*Basil Stumborg:* We’re looking at distributed generation as a way to meet the peak. We’re also working with industry to realign their supply so they can shut some machine off. Because we haven’t been capacity constrained up until this point, we’re just now starting to explore this area.

**Build and Reinvest More pp. 12 - 16**

Q:  
*Bob Jamieson:* Site C isn’t a big reservoir?

A:  
*Basil Stumborg:* No, that reservoir isn’t big, but it has two reservoirs behind it.

Q:  
*Bob Jamieson:* It’s effectively run-of-river? I don’t understand how run-of-river can provide capacity.

A:  
*Basil Stumborg:* Williston is large and that captures the spring runoff and stores it. Site C doesn’t store spring runoff, but it’s stored upstream and it can fluctuate.

Q:  
*Ken Miller:* What investment is BC Hydro putting into solar?

A:  
*Magdalena Rucker:* Solar would be built by IPPs. BC Hydro would not be looking at solar energy.
C:  *Chris Lague*: We can’t afford to install it at $120 MWh. The capital cost to install solar panel is the most of any kind.

C  *Magdalena Rucker*: The most cost effective forms of energy IPPs in B.C. can build are biomass, wind, and run-of-river.

Q:  *Bob Jamieson*: They don’t get any subsidy or advantage like in Alberta?

Q:  *Graham Mann*: Is Site C consulting with government of the Northwest Territories?
A:  *Basil Stumborg*: I’m not sure about that.
C:  *Graham Mann*: I think you should.

Q:  *Ken Miller*: Is anyone talking about having solar energy for individuals and feed back into the system?
A:  *Magdalena Rucker*: BC Hydro has net metering program, so the option would be there.
C:  *Chris Lague*: You would have to displace your entire load to benefit from that.
Q:  *Russel Swail*: Isn’t the push for the smart meter to put stuff on and take stuff off?

C:  *Jeannette Sissons*: When you choose a source that costs five times more than what you can bill it out for, it’s not effective. It may be cool and trendy, but this is a business. As ratepayers, we don’t want to be paying a higher rate. Solar is nice and Kimberly is doing a good job doing it themselves. It’s good for groups to take it on themselves, but I don’t think it’s attractive from provincial perspective.

C:  *Magdalena Rucker*: Solar energy is an option we looked at in the first round of consultation.
C:  *Jeannette Sissons*: It’s not very attractive and cost-effective.
C:  *Bob Jamieson*: I would agree with you on solar and there are many other options. One message that doesn’t get to Victoria is that many years ago Alberta provided at tariff to develop these new options. I believe there are more alternative energy companies in Alberta, than the rest of the Canada combined. I wanted to mention another thing I’ve heard. Because we are generating a far distance away from the load centre, there’s a technology in Norway that uses osmosis. You have a membrane, saltwater on one side and fresh water on the other side. They build a plant with 120 feet of head based on a membrane. This could help us develop power in the Lower Mainland, where we need it. That’s an option that may make sense given our distances.

Q:  *Wayne Stetski*: In a previous meeting, it was brought up that BC Hydro would look to split up the province by regions and each region would be responsible of producing 75 per cent of the energy themselves. You would keep the impacts and responsibilities local. Also, what about returning benefits to those regions, like the Columbia River Treaty, where hundreds of millions of dollars go back to the community and government? I don’t see those principles reflected in this document.
A: **Diane Tammen:** With respect to each region supporting themselves, our geography is that our rivers run through specific region. It could be hard to support regional use when some regions don’t have that resource. Regarding the benefits, the Columbia Basin Trust was set up for that.

Q: **Wayne Stetski:** The funding is independent of the money that’s generated?

A: **Diane Tammen:** Yes, that’s why they were established in the first place.

Q: **Stan Doehle:** Next door in Alberta, there’s a model for wind power. Has BC Hydro done a comparison of the wind power there, compared to our hydro power? That has to be efficient to be there?

A: **Magdalena Rucker:** In the IRP, we looked at all resource options. We tried to come up with resources mixes that would address the load, supply and demand. We did optimization models to come up with the best mix of resources. Wind, run-of-river, biomass and Site C is in there, as well as Mica 6 and Revelstoke 6. We have some wind, but in general, the amount of wind depends on when we go out to calls.

Q: **Stan Doehle:** We have a hydro model, they have a wind model, how much more efficient is either model?

A: **Diane Tammen:** You can’t always count on wind for reliable sources.

Q: **Stan Doehle:** There are studies on wind power here in the east Kootenays. It'd be interesting to see a comparison.

A: **Basil Stumborg:** There are some good graphs in IRP report itself looking at the cost graphs for different energy.

Q: **Doug McDonald:** How much energy do IPPs produce?

A: **Basil Stumborg:** Our current demand 55,000 GWh and we get 10,805 GWh from IPPs.

C: **Jeannette Sissons:** There is an interest in wind, but it is dependent on location and geography.

Q: **Ken Miller:** If you look at energy sources, you’d think there would be interest in putting turbines on the Fraser?

A: **Magdalena Rucker:** The Fraser is off limits because it’s salmon bearing river.

C: **Bob Jamieson:** The Fraser is also close to Vancouver.

Q: **Rex Holley:** Could you build more dams on existing dammed rivers, like the Columbia?

A: **Basil Stumborg:** That’s a good segue into the next topic about squeezing more energy out of what we have. We are looking to upgrade Mica and Revelstoke.

Q: **Rex Holley:** Is there room between Revelstoke and Castlegar for another dam?

C: **Bob Jamieson:** You’d flood Revelstoke and it’s only 10 miles.

A: **Basil Stumborg:** We haven’t looked at that. The government has highlighted the major rivers and Site C is the last large dam.

C: **Rex Holley:** If that’s the most efficient way to go, that’s a crazy idea.

C: **Basil Stumborg:** They’ve made the decision for that societal balance.
C: *Diane Tammen*: BC Hydro won’t be building any more, but IPPs could.

Q: *Rex Holley*: Why do they tie up BC Hydro’s hand?

A: *Diane Tammen*: That’s something to ask the government.

Q: *Joe Tank*: Do we send power to the U.S.?

A: *Basil Stumborg*: We trade power on the western system on an hourly, daily and weekly basis.

Q: *Joe Tank*: If our demand is low, we say we won’t send power to U.S.?

A: *Basil Stumborg*: Trade is more complicated than that. We could buy cheap at night and export in the day when the prices are higher. Even if we’re a net importer, we will still export power.

Q: *Bob Jamieson*: What is the price to reinforce line?

A: *Magdalena Rucker*: $95 million.

Q: *Rex Holley*: I’ve heard that there are some run-of-river projects up north near Terrace. Is this tied to the line?

A: *Magdalena Rucker*: There’s a line being built from Terrace to Falcon Lake. There are three hydroelectric projects up there near the line.

Q: *Rex Holley*: Is it BC Hydro doing that line?

A: *Magdalena Rucker*: Yes. There are also mines going in at Bob Creek.

Q: *Dean Chatterson*: Doing back-to-market purchases, I have concerns about buying power from IPPs at a higher rate than what they’re charging on their system. Why the purchases?

A: *Basil Stumborg*: BC Hydro has long term contracts with IPPs -20-30 years long. We’re purchasing capacity. We are long in energy in the near term, but on a capacity side, we’re short.

Q: *Dean Chatterson*: That’s coming from purchases first or from the system.

A: *Basil Stumborg*: Our system has the ability to meet the needs of a long period of time, but not enough for those short specific periods.

Q: *Dean Chatterson*: So it has to come from purchases?

A: *Basil Stumborg*: Yes. We could fire up Burrard first, but we’ll go to market first, following up on the government direction to lay off Burrard, unless as a backup resource.

Q: *Dean Chatterson*: BC Hydro is required to buy from IPPS than existing hydro. Is that the case and why is that?

A: *Basil Stumborg*: No, that’s not the case. The government has a policy that new energy in B.C. has to come from private sector. The exception is that BC Hydro can build Site C and upgrading our own facilities. In our energy plan, we look at what we can upgrade, but also the new energy that’s available. Some IPPs are cheaper than some of our projects. We have to balance the price. As a general policy, new energy is coming from IPPs and that’s government policy.

Q: *Jeannette Sissons*: To confirm, Burrard is thermal generation and that contributes to GHGs. When was that plant built?

A: *Basil Stumborg*: It’s an old plant.
Q: Jeannette Sissons: It’s a good backup and is not being mothballed and being maintained because it provides that certainty? IPPs are making large investments based on those contracts?
A: Basil Stumborg: Yes.

Q: Bob Jamieson: When you say you’re looking for peaking capacity, I’m assuming you mean biomass, not run-of-river.
A: Magdalena Rucker: Capacity comes from biomass.

Q: Larry Hall: IPPs doing run-of-river, what about impacts from reports that say they’re fish killers?
A: Basil Stumborg: IPPs can produce any type of power. Yes, there have been reports that IPPs put on rivers aren’t living up to the environmental reports that they’ve made. That’s an enforcement/regulation issue that’s up to the environmental side of government to deal with.

Q: Bob Jamieson: When reading between lines, it seems that Site C is de facto. In fact, the Premier went up there and announced the thing and ticked off local people. For the sake of public image, BC Hydro needs to announce that that’s the case.
A: Diane Tammen: We’re not a point to say we going through with it because it has to go through an EA process.
C: Nancy Spooner: We just finished the second round of consultation for Site C last month and the environmental assessment has kicked it.
A: Bob Jamieson: You may want to say to the Premier that when you’re going up there with a bunch of BC Hydro-type people and effectively making an announcement, it bothers people up there and it bothers people here because it sounds Koocanusa and Arrow Lakes down here. There is still a lot of angst.
C: Robyn Duncan: I’d asked respectfully that if Site C isn’t approved, please refer to it as if Site C goes ahead, not when.
C: Basil Stumborg: Yes, I’ll do that. It still has to go through regulatory processes, which has stopped projects before.

Q: Graham Mann: If BC Hydro had larger grid to buy and sell from, would that be beneficial in dealing with the challenges. Manitoba Hydro tried to get grid to B.C. with their cheap energy. B.C. was excited and Alberta said they couldn’t put a transmission lines through it. It was killed. With reality of today’s world, is there any consideration to revive that offer and open up the provinces?
A: Basil Stumborg: I haven’t heard of excitement of building east-west transmission through Alberta. Transmission lines are very expensive to build. Because the way Canada is laid out, trade tends to go north-south. We would benefit by having more trade with Alberta.

Buy More pp. 17

Q: Chris Lague: You’ll only buy it at a rate you set it for?
A: Basil Stumborg: Yes, we’re trying to set the prices at what we acquired it for.
BC Hydro Integrated Resource Plan
A Clean Energy Plan to Meet B.C.’s Future Electricity Needs

Prepare for Potentially Greater Demand pp. 18 – 20

Q: Chris Lague: Who is going to be charged for the construction cost of line for those LNG projects?
A: Basil Stumborg: The upfront work around permitting, design is low cost and that’s the high risk area. BC Hydro is doing it within its own cost envelope. If these plants come online, the actual cost of construction would be up for negotiation. The government said it companies would pick up the cost and not ratepayers.

Q: Joe Tank: Have these been done before?
A: Basil Stumborg: We haven’t had LNG plants in B.C. before.

Q: Bob Jamieson: These would be located in the northwest, where there are a lot of salmon rivers, so you can’t build a dam up there.
A: Basil Stumborg: I’m not sure we could build dams quickly enough to meet this load.

Q: Bob Jamieson: The mines up there, would it be a 10 per cent additional or a 40 per cent addition?
A: Basil Stumborg: It’s closer to 10 per cent than 40 per cent.

C: Bob Jamieson: You have quite a bit of a challenge.
C: Magdalena Rucker: Another option is to supply the LNG load locally through IPPs projects.
C: Bob Jamieson: You would need like 50 projects.
C: Magdalena Rucker: We would also need a thermal gas generating plant as a backup to provide capacity.

Q: Chris Lague: Why not sign a contract for the LNG plants to generate their own power? It shouldn’t be our problem.
A: Basil Stumborg: Self-supply is an option.

C: Chris Lague: It’s just distributed generation.

Q: Rex Holley: Does BC Hydro supply power to Alcan?
A: Basil Stumborg: Yes.
Q: Rex Holley: Don’t they also have a surplus? How much are they selling to BC Hydro?
A: Basil Stumborg: I’d have to look that up.
Q: Rex Holley: They’re going through an expansion, aren’t they?
A: Basil Stumborg: There’s growth up there.

C: Bob Jamieson: I’d like to give a 30-year perspective on this. We won’t build a nuclear plant. The Lower Mainland made that decision but it would logical to have one near the load. We won’t do anything the salmon rivers. And we have load capacity coming from hundreds of miles from the generation. And all of this hinges on whether the pipeline gets built. It’s fascinating.

C: Chris Lague: I think you should determine whether to build the pipeline first to determine whether you have a business to supply.

C: Jeannette Sissons: With the lead time you need, you’d have to start the discussion now.
C: Basil Stumborg: There are lots of moving pieces, so we’re trying to build in options by getting the permitting, getting the design. We’re also being careful, not to pre-commit, not to building
transmission lines before we know a pipeline goes through and not to sign generation contracts before we know demand is there. It’s a tricky balance.

C: **Doug McDonald**: One thing that bothers me and it’s happened over the last few years - anytime we build something that uses lots of energy, like gas or diesel, our supply floor doesn’t keep up with demand. Like with diesel now, we’re paying $1.35/litre. At one time, that was one of the cheapest fuels we had. Once we get the demand over the supply, the costs goes up with it and we no longer have cheap energy.

C: **Basil Stumborg**: I think one of the underlying stories with this IRP is that B.C. has been blessed with cheap power for a long time and that’s coming to an end. That’s why we’re struggling with supply. All our supply curves are heading up. Access to more power is coming from more expensive sources. That’s why conservation is the first place we go.

C: **Doug McDonald**: Even biomass gets too costly to transport.

C: **Chris Hambruch**: BC Hydro is trying to produce clean energy to feed LNG and natural gas to be shipped off shore to produce GHG elsewhere. It’s hypocritical.

C: **Chris Lague**: If the ultimate goal is to displace coal or oil in Japan, it could be good for the planet. Gas is cheaper and cleaner.

C: **Bob Jamieson**: If biomass is significant factor for capacity, there’s a technology to take wood waste to make into diesel. If that comes online, the economics are that the resources are going to shift and you’re going to have to adjust your planning.

Q: **Dean Chatterson**: The coal mines in northeast, is it steel producing coal or is it being used to produce power or use to power plants in Asia?
A: **Basil Stumborg**: That’s beyond my area of expertise.

**Additional Comments**

Q: **Wayne Stetski**: I’ve been in Cranbrook for 21 years, are the downtown Vancouver towers lit up at night? It’s a conservation question.
A: **Basil Stumborg**: No, if you’re working, you have to turn them back on.

Q: **Russel Swail**: Would it make sense to have two-tiered cost, where you encourage people to use their washers in the evening. But also give them something visual to show them how their energy and cost are.
A: **Basil Stumborg**: There are lots of jurisdictions around North America that use tiered pricing to shift usage for different periods. The government has been very clear that we’re not leaning on time-of-use rates pricing.

Q: **Wayne Stetski**: Can you explain for smart metres are supplies can help with conservation?
A: \textit{Basil Stumborg}: The main principle of conservation is knowing what is going on before you can start making choices about how you might use electricity. Even by putting smart metres and feedback in someone’s home, you’re raising people’s awareness without incentives. Over and above that, you’ll look at your bills and get that information.

Q: \textit{Wayne Stetski}: Will BC Hydro inform us that if we use more power at a certain time, we’ll be charged more of that?

A: \textit{Basil Stumborg}: That’s time-of-use which is used elsewhere, but the government has said that we’ve leaned too much on two tiered pricing.

C: \textit{Diane Tammen}: There was a concern that that’s what smart metres were doing, but the government is not considering time-of-use.

C: \textit{Chris Lague}: Isn’t it your responsibility to suggest to the government that since you’re looking for additional capacity and load to displace some of that load during the peak periods so you won’t have to sign those contracts at high prices? There is incentive to do the right thing to keep our rates low. You’re spending all that money on smart metres to generate all this information. I know there’s a policy for electrification, and trying to get more electric cars. What are people going to do at 5 pm when they get home from work? They’re going to plug in their cars and all of us are going to have to pay for that. I think it’s your role to go back to government and insist that time-of-use is good.

C: \textit{Diane Tammen}: I hear, at our public meetings, that some people want time-of-use, as a voluntary measure instead of a mandatory measure.

C: \textit{Ken Miller}: Consumers would be happy to comply if they had info on how to cut back on their power bills. I think BC Hydro could do a lot more to provide information on where my consumption is going, how much that would cost me?

Q: \textit{Dean Chatterson}: Looking at the summary page for the IRP. It looks like the plan closes the gap unless Site C isn’t built. What’s the contingency beyond Site C?

A: \textit{Basil Stumborg}: If Site C doesn’t come online we won’t be surprised, due to the regulatory processes. We’re getting that notice well before that interconnection date. There’ll be a change to switch gears and think about more conservation and more purchases from IPPs to fill the gap.

Q: \textit{Chris Lague}: There’s a big assumption that conservation is going to happen. There’s no price vehicle. What if it doesn’t happen and the top line is higher? Do we buy power from Alberta, U.S. burn coal? It’s not the right thing to do but we have to keep the lights on.

A: \textit{Basil Stumborg}: The deliverability risk of conservation was a big topic we wrestled with in the IRP. We have worked through contingency plans, what red flags would look like. They’re built into our contingency resource plan. We have our price signals, our two-tier pricing. Our hope is that at the margins, consumers are facing the cost of new supply and so when they’re saving, the benefits level to the amount of what we would buy the new supply for. We’re taking a chance because it’s a low cost, environmentally friendly way to go. It’s not a slam dunk.
C:  *Larry Hall*: If you put in a report about time-of-use rates to the government, it’s likely that the minister and the premier will spend some time to read it and understand that there’s pressure from the grassroots to have time-of-use pricing. If I write a letter to the minister or the premier, I will get a letter back saying we’re not interested in this activity. The minister and premier won’t even know I wrote the letter. I think that BC Hydro should put in the report that time-of-use is wanted by the people.

C:  *Graham Mann*: I think you’ve been giving impossible situation. Energy is too cheap in B.C. I’ve lived in the Northwest Territories. When I moved here and talked to by contractor about building codes for my home and insulation, the difference between what he said and facts were very far apart. To survive in the north, you need to save energy. If we strength up building codes, you’ll get big savings. We can’t afford not to.

Q:  *Rex Holley*: Has BC Hydro looked into the theories that Nikola Tesla had? We are bombarded by electrons constantly and he had a theory that we could produce power from that.

A:  *Magdalena Rucker*: BC Hydro does have a group that looks at new technology and I’ll pass that on.

C:  *Lana Kirk*: Regarding writing a letter to the minister. The chamber is a leader in policy development. We just came back from the provincial chamber AGM and we brought forward policy that came from local chambers. Those polices take it to all levels of government. That’s another avenue to government.

C:  *Jeannette Sissons*: When we talk about cost consumption of energy, there are a few businesses on Vancouver Island that equip their warehouses with solar panels on their roofs to be self-sufficient and to reduce costs. When you talk about building codes - I grew up in Prince George and the winter is different that here – the way you build here is different. When you’re building for yourself for a long time, you consider those costs.

Q:  *Bob Jamieson*: When we get power from Alberta, it’s from coal plants?

A:  *Diane Tammen*: When we buy from Alberta, it is coal, but it’s a small percentage.

Q:  *Bob Jamieson*: It’s probably for peaking capacity?

A:  *Diane Tammen*: Yes.

Q:  *Rex Holley*: Are we subsidizing industry with cheap power or are they paying the same rate?

A:  *Basil Stumborg*: That’s not a simple question to answer. When we go in front of the regulator, we take the whole cost and then split it up by class. And we allocate the cost of serving those classes. It’s typically easier and cheaper to serve industry because they are a few of them and you’re doing it at a large scale. It’s economies of scale. They’re paying lower prices, but they’re paying less because it’s cheaper to serve them. When new customers come online, are we subsidizing them? A new home, when it comes online, they pay an average rate, not the rate to produce new energy.
Part of the new concern is that if they get a new industry coming in, if we charge them the average rate, then they’re getting subsidized. That’s why your question is very pertinent to the LNG question. That’s why the government is keeping a close eye to this.

Q: Rex Holley: So the reason why they’re cheaper is because they’re using a three-phased power instead single phased?

A: Basil Stumborg: There’s less infrastructure required.

Basil Stumborg wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.

The record notes the meeting ended at 3:00 p.m.
| MEETING DETAILS | BC Hydro Integrated Resource Plan  
A Clean Energy Plan to Meet B.C.’s Future Electricity Needs  
Prince George – Multi-Stakeholder Meeting  
June 5, 2012, 1:00 p.m. – 3:00 p.m.  
Prince George Ramada – Cranbrook South  
444 George Street, Prince George, B.C. |
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<tr>
<td>PURPOSE</td>
<td>Notes from a multi-stakeholder meeting for the BC Hydro Integrated Resource Plan held with Stakeholders and representatives of the Integrated Resource Plan on June 5, 2012 at the Prince George Ramada, Prince George, B.C.</td>
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<tr>
<td>FACILITATOR</td>
<td>Judy Kirk, Kirk &amp; Co. Consulting Ltd.</td>
</tr>
<tr>
<td>PRESENTER</td>
<td>Randy Reimann, BC Hydro</td>
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| ATTENDEES | Rod Albers, West Fraser  
Warren Brown, Datoff Bros Construction Ltd  
Pat Crook, District of Mackenzie  
Aaron Ekman, BCGEU, Peace River District Labour Council  
Sotirios Koroganas, Canfor Pulp Prince George  
Veikko Paivinen, West Fraser  
Sushil Thapar, City of Quesnel |
| BC HYDRO INTEGRATED RESOURCE PLAN TEAM ATTENDEES | Kathy Lee, BC Hydro  
Brandee Clayton, BC Hydro  
Dave Conway, BC Hydro  
Bob Gammer, BC Hydro  
Madelaine Duke, Kirk & Co. Consulting Ltd  
Emilie O’Genski, Kirk & Co. Consulting Ltd, Meeting Recorder |
| AGENDA | 1. Introduction  
2. Draft Integrated Resource Plan Overview  
3. Consultation Topics – IRP Recommendations  
4. Question and Answer  
5. Feedback Form |
| KEY THEMES | - Some participants expressed an interest in getting additional specific information about commercial and industrial conservation programs.  
- Some participants expressed an interest in the forecasted increase in demand from LNG and whether BC Hydro has flexibility built into its plan so that energy and capacity investments can be appropriately scaled back if LNG demand for energy does not emerge.  
- Some participants asked BC Hydro to consider incentivizing more efficient private sector gas-fired generation. |
Some participants expressed concern that LNG will be shipped to Asia to capture current high prices for gas, but at the cost of not utilizing this same natural gas to fill the energy and capacity demand for gas in B.C.

### DISCUSSION

The record notes that the meeting was called to order at 2:05 p.m.

(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. **Judy Kirk – Welcome and Introductions**
   Judy Kirk welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Judy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. **Randy Reimann – Consultation Discussion Guide**
   Randy Reimann reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

   **Introduction pp. 1 - 9**

   Q:  
   **Sotirios Korogonas**: With the IRP, is it intended as a map to respond to directions given to BC Hydro by the government or as a document to provide feedback to bureaucrats for them to consider other options? Do you have flexibility or are you constrained by the government?

   A:  
   **Randy Reimann**: There is a bit of both. We have to produce the plan in the context by the policy makers. The Clean Energy Act creates those boundaries for us. Coming out to consult is the opportunity to do exactly that. If you think there is something the government should hear about then we will capture that here and report back.

   C:  
   **Sotirios Korogonas**: Around natural gas, it’s not all equal. In this province we think of Burrard Thermal as natural gas at 30% efficiency. It’s not the same technology that could be done with other natural gas where you can get to 85% efficiency processes using natural gas. You will generate power and have a net reduction in the overall GHGs even by increasing the amount of natural gas you burn.

   C:  
   **Judy Kirk**: Absolutely appropriate discussion to have as we move into the recommendations that include gas. Even if there isn’t a specific question we have purposely put in a section for additional comments where you can add that.

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1Green House Gases
Q: **Aaron Ekman**: My question is about the timeline on page five. I don’t see anything about the BCUC\(^2\) review? Is that omission related to the Clean Energy Act?

A: **Randy Reimann**: We had a few issues with our 2008 LTAP\(^3\) where we were being asked to enact policy that the government wanted us to. We proposed a plan that we thought was a good mix and the BCUC didn’t agree that it was in the ratepayer’s best interest. It caused the government to say that they set policy for the province and we need to be able to do that. The commission needs to look after the ratepayer’s interest so they ordered it in a different fashion. We issue the IRP to the government and we will tell you whether you hit the mark and if approved it becomes a contextual document for the commission to approve any other applications we make. We do certificates of public convenience and necessity, or expenditure approvals. It has taken this out of the commission’s hands in terms of approving it directly, but it doesn’t say that everything we propose, the commission has to do.

Conserve More pp. 10 - 11

Q: **Rod Albers**: How do you develop that program? Is it PowerSmart? How do you achieve the target?

A: **Randy Reimann**: We have rate design measures largely in the commercial area. There will be more push by PowerSmart partners and other incentives. That’s not part of the IRP right now. On the main page of our website, it will take you into the application. We have a nine chapter application on the website now and the appendices should be going live today. There is a more detailed DSM\(^4\) plan on what we are going to do that’s there as well.

Q: **Sotirios Korogonas**: You have 9,800 GWH and you’re targeting primarily commercial?

A: **Randy Reimann**: I meant on the rate design. We have a residential step rate and an industrial step rate; we want to get a commercial one as well.

Q: **Sotirios Korogonas**: At this level of target, industrial would be your best opportunity to achieve this goal. In those appendices, do you have specifics around industrials and rate design as well? If you’ve only let with Tier 1 are there more incentives or is it the PowerSmart program with the existing TSR incentives?

A: **Randy Reimann**: My understanding the DSM folks haverecently revamped their industrial incentive programs. It’s a balanced measure but we are trying to target all three customer classes to achieve our targets.

C: **Sotirios Korogonas**: But you’re relying on existing programs within PowerSmart as one of the mechanisms to drive towards this goal.

C: **Randy Reimann**: On the codes and standards, and I’m not intimately familiar with where they are going, they will be looking to increase efficiency requirements.

C: **Judy Kirk**: This is why this recommendation has an “A” and “B” part. I want to add that last year when we went around the province, people said they wanted BC Hydro to be more aggressive on

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\(^2\)BC Utilities Commission  
\(^3\)Long Term Acquisition Plan  
\(^4\)Demand Side Management
conservation, but be cautious with a balance between mandatory and voluntary. In terms of the specifics, I would encourage you to have a look at that and then make sure BC Hydro knows what you think of that balance.

Q: Rod Albers: Are you talking about industrial load curtailment? Are you saying that the industrial customers will curtail their load voluntarily?
A: Randy Reimann: Some customers are quite keen on that. We’ve seen success with some customers.

Q: Sotirios Korogonas: They were compensated, it wasn’t voluntarily. Is it free or is it compensated.
A: Randy Reimann: It’s compensated, but you don’t have to do it. We aren’t going to put it into a forced rate. It has to make sense financially.

Q: Sotirios Korogonas: That program exists today?
A: Randy Reimann: Yes, it’s been a large measure with a shorter-term focus. We’ve heard from people that if we make it a 10-year window that they could invest capital up front. We’ve looked for the long-term commitment.

C: Veikko Paivinen: We used to have a winter load curtailment but now you’ve taken that away. That was a very good program.
C: Randy Reimann: We were kind of on the margin where things were a little tight. Moving forward we see some capacity crunches coming up.

Q: Rod Albers: Are Smart Meters allowing you to take more control of load curtailment?
A: Randy Reimann: I think there’s potential to do that, but I don’t know that anything has been identified yet.

Build and Reinvest More pp. 12 - 16

Q: Sotirios Korogonas: When you talk about upgrades, is this existing infrastructure from Hydro assets or also thermal assets to maximize efficiency? Are you looking at only your Hydro assets or also your thermal assets?
A: Randy Reimann: We are not looking at Burrard; it is an emergency bridging resource. The other facilities are owned by other parties and I don’t think we have approached them, but that is a good comment.

Q: Sotirios Korogonas: You’re only internally owned thermal asset is Burrard, right?
A: Randy Reimann: I think we only have Burrard and then a small facility in Prince Rupert that hardly gets used.
C: Bob Gammer: There was also one in Fort Nelson and we’ve improved it to 50% improvement for capacity.

Q: Sotirios Korogonas: Capacity. How about efficiency?
A: Bob Gammer: It’s gone from single cycle to combined cycle plant.
C: Judy Kirk: Thanks Bob. That is a really great addition. Sotirios, if you’ve got other things to say about thermal then please do not hesitate in your feedback form.
Q: *Pat Crook:* Does California have transmission lines going east to west or just north to south?

A: *Randy Reimann:* They’ve got quite a few east to west and a few north to south. A lot was built outside of California from the desert states going into California. There’s a bit more trade going north because of the peak difference.

C: *Pat Crook:* I would just think it wouldn’t be that secure if you base it there.

C: *Judy Kirk:* You’re talking about bridging a relatively short-term gap.

A: *Randy Reimann:* Our system peak load is just over 10,000 MW now. The US’ west coast is in an area of 180,000 MW. We saw some problems with earthquakes in San Francisco that shook up the system but other than that it has a pretty well-built system.

Q: *Sotirios Korogonas:* How much of the IRP is reliant on the Alberta intertie? Given the price of gas and their base load facilities, even for the last few weeks we have been importing power from Alberta lower than our cost; which is good business sense.

A: *Randy Reimann:* It’s about 1,000 MW but we frequently rate lower than that. The Alberta market is a small market with a steep price curve. If we go into their market and buy out of the pool we can drive them up in their prices quite quickly. They have been fairly restrictive with how much we can buy and at what time. We buy and sell through PowerEx when there is an opportunity to make money but it’s not enough to make too much money. Our tie into the United States is rated 3,000 MW.

C: *Sotirios Korogonas:* Even if you fill that, you won’t impact their system. Unlike Alberta, you won’t be limited.

Q: *Sotirios Korogonas:* Is the only demand growth driving recommendation #7 LNG⁵?

A: *Randy Reimann:* It’s actually LNG and mining. We see a lot of mining development on the North Coast as well.

Q: *Sotirios Korogonas:* So if it weren’t for LNG facilities Action #7 would still be required due to forecasting in the mining program?

A: *Randy Reimann:* It’s on the margin. It depends how much mining shows up and how quickly. There is a new line being built, north of Terrace, the NTL⁶ and that’s opened up a whole new corridor of mines and we’ve seen 200-500 MW of load growth in mining in that region.

Q: *Sotirios Korogonas:* Mining has limited capacity to generate power; LNG has more capacity to self-generate. Was this action policy driven versus a technical or business decision?

A: *Randy Reimann:* Things that may add to public policy or GHG reductions. I don’t think the province can unilaterally decide how LNG plants can be supplied. We are working with the government and proponents to look at power supply and see how we can meet their needs by using clean resources, backed up by gas.

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⁵Liquefied Natural Gas  
⁶Northwest Transmission Line
C:  *Pat Crook:* They are also talking about gas generating plants in Kitimat. So that is a big firm draw there.

Q:  *Sotirios Korogonas:* The government has come out and said that at least two plants will be coming to fruition are to be supplied by BC Hydro for electricity. They aren’t even planning on doing self-generation. That was announced by the government was it not?

A:  *Randy Reimann:* That’s generally correct, although there is a smaller floating facility in the Douglas Channel that can’t self-generate. The second one hasn’t applied for permits to self-generate, but having said that, we don’t have the load commitment yet. It’s still in the works.

Q:  *Unknown:* So you’re saying it’s still an option to have self-generation, or even other generation to avoid construction of Action #7?

A:  *Randy Reimann:* What we are hearing from these proponents is that having local generation is an option, but it’s pretty attractive to be hooked up to the system so they can have backup options and having the stability of the system keeping everything in balance. I think this is the leading alternative. What we are doing with these actions up until the big capital costs come into play. If the LNG doesn’t show up when and as expected, some of these things will need to be looked at. If you look at Chapter nine of the IRP which highlights which actions are somewhat beholden to the LNG loads.

C:  *Judy Kirk:* It’s important that BC Hydro looks at their load forecast every year. The LNG facilities give updates on what they need.

**Buy More pp. 17**

C:  *Sotirios Korogonas:* France is a good example where they incented power generation through an innovative model and linked it to efficiency. So it was valued higher. For example, a plant like Burrard Thermal would have a low power price because it’s GHG impact and a plant that operated with 85% efficiency would have a higher dollar per megawatt value. The country saw a net reduction in GHG with the same amount of gas that they were consuming. People would run the power through high-efficiency co-generation. If you create the right incentives for the private sector you could meet those targets.

C:  *Randy Reimann:* Another way to get at that would be the carbon tax.

C:  *Sotirios Korogonas:* The carbon tax reduces your fuel consumption of natural gas. What I’m saying is for the same amount of fuel you consume; if it’s being consumed for heat anyway you can produce it through a gas powered turbine to produce the megawatts and the heat to support the same amount of fuel. You can produce steam two different ways and get to a net reduction in GHG’s with a higher efficient process. Drive efficient power generation if the price and incentives are right.

C:  *Randy Reimann:* If you pay plants that produce GHG emission you are putting a GHG penalty on that plant. If you charge a carbon tax on GHG emissions it gets you to the same place. Burrard only runs 12 days a year during the winter peak. We’ve taken the island co-gen plant and make it a dispatchable plant as well. It only comes on at peaking periods. The gas runs a short support for the systems. It’s hardly ever on.
Sotirios Korogonas: My point is when you are looking to buy more. Right now you’ve been looking at run-of-river and wind. Gas-fired acquisition has never really been on the plate and you have never looked to buy private sector gas powered generation. There may be opportunities there without negatively targeting the provinces GHG targets. At the end BC Hydro benefits by acquiring a power that can meet the load and without having to incur the capital cost.

Prepare for Potentially Greater Demand pp. 18 – 20

Q: Sotirios Korogonas: From the perspective of doing this and running LNG to ship overseas. It’s essentially exporting capacity that we have in the system overseas for someone else to take advantage of. It’s almost counter intuitive since we are forecasting a supply gap, yet we are still exporting. How do you reconcile that and have the self-sufficiency target. You have two different goals that seem like they contradict themselves.

A: Randy Reimann: I think they are very clear on the mechanics and the issues. Where they have landed are on those three bullets. They want to make sure LNG was competitive, maintain their commitment and leadership in climate change, and they wanted to make sure the rates weren’t impacted.

C: Rod Albers: Does the IRP allow you to provide recommendations to the government. We are shipping off natural gas, a natural resource that we can use in our own province to enhance the ability of our existing businesses to be more competitive. Yet, we are going to ship that off and raise rates in order to achieve that result. It doesn’t really make sense. You’re saying it’s the Clean Energy Act that’s creating these decisions. Can you influence the government to have a review of that policy?

C: Pat Crook: It’s the 400% increase of natural gas prices.

C: Sotirios Korogonas: They have more shale gas in Asia, according to the International Energy Agency then we do in North America. We have the infrastructure to access it but they don’t, right now. That could change.

C: Randy Reimann: I hear your comment, we are capturing it. I encourage you to put your feedback in.

C: Judy Kirk: We’ve been in other communities, and this issue that you are raising now has not come up before. There have been other issues relating to LNG that have come up, but not this specific issue. I would encourage you to write that down.

Q: Veikko Paivinen: It says you are reducing GHG emissions, not to question natural gas here, but turning it into LNG, shipping it away where it’s going to be combusted anyways. Greenhouse gas is worldwide.

C: Judy Kirk: We have heard that in meetings before as well.

C: Sotirios Korogonas: Is LNG compressed and shipped and is Kitimat’s proximity to Asia what helps it stay competitive? LNG has to be gassed off and vented off the ships; therefore contributing to the global GHG problem on route.

Q: Rod Albers: Does it impact the Clean Energy Act when you’re drawing in coal generated power at night?
A: Randy Reimann: The bit about where you’re going to get the energy from matters. The government is working on a western climate initiative with California and Quebec. It’s looking at building a cap and trade so you would understand what electricity you’re buying and when; whether you’re buying clean resources or from coal. It would matter in the provincial registry; we don’t understand exactly how that would work. If there are GHG costs associated with that, it would make it less attractive. At the end of the day if we aren’t finding another clean resource, we’re looking at building gas for capacity.

Q: Sotirios Korogonas: What’s the appetite for building gas in the Lower Mainland?
A: Randy Reimann: It’s almost impossible in the Lower Mainland itself. It’s one of two protected air sheds in Canada. We have a hard time keeping Burrard around for peaking purposes.

C: Sotirios Korogonas: In your previous comment, you said you want the generation as close to the load as possible. The next lowest cost is gas fired, but the people don’t want it anywhere near their back yard. It seems contradictory.

C: Judy Kirk: That’s one of the reasons the draft plan is in front of you today and we are asking for your feedback. At the beginning of the Discussion Guide on page nine where Randy went through the considerations for developing the guide, the footprint that the public accepted for citing is all part of the consideration. No matter how efficient you can make something, you’ve got to deal with the public on environmental attributes.

C: Sotirios Korogonas: I guess you can build transmission, but you can’t build gas in the Lower Mainland, or it’s highly unlikely. You do what you can.

C: Judy Kirk: One of the considerations, and this plan isn’t about citing, last year British Columbians told us that they were concerned about gas because of GHG and citing anywhere in the province, with a few exceptions, would have its challenges. Not just the Lower Mainland.

C: Sotirios Korogonas: For B.C., I think when we say gas, we immediately think of Burrard. But today, globally, where are people going to get incremental power generation? Not everyone has hydroelectric. Natural gas is clean, efficient and low emissions gas fire generation. I think it’s important in the IRP program to communicate that not all gas is equal and that today, not all gas is Burrard.

C: Judy Kirk: I would take issue where you’re saying that British Columbians think Burrard when they think gas. In the northeast they don’t.

C: Sotirios Korogonas: I’m talking about Lower Mainland.
C: Judy Kirk: Right. They also think about Sumas that was pushed back or even Duke Point. You’re point about raising public awareness about the fact gas is not gas, that’s absolutely right.

Additional Comments

Q: VeikkoPaivinen: Where does curtailing the load fit in?
A: Randy Reimann: If we get some resource smart or other DSM capacity projects that would reduce our short term reliance and would push out the need for future capacity resources. If we didn’t have to rely on the market at Burrard, we would prefer to do that. The sooner we get those in, the less we do that.
Q:  *Judy Kirk*: Graphically, does that show up in the green arrow or the first pie chart?

A:  *Randy Reimann*: The first pie chart, in the red slices and potentially the organize slice.

Q:  *Sushil Thapar*: I always wonder about the rates between residential and those for industrial. When I look at forest industry, what is the incentive for them to conserve energy? They always have the lights running. There are hundreds of lamps and then I look at my house I see LEDs and CFLs and turn each light off. It’s costing me almost double then what my workplace is paying. There is no incentive for them to conserve.

C:  *Judy Kirk*: You’re asking what’s the incentive for industry to conserve if they are paying a lower rate than residential?

A:  *Randy Reimann*: There are two components. There is the cost of generation and delivery. Customers are paying the same amount for generation; the delivery is the cost impact to get it to all those houses. There is a cost impact for the wires to residential. Part of the answer is we’ve gone to two-tiered rate for industrial and the intent is to go there with commercial. We have an initial rate that’s close to our historical costs, and then we have trailing step that gives the price signal of the cost of new energy and that is a lot higher. Generally, the trailing step of that rate was intended to give you the right incentive to conserve. There is some work to get key account managers to help install light timers. I’m not sure about safety with where and when you can put windows in. I think there is a lot that can be done in terms of building design and natural light that could reduce costs.

C:  *Sushil Thapar*: Some of my managers have told me that hydro is cheap so they don’t need to conserve. They don’t need 500 lights on when there is one person watching the mill. Can’t they have a two-switch system when the production is on the full swing you can use all the lights and when there’s one person in the mill you turn down a percentage of the lights? They have day time running lights outside too. I did ask and they think that it’s so much cheaper than natural gas. With natural gas they would shut off heat inside the building so it wouldn’t cost much, but with hydro they don’t care.

A:  *Randy Reimann*: That’s not a great answer; we have had some good success with a lot of companies regarding conservation. They should be helping themselves. It says that there are opportunities to work with them and do more.

C:  *Sushil Thapar*: Maybe it’s not just the rate, but it might be a moral signal. That might help them lower their consumption.

C:  *Aaron Ekman*: From a ratepayer perspective, there are some serious concerns about the BCUC getting moved to the back of the process here. There is a lot of expertise that is not being used. For the minutes, I want it registered that we are concerned about that. I appreciate the time you took to bring this information to us.

C:  *Sotirios Korogonas*: Going back to page 21, I think the approach is good. First conservation, then building, then buying and looking after. I think overall the approach is sound. Don’t take my comments here today as being negative. I just want to expand above and beyond what is here.
think overall the IRP will benefit the province. I want to make sure we aren’t missing opportunities and we look under every stone.

*Randy Reimann wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.*

*The record notes the meeting ended at 2:28 p.m.*
### MEETING DETAILS

| BC Hydro Integrated Resource Plan  
| A Clean Energy Plan to Meet B.C.’s Future Electricity Needs  
| Fort St. John – Multi-Stakeholder Meeting  
| June 6, 2012, 2:30 p.m. – 4:30 p.m.  
| Quality Inn Northern Grand – Grand 1  
| 9830 100th Avenue, Fort St. John, B.C. |

### PURPOSE


### FACILITATOR

Nancy Spooner, Kirk & Co. Consulting Ltd.

### PRESENTER

Randy Reimann, BC Hydro

### ATTENDEES

- Andy Ackerman, Myriad Consulting
- Naved Amircada, CPV Canada Energy LP
- Murray Armstrong, Dawson Creek
- Ken Boon
- Bill Brown, Backcountry Trucking
- Bruce Christensen, City of Fort St. John
- Dean
- Diane Culling, P.V.G.A.
- Ruth Ann Darnall, P.V.G.A.
- Philip Dyck, Canadian Helicopters
- Bert Eisler, Taylor
- Lenore Harwood
- Wally Harwood
- Wayne Hiebert, P.R.R.D.
- Gwen Johansson
- Gord Klassen, City of Fort St. John
- Jean Leahy
- Jim Little
- John Locher, District of Hudson’s Hope
- T. McFadyen
- Clarence Mineault, A.B. Security Dawson Creek
- Clayton Mineault
- Andrea Morison, P.V.E.A.
- Dzengo Mzengoza, N.E.A.T.
- Ron Peterson, Taylor
- Walter S.
- Victor Shopland, City of Fort St. John
- Cheryl Shuman, City of Dawson Creek
- Walter Smedaniuk, Fort St. John
- Craig Thompson, Canfor Taylor Pulp
- Shaely Wilbur, City of Dawson Creek
MEETING DETAILS
BC Hydro Integrated Resource Plan
A Clean Energy Plan to Meet B.C.’s Future Electricity Needs

Fort St. John – Multi-Stakeholder Meeting
June 6, 2012, 2:30 p.m. – 4:30 p.m.

Quality Inn Northern Grand – Grand 1
9830 100th Avenue, Fort St. John, B.C.

BC HYDRO INTEGRATED RESOURCE PLAN
PROJECT TEAM
Dave Conway, BC Hydro
Brandee Clayton, BC Hydro
Bob Gammer, BC Hydro
Kathy Lee, BC Hydro
Madelaine Duke, Kirk & Co. Consulting Ltd
Emilie O’Genski, Kirk & Co. Consulting Ltd, Meeting Recorder

AGENDA
1. Introduction
2. Draft Integrated Resource Plan Overview
3. Consultation Topics – IRP Recommendations
4. Question and Answer
5. Feedback Form

KEY THEMES
- Many participants expressed support for greater conservation through time-of-use rates. Several people expressed the belief that rates should more accurately reflect the cost of supply.
- Several participants asked about the current amount of spill at the Peace River facilities and questioned whether the lost opportunity is a result of obligations to run-of-river contracts.
- Some participants asked BC Hydro to consider incentivizing more efficient private sector gas-fired generation.
- There were a number of questions about planning for LNG load, why the producers would not be required to use gas instead of electricity, and the amount of risk in the IRP based on the LNG requirements.

DISCUSSION

The record notes that the meeting was called to order at 2:30 p.m.

(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. Nancy Spooner – Welcome and Introductions
Nancy Spooner welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Nancy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.
2. Randy Reimann – Consultation Discussion Guide

Randy Reimann reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

**Introduction pp. 1 - 9**

Q: Wally Harwood: Can you repeat what you mean about 66%?
A: Randy Reimann: I was saying that BC Hydro is required to meet 66% of incremental load requirements by demand side management until 2020 (the target year).

Q: Wally Harwood: So, that’s the total amount of input from DSM or is that new energy?
A: Randy Reimann: That would be new, incremental demand.

Q: Diane Culling: What is the rate that you are offering the LNG1? Is it current large industrial rate?
A: Randy Reimann: The government is looking to keep the LNG industry competitive and meet their climate action targets by having us supply clean electricity backed up by gas and they want to protect ratepayers. The intent is that domestic ratepayers wouldn’t be having a rate impact as result of LNG. We’re in current negotiations with the government and the LNG producers.

Q: Diane Culling: That’s nice but, to be doing long-term planning when you really don’t understand doesn’t make sense to me. If you haven’t sweetened the pot sufficiently for them to use electricity, then there would be no reason to use the gas in North America. So when you go forward in this planning process with that much uncertainty that’s a big elephant in the room. We couldn’t afford to build additional generation without incurring large industrial rates.
A: Randy Reimann: Well the government doesn’t want to increase rates for ratepayers.
C: Nancy Spooner: I am confident that you will reflect that comment in your form.

**Conservation pp. 10 - 11**

Q: Andy Ackerman: How confident are you in the difference between before conservation and after conservation? I don’t see a lot of big cities turning the lights off. We have a growing population of people which increases demand. How confident are you that you will achieve that conservation target? I’m not sensing people are serious about that.
A: Randy Reimann: We have a long way to go and DSM2 has a good track record to date. The higher DSM targets we pursue it’s going to get more difficult and the public needs to work with us to achieve those targets.

Q: Bruce Christensen: In your forecast, do you recognize plans like waste energy and IPPs3? Does your forecast in any way reflect how many come online or have you just picked a date?

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1 Liquefied Natural Gas
2 Demand-Side Management
3 Independent Power Producer
A: **Randy Reimann**: We do two things. One is the forecast the load they need and then the acquisition programs to buy power. We periodically run large calls for people to bid into on a cost effective basis. Additionally we have a standing offer out there with anything less than 15 MW. It gives opportunity for people to find efficient ways to generate on a smaller scale. We also have a net metering program at the residential level.

Q: **Ken Boon**: Why does it show energy supply actually decreasing? I realise it’s a forecast but why wouldn’t it include increased production?

A: **Randy Reimann**: We have some IPP contracts and those will be ending and it’s uncertain whether it will be renewed. Like the Alcan contract that could drop off. We have a number of biomass contracts and due to the uncertainty regarding the amount of biomass production out there, we have assumed that those will be renewed. We’re looking at them, but we don’t count on them.

Q: **Ken Boon**: So even with forecasting new production coming online, you’re thinking it’s actually going to decrease to some less optimum offering?

A: **Randy Reimann**: Yes, you’ll see a bit of a ramp up towards the fiscal 16 timeframe. That’s as we get the IPP contracts in the 2010 clean power call. Those are coming online and it’s ramping up. We’ve been purchasing IPP contracts since the 80’s and some of these contracts didn’t end and theirs uncertainty with whether or not they could be renewed.

Q: **Andy Ackerman**: My concern is the population keeps going up and that generates demand so it’s tough to meet a target that you set three years ago. Since the industry keeps growing and that generates huge demand for power. I’m wondering if those expectations are unrealistic because of the spike in demand that will continue to grow.

A: **Randy Reimann**: We’ve been thinking about that. We do believe we can increase our target from the current 8,800 GWh by 2020 we could push that up to 9,800 GWh and that is what we’re recommending to do. That said, the 2/3 target by 2020 was set when LNG load growth wasn’t envisioned. Out of the normal domestic growth we have, the 9,800 GWh takes us to about 78% of incremental growth but once you start layering in LNG, it takes us to 58%. There is a certain level of efficiency savings available from our customer base. There is so much we think we can get and that number is in the 9,800 GW range.

Q: **Diane Culling**: To follow up on Andy’s comment, you said you thought it would be more difficult to pursue the lack of DSM issue. I think that I disagree. You want to get people on board and people are not turning off the lights. If you want people to get on board, increase the cost of electricity. One example is the size of houses built in Fort St. John. We are seeing a shift to more manageable housing sizes these days. Combined with the price of electricity, industry will look at finding efficiencies. We need to look more into DSM that isn’t being tapped into.

Q: **Bruce Christensen**: Going back to the recommended action on page 11, through the use of smart metres which are being installed right now, will BC Hydro immediately monitor the high usage of industrial users and work with them to say “you can reduce usage if you do this”? What is the time period that the ability will be put into use? The meter will give you that information, right?
A: **Randy Reimann:** I’m not entirely clear on the timing for that. One thing you can do is see what you are consuming. It does have detail about consumption patterns and reports back to the utility a few times a day. We might be able to target capacity savings but I think once we have some experience with them we might learn more. For some of our large industrial customers, we’ve had smart meters on those for the past 15-20 years and we have a very good understanding of what their consumption rates are and they have access to that data. What’s happened with the large industrial capacity is up to date, we’ve been reasonably OK with capacity – it’s going forward that capacity has become a crutch for us. We are opportunistically looking at load curtailment to get off peak periods. We’re wanting to move it from something to do with when the market looks good to a resource we can count in our stack and know that it’s going to be there. It’s that transition that we are talking about.

Q: **Gwen Johansson:** It seems to be that that’s the purpose of having smart metres. My question is why not?

C: **Craig Thompson:** Why can’t we program our appliances so we can be more efficient? I’d prefer time of use rates and I’d take advantage of that. It seems ludicrous that the government is introducing smart meters and not allowing time of use rates.

Q: **Gwen Johansson:** I went looking for analysis of the impacted price on demand; can you give us a summary on how price will affect demand?

A: **Randy Reimann:** In our load forecast, we have an elasticity measure. There is minus .05 elasticity for a 1% increase in rates that you would get a minus .05% decrease in consumption

C: **Gwen Johansson:** Is that a sliding scale?

A: **Randy Reimann:** Elasticity is one of those very difficult things. We’ve done a lot of work on this. You almost need someone who is exposed to a rate increase and then someone who isn’t to see if you have consumption patterns for 10 years. If there is a change, how much of that is attributed to price change? To try and pull those apart is difficult. We’ve looked at other jurisdictions and tried to find comparable analysis on this but it’s tough to find that information out. At the end of the day, it becomes an academic exercise that if you have significant rate increase that that would elicit a response. One problem with electricity is how much demand is elastic or can people shift in the short term versus the long term. It’s more an art than a science. I’m not sure if we have it in this load forecast.

C: **Gwen Johansson:** You must have projected what the price increase will be.

A: **Randy Reimann:** We made some gross assumptions. We haven’t put out a large term rate forecast because we are working with the government on keeping rates down.

**Build and Reinvest More pp. 12 - 16**

Q: **Ken Boon:** When you said Site C gives you capacity and flexibility with run-of-river, it seems to me like run-of-river and hydro is not the best mix.

A: **Randy Reimann:** When we have high snow pack and inflows the freshet season can be a concern. To limit the amount of firm power we get and most of the energy we get from IPPs can be bought
at market price. We cannot physically absorb it all, particularly in a heavy inflow year. That problem becomes worse if we buy a number of additional IPPs on a run-of-river with a lot of freshet energy. We are looking always to mitigate that. Site C has the ability to incorporate wind. There are really two aspects; what happens in the freshet and how much can we store is one part and the other part is as the resources go up and down we need something to offset it so we get the output at the level the load demands.

Q: Diane Culling: On page 12 it says there will be 35,000 indirect and direct jobs if the Site C dam is built. How did you determine that? I’m sure you know where those jobs are coming from. I’ve never seen anything to justify those numbers.
A: Dave Conway: I can follow up with you about that afterwards.

Q: Dean: I’ve lived here for two years. I hear that there is a shortage of people to employ. There are invitations for people to respond to jobs and its trouble. I’m wondering if there was any thought of where these 35,000 people are coming from. This is a specialized job. Have you thought of ways to recruit skilled people?
A: Dave Conway: There is a lot of concern. We also know that anyone who wants to work locally will create a vacancy. They would come locally, provincially, nationally and internationally. It’s a challenge.

Q: Ruth Ann Darnall: If we brought back all Columbia River power, how much would that be and why isn’t that an option? We are supposed to talk about that by 2014 right?
A: Randy Reimann: The treaty goes until 2024 and there is a provision to give notice of minimum of 10 years. The government is working with the United States on that. That is one reason of uncertainty. In terms of the amount that is available today, it’s on page 15 in the middle column.

Q: Ruth Ann Darnall: That is only our entitlement, what is the whole amount?
A: Randy Reimann: The Canadian Entitlement is that we control the water here to manage floods and the timing of water release and that resulted in an incremental generating capability in the US. They run it through a series of dams on the Columbia River. The original agreement is that Canada got a portion of the incremental generation in the US and that’s our share of it.

Q: Gwen Johannson: It seems to me that you are constrained a lot by legislation as to what you put in this IRP – one of them being the natural gas option. What I’m wondering then is so in the next stage you have gas priced at low levels in Canada so if someone builds a plant in Washington and sells power to BC, is that going to be disallowed somehow?
A: Randy Reimann: It doesn’t qualify for us to meet self-sufficiency. With self-sufficiency, the government has asked us to build enough to meet our own needs in the province so building it outside of the province wouldn’t qualify.

Q: Gwen Johannson: We know that there has been an amendment to the legislation in 2010. Have you looked into the possibility that there might be further amendments – particularly on natural gas – and could you somehow work that into some contingencies in the future?
A: *Randy Reimann*: The IRP is within the context of the *Clean Energy Act*. In moving forward in any of these actions, we are trying to make sure we keep options alive to meet LNG loads. It does give us some off-ramps to change course if those resources aren’t needed but no, we don’t explicitly consider not meeting provincial policy.

Q: *Andrea Morison*: I had the same question – whether there was any talk about overriding the *Clean Energy Act*’s requirement or that 7%, especially looking at the fact that you’re thinking about operating Burrard Thermal again. Would there be any interim measure to allow for that?

A: *Randy Reimann*: Not that I know of.

Q: *Andrea Morison*: So that’s strictly within your 7%.

A: *Randy Reimann*: Extending the use of Burrard, the *Clean Energy Act* says we’re not supposed to plan to use or operate it except in an emergency or as allowed by a regulation. There is a regulation in place right now that allows us to run it up until we can build the Mica 5/6 units that are under construction and a transmission line that runs from Merritt to Coquitlam. We need that supply to replace the capacity that Burrard would have provided. In the interim we can run it. It is typically run about 12 days a year during a two week cold snap – it doesn’t run very much. We can do that all within the 7%.

Q: *Andrea Morison*: How many megawatts will the 5/6 units at Mica provide?

A: *Randy Reimann*: They’re about the same size as the Revelstoke 6 – a little bit less than 500 megawatts each.

Q: *Dean*: In 20 years, you forecast 2013. Basically you are looking at the last 10 years. After that you’re going to have to take 10 years to build new infrastructure. To me, it makes sense to put 50 years so you have a longer plan.

A: *Randy Reimann*: We’ve given some thought to that and there are some areas of this plan that we’ve looked at 30 years. The longer you go, the more uncertainty there is. It’s the nature of the utility world that a lot of the resources that we build, for example, major transmission lines are about 10 years from time they are planned to being in service. We do need to make those long-term commitments and there is uncertainty about the load. We update our load forecasts every year and we track what’s happening. What ends up happening with water projects is that you have a very small spend in the initial period and you get to the point where you start to break ground and then the spending goes up when it goes into service. We are trying to move things along and shorten the delivery time. It’s a tough problem and you have to make commitments.

Q: *Andrea Morison*: I wanted to clarify; did you say some of your planning included providing electricity to Horn River Basin?

A: *Randy Reimann*: It’s looked at as a load scenario. We’re not taking any definitive actions on building anything at this point, but I have a slide on that in the guide.

C: *Andrea Morison*: The Northeast Transmission Lines has been shelved for Fort Nelson. I’m just wondering how those two things jive here.

A: *Randy Reimann*: I don’t think they’ve been shelved for Fort Nelson, there are still studies going on and there’s discussion about how that supply up there could happen.
C:  *Ruth Ann Darnall:* We wouldn’t need more transmission lines if we put generation where the demand was.

Q:  *Wally Harwood:* From the transmission side and production, this is based on the LNG projects. How much security is there that these will go ahead?

A:  *Randy Reimann:* We are keeping the in-service date alive by moving it forward through approvals and design stages. Before we commit to building it, we need a contract with the LNG producers. Security for building supply is an issue that’s being looked at and considered.

Q:  *Wally Harwood:* Sliding back the transmission is fairly simple but the production side and demand. There must be two curves – one for if LNG goes ahead and one if it doesn’t.

A:  *Randy Reimann:* We have a detailed draft IRP on our website. In chapter 9 we have a table with what actions would be needed for domestic load alone, what would be needed for initial LNG and what would be needed if a third LNG plant would be built. We tried to separate them to give you an indication. On the supply side in terms of energy, we have enough energy in the system that we can supply those first two LNG plants for energy in fiscal 16 and fiscal 17. We do need some additional capacity resources and we have a bridging strategy.

Q:  *Wally Harwood:* In 2020 we should be right on course?

A:  *Randy Reimann:* Right, so if the LNG doesn’t go ahead, we have enough energy to go up to about 2021 when Site C would come on although we still have a capacity shortfall. What ends up changing with the LNG are the IPP contracts that we’ll be signing.

Q:  *Diane Culling:* They don’t know where the situation is going. The world is awash in LNG right now and B.C. is a late comer and we have a disadvantage to China proximity. If BC Hydro plays a game with the LNG industry you are getting into a speculation game with an industry that has historically taken their own risks and hits at the time. Now B.C. is entering into that game with our Crown corporation and people need to understand that.

Q:  *Ken Boon:* Did I hear rumblings that the government might use natural gas to power one of these plants.

A:  *Randy Reimann:* They have said that clean electricity backed up by gas would be best. We’ve been trying to work within that 7%. Whether they’ve looked at extending that, I don’t know.

Q:  *Ken Boon:* It would be clean if they sequestered the carbon. It seems like BC Hydro’s job keeps changing from a year ago with IRP. Burrard was supposed to be shut down. I don’t even think you are considering taking power from Columbia Power. Everything is changing so much. BC Hydro didn’t forecast the 2008 recession. Not only is the world awash from natural gas but the world economy is just volatile. I don’t understand how you make these forecasts.

A:  *Randy Reimann:* We can’t not plan for it either. We have to make sure if there are loads that we are capable of doing that. We need to do that in a fashion that can minimize costs and address the risk as best we can. It’s not a plan to not have a plan.

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Q: Andrea Morison: The EA process for Site C is a three year process. That means it could be done in the fall of 2014. It was my understanding that there would be a year of planning and 7 years to build the dam. So that brings us to 2022, but I keep hearing 2021. Where am I missing something?
A: Dave Conway: A lot of that planning work can be done pre-certification. Nothing would be done in the way of works prior to certification but we can do a lot of pre-stuff first. It would still take 7 years to construct though.
C: Diane Culling: I’ve heard Dave and Randy call it certification. It’s an environmental assessment and “no” is a possibility still and I think that the language you use is inappropriate.
C: Dave Conway: I try to say “if certified” but thank you for that catch. I try to be careful with my wording.

Q: Bruce Christensen: That is predicated on Site C or else you want be able to build transmission to Prince George?
A: Randy Reimann: This third LNG customer would bring their load on in 2020 and it pre-dates Site C. We would need clean energy and we would have to build additional gas capacity to back that up and support the clean energy.

Q: Ken Boon: To follow up on the blue box, it says build 500 KV line to Peace River – would that go in if Site C was not done? What happens if Site C doesn’t pass the environmental assessment?
A: Randy Reimann: The need for that line is not one that we are not finished analysing. What drives it is the amount of wind resources that may be bought in the Peace region. The question is do you build the transmission to handle the maximum from the wind outputs plus the maximum for the Peace or given the wind peak output is not that often, would you just absorb it into the system and turn down the generation and not build extra transmission? We are leaning to the later to avoid building that segment but we want to look at it.

Q: Andrea Morison: I was just thinking about the fact that LNG might use gas versus hydro power to produce electricity, will industry have caps on the amount of fossil fuels that they can burn for electricity. It’s standard for industry to use their own resources, right?
A: Randy Reimann: The 93% clean target is focused on utilities – so presumably they wouldn’t be captured by that. There is a requirement that the government still has regulation for all new gas fired generation and existing generation by 2016 to do 100% offsets. So there are questions about what those offsets would cost. The presumption is, is that gas producers wouldn’t get hit with both the carbon tax and offset costs but at least one of them and likely offsets.

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Q: Dean: Can you explain, in your forecast, if you included this LNG? Will your figures include demands as well for what they might use?
Randy Reimann: There has been a fair bit of mining in the province. It included the first two LNG facilities. That LNG is included and there is an additional plant that could be as much as 1,200 MW and 12,000 GWH and that is not included. There is an allowance for mining load growth in there.

Q: Ken Boon: On pumped storage, what kind of ratio?
A: Randy Reimann: 25-30% loss going through the loop.

Q: Bruce Christensen: Would that be considered for large reservoirs such as Williston or the proposed Site C?
A: Randy Reimann: We have identified additional pump storage option. We kind of focused on the ones in the Lower Mainland because that is in the load center and would help us avoid future transmission but there is one that we looked at the Mica Dam. An additional tunnel was built as water diversion and we could use it for pump storage. We would pump from the Revelstoke reservoir back into the Mica. That one has attraction as well and it would give you multi-year storage. It’s a long way from the load center but we are looking at it.

Q: Bruce Christensen: You’d be dealing with a different type of soil as well. I could see the wash basin going up and down and if we started lowering and raising the water behind WAC or Site C that would increase sloughing substantially.

Q: Ken Boon: You don’t acknowledge the fact that California doesn’t like Hydro or run-of-river.
A: Randy Reimann: We’ve been working with the US government to have them look at the IPPs that are built in the province. There is a size restriction on nothing larger than 15 megawatts.

C: Diane Culling: The size restriction is 30MW.

C: Jim: Have they paid their bill yet?
A: Randy Reimann: That whole market fiasco down in California is still going on today. But BC Hydro made an awful lot of money that went into the government and we continue to trade today. They are a valued customer. Our trading arm PowerEx does a lot of trade that benefits the ratepayers.

Q: Diane Culling: PowerEx sells on the US side. So it’s independent of generation that’s happening in B.C.?
A: Randy Reimann: There’s a lot of flexibility in the system where we can reduce our flows at night when it’s cheap and sell it back in the daytime when it’s expensive. A large part is done off the system and a large part of it has been done on the system. There are times when the electricity goes negative. The wind producers in the US sell energy and renewable energy credits and have gotten maybe $20 a megawatt hour for it. If they can pay people to take their electricity they’ll still make a buck a profit and that makes the market negative however this is in the freshet period although is starting to occur at other times as well. It becomes a fair opportunity for BC Hydro, not so much in the freshet but in other period. If there are times when the market is negative, we can turn our system and absorb it and sell it for when the market is higher. There is good profit potential.

C: Diane Culling: That’s why we’ve lost that capability to take advantage of this over the years.
Q: **KenBoon**: Further, has BC Hydro been in a position where we are giving power away? Because I know sometimes we benefited from those ourselves. Are we getting more in a position where we are giving our power away? Before we had run-of-river, all we had to worry about our dams; however, now we have dams and run-of-river all trying to produce power at the same time. Either we are paying a lot of money for run-of-river and spilling our dams because we have too much power.

A: **Dave Conway**: This is the first year of high water with the freshet with the IPPs coming in at the same time. We are just starting to see it. The Peace Canyon has filled with the first flow the region has had since 2002.

Q: **Dean**: For me, we are talking about the demand and the future. Where are we right now? For example, you could put a pie chart of the current situation. How much residents or commercial are using? Going forward, I can understand the other possibilities.

A: **Randy Reimann**: If you go to BC Hydro IRP website, we’ve got a draft application and there are 9 chapters. Chapter 2 has the load forecast and runs through the capability of the system as it is today. You’ll see in there what the net balance is today and how that grows over time. There are more details in the appendices if you’d like to take a look online.

Q: **Craig Thompson**: How much IPP is contract right now?

A: **Randy Reimann**: I would say 15,000 GWh. I’d have to double check.

C: **Craig Thompson**: When was the last call for IPP and how much are they actually producing? Tier two power is still relatively cheap. When will that move?

A: **Randy Reimann**: The two usually follows the latest results of the call.

C: **Craig Thompson**: It never moved last time.

A: **Randy Reimann**: The rates group is looking at that. I’m not clear on the exact timing. I think the way to look at the buying of the IPPs is that we’ve been building out a clean system and the two that have been the best have been run-of-river and wind. We buy the cheapest ones we can. There is a freshet period and if we have really heavy inflows what we’ve lost is in the past is possibly sold that we could have sold that energy into the markets. Even historically when we had a heavy water year, the US has a high water year themselves. We lose some opportunity to sell some energy, but it’s not a huge impact. Overall, we are still trying to buy the best portfolio and run-of-river has been good and added to that. We do need to keep an eye as we go forward and manage the freshet issue as we don’t want to be in a position where we have to spill a lot. We need to think about how we buy IPPs and how we use their projects. It has been a good mix to date.

Q: **Diane Culling**: This is BC Hydro’s 2002 energy study. Prior to 2002, BC Hydro could look at a suite of different options and there is only one hydro flood reserve. Site C is a one trick pony. I’m amazed that there is only one sentence of geothermal. The financial press always says that BC is one jurisdiction with significant geothermal capability. In this you identify the top 16 sites for geothermal capability. Geothermal has the same capabilities as large hydro. It gives you huge
potential and it will make money for us. The six most economic sites come from Pemberton, Terrace, Squamish, Lillooet, etc. and it gives us security of supply. Looking at potential mining contracts in northwestern B.C., it seems like a good fit. In all the years you’ve gone through the Site C you’ve underplayed the potential of geothermal in this province. I think that needs to be addressed.

A:  
Randy Reimann: That’s a good comment. We are interested in geothermal. I’d say that large hydro has more flexibility and integrating resources than any thermal resource. With geothermal, you need to keep the cycle going to make it efficient. In our resource options update (ROU) we have the last three IRP listed with geothermal resource potential processes and we would love geothermal to be bid into our acquisition process. We had a geothermal entity and we hoped and thought they would manage to bid into our 2006 call for power but it turned out that they ran into fault difficulties and when they were drilling their holes they couldn’t contain their water and when they started drilling up on the mountain they couldn’t get it right. It highlights that they key concern is you can spend a lot of money and it’s a huge risk. We’ve been working with the government so once you explore a site it guarantee’s development. It’s shy of hydro putting a bunch of money to develop. We still look at it and giving it thought to it. It’s there but it’s risky.

C:  
Diane Culling: Craig is from western geo power, he said their biggest problem was access to the hydro grid. We heavily subsidize our oil and gas and this is public policy.

C:  
Ken Boon: I do believe that geothermal gives up different forms of efficiency. I think geothermal is more efficient that hydroelectricity.

Q:  
Jim Little: BC Hydro doesn’t take the risk but I beg to differ. The ratepayers are taking the risk for the IPPs that are being put into the province. I would disagree to say we haven’t taken risks for a lot of these private contracts. I have to say that with IPPs we are guaranteed minimum load. In times when say we don’t need the power but there is nowhere for it to go, do we get a cheaper price over our minimum?

A:  
Randy Reimann: My point was is if you have a run-of-river bidding into a call. They get paid when we get energy. We are not advancing study money for them.

Q:  
Jim Little: Do we get a preferred price?

A:  
Randy Reimann: Generally, there is a firm amount we buy that we plan on and we pay them their bid price. Over and above that firm energy, we give them to float the market or floating market price curve. It’s a forecast of what the market would pay in the longer run.

C:  
Clayton Mineautt: I want to respond to Diane about geothermal. You were commenting about BC Hydro gambling in uncertainty. Geothermal is the most uncertain of them all whereas Site C is firm. You know where it is.

C:  
Ken Boon: Well I think it’s worth taking a gamble on geothermal because there are zero footprints and Site C is bad for this region. I’d be willing for BC Hydro to take the gamble.

Randy Reimann wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.
The record notes the meeting ended at 4:30 p.m.
Notes from a multi-stakeholder meeting for the BC Hydro Integrated Resource Plan held with Stakeholders and representatives of the Integrated Resource Plan on June 7, 2012 at the Sheraton Vancouver Guildford, Surrey, B.C.

FACILITATOR
Judy Kirk, Kirk & Co. Consulting Ltd.

PRESENTER
Doug Little, BC Hydro

ATTENDEES
Amir Aminpour, Corporation of Delta
John Appleby, Delta Chamber of Commerce
Jack Arnold, City of Langley
Lori Daniels, Salish Consulting
Craig Hodge, City of Coquitlam
Mark Grant, Rupert Peace Power Corporation
Liz Johnson
Don Luymes, City of Surrey
Shari Mahar, Community Integration Services Society
Neal Nicholson, City of Coquitlam
Chad Peterson, Green Valley Power
Ray Pillman, Outdoor Recreation Council of British Columbia
Larry Robinson, City of White Rock
Jennifer Shragge, Corporation of Delta
Eric Sigalet, Sigalet International

BC HYDRO INTEGRATED RESOURCE PLAN PROJECT TEAM
Kenna Hoskins, BC Hydro
Sanjay De Zoysa, BC Hydro
Steve Higginbottom, BC Hydro
Susan Campbell, Kirk & Co. Consulting Ltd, Meeting Recorder

AGENDA
1. Introduction
2. Draft Integrated Resource Plan Overview
3. Consultation Topics – IRP Recommendations
4. Question and Answer
5. Feedback Form

KEY THEMES
- Some participants expressed an interest in knowing whether LNG plants will self-supply their electricity demands.
• Some participants expressed concern that IPPs produce energy at a higher cost than BC Hydro can produce, even through Site C and other BC Hydro generations and upgrades.
• Some participants said that BC Hydro should have industry such as LNG and mining pay more for their energy than current industrial rates, in order to pay for the higher cost of new electricity and capacity generation.
• Some participants suggested that BC Hydro develop pump storage and gas-fired generation instead of procuring private developers to produce these generating facilities.

DISCUSSION

The record notes that the meeting was called to order at 1:00 p.m.

(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. Judy Kirk – Welcome and Introductions
   Judy Kirk welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Judy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. Doug Little – Consultation Discussion Guide
   Doug Littlereviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

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Q: Neal Nicholson: Before you leave Page 6 (middle block of the page), we say Hydro has included the development of two LNG facilities proposed for the north coast, how much demand and how much impact will they have on demand?

A: Doug Little: Good question. So the first two we have included in our base forecast (we also do scenarios later on of additional LNG projects), but we’ve included the first two because they have National Energy Board gas export permits and are fairly well developed projects – they are not under construction yet, but they are included. The total volume from those first two plants is about 5,000 gigawatt hours so to put that in context, our total annual energy today is about 5,500 gigawatt hours and would be 5,000 on top of that – so that is the size of those two projects and they hit the load in 2016 and 2017 and you can see that line on the graph.

C: Neal Nicholson: That is a significant increase.

Q: Ray Pillman: What is the duration of a peak? Is it once in a year? Or, are there similar other kinds of peaks?
A:  *Doug Little:* It is a peak that occurs in the winter and it is usually when there is a cold snap that covers most of the province. Typically the cold snap lasts a few days during a winter but some winters we can get two or so of these events and we have to plan for the ability to meet this need in the amount of electricity over the winter. It’s impossible to tell when a cold snap is going to hit.

Q:  *Eric Sigalet:* Would LNG plants consider generating part or all of their own electrical supply?
A:  *Doug Little:* Yes and that is common throughout the world. We are in discussion with all of the LNG components of the electricity supply; however, these plants are interested in taking electricity from us for a number of reasons; it avoids the greenhouse gas issues and creates reliability for them. That is part of the discussions we (BC Hydro and the province) are having with potential customers over the next couple of years.

Q:  *Neal Nicholson:* So the energy required for the peak that you are forecasting coming out of plants that are based on them not producing any of their own (electricity), is that correct?
A:  *Doug Little:* That is correct for these first two. There have been four or five that are being publically talked about but we are only including the first two in our forecast and that’s because they have got all of their NEB export permits.

Q:  *Chad Peterson:* If they produce their own power, does it bypass the province’s clean energy requirement if they don’t sell it? Does that count?
A:  *Doug Little:* There are two ways that they can meet their own energy needs – the first is to use their own natural gas to create energy to run their process and the other way is to burn natural gas and use it directly in their process. If they just burn natural gas, it doesn’t impact on the 93% clean energy requirement, but if they do use natural gas, it does impact (the requirement).

Q:  *Craig Hodge:* Their energy source obviously is natural gas but have they looked at other options as well - building their own dam, locating near a river, or if they decide to go hydroelectric to buy from you?
A:  *Doug Little:* Their choices are to use natural gas to run their processes or they can work with BC Hydro for a clean energy solution that is viable. How this would work is that BC Hydro would acquire the clean energy then BC Hydro would have a contract to sell it to the LNG customers. With the clean energy projects are we know that wind is intermittent, hydroelectric plants are the same (run-of-river), so they would need a firming capability or have a backstop.

Q:  *Larry Robinson:* When it comes to buying and reinvesting more currently during peak times are we purchasing power from out of province?
A:  *Doug Little:* We go through an overall optimization using our subsidiary called “Powerex” where we are buying and selling all hours of the day. The reason for that is we have tremendous value in our heritage hydro and what that allows us to do when market prices are low we can bring in power from the US or Alberta and slow the generation from the dams and optimize our processes and that is one of the advantages that BC has in electricity and that advantage has earned billions of dollars.
for the ratepayers of the province over the past 20 years. At any given time, BC Hydro is either buying or selling over peak periods. Typically, we would be selling if we had enough surplus supply because typically the prices would be higher.

C: Larry Robinson: However, the public perception does not take into account that you are reproducing a commodity that is tradable on the market.

A: Doug Little: Our first obligation is the meet the requirements of British Columbians. However, from time to time we have surpluses and so on and that is what we use to trade on the markets.

Q: Neal Nicholson: On Page 8 – beyond 2018 you show that energy goes down as the IPP contracts expire but although this happens doesn’t the capacity remain? So, that power remains available, but at a price?

A: Doug Little: Good point – all of the hydroelectric (the run-of-river are and the wind) are included in the resource base going forward so we assume we will renew those contracts when they expire. The reason we make that statement (that production goes down) is because a number of the bio-mass, wood waste projects around the province, and with the pine beetle epidemic there is uncertainty around the longevity of the fiber supply and these may go off line unless the supply was there, in which case we plan to renew them. But because there is risk around that we haven’t concluded that.

Q: John Appleby: As you mentioned you have some fairly healthy earnings from PowerEx over the years essentially using material that’s serviced to requirements. As you move into the potential for greater demand are you planning to get less from this or source or build so that powered can continue to support those operations?

A: Doug Little: We will continue to use PowerEx to optimize the value of the dams and the reservoirs by buying and selling at different periods and we expect it will continue to provide good revenue but we will not build new assets specifically for exports because there is no money in building new assets to the US market for several reasons; the US is oversupplied and they have several subsidies that make it hard for us to compete. So the answer to your question is no we are not building assets specifically to engage in that trade but we expect that that kind of trade will continue as it has for the last five or 10 years in a similar fashion even though our load will be growing in the province.

Q: Jack Arnold: For clarification, so we sell and buy – do we sell at a higher price than we buy?

A: Doug Little: Yes when we are trading with external markets in AB and the US.

Q: Jack Arnold: Is there a problem with collecting what is owed to us?

A: Doug Little: Not since 2000 when California defaulted on a number of contracts.

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1 Independent Power Producers
Q: **Shari Mahar:** So does BC Hydro plan on modeling consumption reduction? While this might be a clever plan whenever I drive by BC Hydro facilities they are well lit at night. Could BC Hydro model the kind of conservation that they are asking others to do?

A: **Doug Little:** Yes, that is a good point and BC Hydro started a couple of years ago when we highlighted that consumption and we are trying to do that and apply the same standards to all of our facilities around the province that we are asking of others.

C: **Shari Mahar:** When I drive by Edmonds I see that the Edmonds tower is all lit up.

Q: **John Appleby:** You’ve identified government as being a participant but I don’t actually see the same industrial liaison and what about the newer technologies that are emerging almost daily? What plans do you have to address that sector (the commercial and industrial sector) of the market? For example a dryer that runs more efficiently – how do you plan to factor that in?

A: **Doug Little:** We do have things like, for example, the refrigerator buy-back program where appliance manufacturers have developed much more efficient fridges today than ones that are 10 or fifteen years old. So we have in place an incentive program where we haul it away if you replace it with a new efficient one. That is one example of how we are working with the manufacturers to get broader penetration in the market. In the industrial sector we do that a lot and for example, new motors are much more efficient so we work with pulp mills, saw mills and mines to have incentive programs to replace with newer more effective motors and machinery.

Q: **Don Luymes:** How firm is that 8,800 gigawatt hours by 2020? How big a role to rate increases play in changing consumer behavior to get to 8,000. How much pressure is there to increase the rate to get there will there be?

A: **Doug Little:** We track our programs very carefully and we analyze every year and adjust if we are or are not on track. Rate impacts do play a component, but it is not huge, although generally if prices go up people tend to use less of it. Our rates are set to recover costs so we wouldn’t have the ability to raise rates artificially to encourage more conservation. We wouldn’t do that. Our rates are set to recover our total cost of operations. There is a way in which rates may apply and that is through the two-step residential rate that doesn’t collect us anymore revenue in total, but gives the signal to the consumer around consuming less during peak periods.

Q: **Don Luymes:** Mandatory time-of-use rates are not part of the equation – technically what is the benefit of time of use rate differences from your perspective?

A: **Doug Little:** Time of use rates is not part of the approach. We are considering that customers may voluntarily opt in and say get a lower price if they run their dishwasher after 8 p.m. – they see that they have an opportunity to save money if they change their behavior.

Q: **Ray Pillman:** In Europe, 15 years ago, residents had automatic equipment that shut things down at certain times of day, is that a possibility here?
A: **Doug Little:** We are not looking at specific programs like that right now - we are very much focused on voluntary programs that create incentives to change behavior of residential and industrial customers but we are aware of that approach.

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Q: **Don Luymes:** Will Site C trigger new power line corridor needs or will its delivery be along existing power lines?

A: **Doug Little:** It will be along existing lines, but will require new power lines from Site C to the existing grid.

C: **Neal Nicholson:** “Portfolios that include Site C would generally have a greater footprint on land.” I think what you’re saying is the Site C dam will cover up more land…with water?

A: **Judy Kirk:** In one area versus the dispersal of footprint.

C: **Neal Nicholson:** The way I read it though, the aggregate footprint of the dispersed is less than the footprint of Site C.

A: **Judy Kirk:** I think it’s the opposite. Although portfolios excluding Site C would require a greater number of projects with more dispersed environmental footprints. I will acknowledge that it could have been written better however what it is trying to convey is in order to produce the same amount of energy and capacity as a Site C you would need a greater number of projects and in the aggregate their footprint would be larger.

Q: **Neal Nicholson:** I’m sorry, what is confusing me is that right at the beginning of that sentence it says it would have a “greater footprint on land.” Greater than what? It seems to be it could only be greater than the aggregate of the dispersed sites. I am challenging the language here because I can’t tell for sure and unfortunately this is significant to me.

A: **Judy Kirk:** Notwithstanding what is written here, the idea is that in order to get the same amount of energy capacity you would have to have smaller projects and in the aggregate their footprints would be larger.

Q: **Mark Grant:** Is there any risk that government policy could change?

A: **Judy Kirk:** I am going to jump in here before Doug (Little) answers and say that is best asked of government.

A: **Doug Little:** Right that is a question best asked of government; however, BC Hydro believes Site C is an excellent product, it has a life span of 70 to 100 years and we take on a long term planning horizon that out spans political life and that is why we are proposing it.

Q: **Craig Hodge:** This is around a technical aspect of generating power using water- with the addition of more generators; does that draw the water down faster?

A: **Doug Little:** It depends on how we choose to use it. It is the same amount of water in the reservoirs but it does give the ability to produce more power at peak periods. We only have the same amount
of water, so we need to choose those periods carefully because we can generate more at one time where we generate at maximum volume.

Q: Craig Hodge: But, does the water draw faster if there are more generators?
A: Doug Little: Yes, the volume of water is increased.

C: John Appleby: This discussion takes me back to the late 1960’s when I was in the Kootenays and where I was trying to convince people they wanted their land flooded.

Q: Chad Peterson: Out of three resources – the Columbia River is clean energy but does that mean the other resources are non-renewable as far as the incremental power adding to the grid?
A: Doug Little: As an example let’s take Burrard Thermal – it a natural gas remitting resource and would fall within the 7% allowance for natural gas generation within the existing policy. As for market purchases, much of that energy will be renewable particularly in the spring periods. Much of the energy comes from hydroelectric generation and wood production in the Pacific Northwest, so a bunch would be renewable but we recognize that some would not be and we factor that in.

Q: John Appleby: Isn’t the Columbia River Treaty close to expiring - what is your position on that and what are the requirements for its renewal?
A: Doug Little: That is a good question and the Columbia River Treaty will expire as early as 2024 and it does require 10 years notice, so 2014 (the notice period) is coming up – that is a topical point. The negotiation of the treaty is a provincial responsibility and BC Hydro is supporting the province in discussions with the US\(^2\) and our expectations are that the treaty will be extended and renewed. The power benefits that we’ve had will continue in some form to be retained by British Columbians.

Q: John Appleby: So would you anticipate any renewal on it requiring any reconfiguration of assets in that area?
A: Doug Little: Maybe the shape and timing of stream flows and some operational changes around water flows and address stream issues. So it doesn’t require any asset changes but maybe some agreed upon operational ones.

Q: Chad Peterson: What percentage of the loss of revenue to PowerEx would that represent if we started using the Columbia River Treaty power instead of selling it to the States to make a profit? Does that mean the 1.7 billion over 10 years is all of a sudden going to drop by 10% or something?
A: Doug Little: It is a short-term capacity requirement and not an energy requirement. This is about reliability over a short period over the winter and it would not have a material impact on revenue.

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\(^2\) United States
Q:  **Ray Pillman:** My question is around IPPs generally – they are (hydro, wind and others) fairly costly and for private power developers, they cost 40% to 50% more than if BC Hydro would build them because of the cost of capital. The state that BC Hydro can borrow the money for is 2%-3% less and additionally when BC Hydro calls for proposals there are so many proposals made that the developers can’t afford the investigation particularly the subsurface investigation for tunnels and so on, so to get a really good firm price they add contingencies in so BC Hydro is paying for products through power purchased at a considerably higher price than for the same product if they produced it for themselves – so why is this being done?

A:  **Doug Little:** That is really a policy question for the province – BC Hydro is limited to developing assets on the existing river sheds, like Site C. That is based on a policy decision made probably 8-years ago and that is our framework that we are operating under. Beyond Site C and the others additions on Revelstoke dams, BC Hydro is not authorized to develop others.

C:  **Ray Pillman:** Yet, it is paid for by the users and we pay considerably more for it, so that is a fact.

A:  **Judy Kirk:** I would encourage you to put those reasons in and add them to feedback form.

Q:  **Craig Hodge:** What is 15 megawatts? If I put solar panels on my roof, am I in that range?

A:  **Doug Little:** No, you would be way smaller. Your home would likely be less than 50 kilowatts and a kilowatt is a lot less than a megawatt as there are 1,000 kilowatts to one megawatt; so 15 megawatts, that is quite big.

Q:  **Craig Hodge:** But a community could do that and I am thinking of a First Nations project on Vancouver Island where they were putting power in on the grid and net meter needs both ways, like in Sooke.

A:  **Doug Little:** Yes in Sooke, net metering, yes, they are big on it. Net metering is all the same value.

Q:  **John Appleby:** What about those projects way off the grid? Who pays for the hook-up to the grid? Who pays for the line from the project to the grid?

A:  **Doug Little:** The developers pay for the line, in its entirety, to the grid.

Q:  **John Appleby:** So BC Hydro indemnifying developers to pay for power at a greater rate.

A:  **Doug Little:** A developer must put in a bid cost that is inclusive – it is an “all in price” and where they connect to the grid and they have to submit aprice into the grid.

Q:  **John Appleby:** Are you mandated to accept the price, because it is part of clean energy or do we have to take that offer?

A:  **Doug Little:** No, BC Hydro goes through a competitive process and they (bidders) have to submit a competitive RFP and in our last call we got over 70 bids and accepted 22 and it was a competitive price.

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3 Independent Power Producers
4 Request for Proposals
Q: Amir Aminpour: What is going to be the impact of the improvements to the municipality – how will it be distributed? You are putting more power in and how is that being distributed to the municipalities?

A: Doug Little: BC Hydro is adding generation in various places in the province and transmission upgrades where necessary. On Page 16 there is a reference to an interior to Lower Mainland Line which is a new 500 kilovolt line that goes from Merritt to Coquitlam and that is a project that will transfer power from basically anywhere in the interior and of the province to the Lower Mainland and then fans out to all of the municipalities in the area.

Q: Amir Aminpour: Do those lines need to be reinforced?

A: Doug Little: Yes there are new lines and replacement lines – BC Hydro has a long-term program to reinvest in existing lines and add new lines for growth.

C: Amir Aminpour: In our municipality of Delta we have had issues with overhead lines and we are running out of real estate and everyone wants it underground and hopefully BC Hydro has a strategy to address that.

C: Judy Kirk: I am going to jump in here because that is a question about distribution and it is a good question and I would encourage the dialogue but it is not in the plan.

A: Doug Little: Overhead versus underground is an issue and we can talk about that off line and I can give you a business card for a BC Hydro person to talk to you about it.

C: Amir Aminpour: I just want to sure there is more of a strategy plan around this issue.

A: Judy Kirk: Please put that comment into the feedback form under additional comments. Ask how will we deal with it and reference your real estate concern.

Prepare for Potentially Greater Demand pp. 18 – 20

Q: Neal Nicholson: In the second bullet of Recommendation No. 9, as you go forward will you still be required to maintain “93 -7” and anything else? You are expected to improve on it as you go along?

A: Doug Little: Yes, that is existing policy. So the gas generation would have to fit within the 7%.

Q: John Appleby: I am surprised that BC Hydro is stuck with this particular issue on its own, what with the issues we’ve been looking at in terms of pipelines going from Alberta to BC is that all the profit sits in the risks in BC- why, as a price of admission, should these carriers not actually build facilities like generating stations that can supply their own requirements and additional ones as well?

A: Doug Little: If you go to the box on the right side of page 18 there are examples of provincial government document. The one on the left is a LNG strategy that specifically deals with a number of those issues. One of their key components from our perspective is that these LNG companies will be required to contribute to new infrastructure and new electrical supplies – so they are not getting the same industrial rate. They will have to contribute the full cost of infrastructure to meet their requirements.

Q: John Appleby: Anything left over to meet additional requirements?

A: Doug Little: There are active discussions that are underway and we are working with the LNG companies in discussion around their terms and conditions for that – one option might be more
generation be developed to meet growing needs elsewhere and transmission reinforcements are a part of that because if you have a lot of generation in the northwest of the province that surplus to the needs of those companies, you need to be able to translate that back to Prince George and around the province and so on. We are factoring that into the planning exercise.

Q: **Mark Grant:** Considering the time frame – would IPPs be a part of supplying LNGs as an option and if so, would that be outside of the 2,000 gigawatt hours mentioned and then lastly would it be done with LNG and IPP developers?

A: **Doug Little:** Yes, yes and under discussion. Yes it is incremental to the 2,000 megawatt hours and yes IPPs would have a significant component in the actual process however we are just in the early stages of designing that and it is too early to say what the processes would look like.

Q: **Ray Pillman:** The supply of LNG to far markets can be supplied from elsewhere in the world, and these are going in now in large quantities so this is a risky project because purchasers will always or nearly always buy the cheapest so any investment to provide electricity is risky – there is considerable risk around this and it is a huge investment.

A: **Doug Little:** You are absolutely correct and we know there is a very competitive worldwide market for LNG – quite right that there are risks and it is our intention and it is the policy of the province that those risks need to be carried by the developers and that BC Hydro and ratepayers not take the risk.

Q: **Neal Nicholson:** Both 11a and 11b begin with the same three words I haven’t seen elsewhere “working with industry.” What is the significance of that statement? Does that imply that you’ll be talking to industry about needs or does it mean to imply assisting?

A: **Doug Little:** This is not something that BC Hydro would do directly, for example, BC Hydro would entertain proposals from a developer for pump storage and then if needed BC Hydro would enter into a contract for that pump storage, similarly with the natural gas option.

Q: **Neal Nicholson:** I think maybe it’s the same thing. Why not? Why would BC Hydro not do this? It falls within your needs.

A: **Doug Little:** We have no expertise in gas generation development.

Q: **Neal Nicholson:** What about how long you have been running Burrard Thermal?

A: **Doug Little:** We have a gas generation development that existed in the company 50 years but we’ve not developed anything since. The actual gas plant that we own now in Fort Nelson was developed by other companies and operated by them for more than 10 years. We only recently took over ownership of it so we don’t have expertise around developing a natural gas and on pump storage we have never done that in B.C. BC Hydro’s core capability is large water storage projects and we have expertise in large hydro and transmission. These things are not part of our core business so we look to industry to explore what our options are and how they could best be developed.

Q: **Ray Pillman:** Pump storage tends to be expensive, there are a couple large ones on the Niagara River and I lived near one once however because of the cost they haven’t been very popular.
A: **Doug Little:** Right and there is another large one around Los Angeles (USA) and they are expensive and we haven’t explored one because in B.C. we have had other cheaper options but we are starting to look at the longer term and the need for additional capacity like that so we need start to understand and be prepared.

Q: **Don Luymes:** Aren’t they best located close to demand so not to have lost return - are you talking about existing reservoirs such as Stave Lake, Coquitlam Lake, what is an example? Is this about new product and not a retrofit?

A: **Doug Little:** Correct, new projects and close to demand center and you are right - location will be important.

Q: **Amir Aminpour:** Nuclear energy?

A: **Doug Little:** For quite some time the provincial government has had a policy of no nuclear generation development in the province and we have a wealth of resources, we know there are other places that don’t have those resources.

**Additional Comments**

Q: **Larry Robinson:** I only have one last comment and it is supplemental to what the gentleman beside me was saying earlier and that is I want to support Site C, but I know as an elected official that the citizens are looking for a simplistic cost benefit analysis; something along the lines of how many acres will be flooded, what is salvage going to be and etc. because I know that the elected people will have to sell the project.

A: **Judy Kirk:** Site C is currently in an environmental review and we are helping with that and so I have some knowledge and in that review they are looking at hectares and loss of agricultural land and there is in excess of 43 studies on BC Hydro’s website and the Environmental Assessment Office website has a section on Site C where the whole scope is explained and the application will be on there in the new year and I would encourage you to review that information.

A: **Doug Little:** Hectares of land will all be documented in there.

Q: **Neal Nicholson:** My first question was around source data and you have answered that. With respect to Page 22, I am curious as to why on all the charts you show demand before conservation and then demand after the recommendation around conservation and yet earlier you show it after the current plan and I don’t understand why because is it not significant to the discussion?

A: **Doug Little:** In the current plan we have been operating under since 2008 and we are now updating that plan – the question is what is the demand for electricity, what is the gross demand for electricity and assuming the current plan is successful then what is the net demand? It is that incremental gap that we need to understand and that is shown at the beginning of the document. Options to fill – conservation 1,000 gigawatt hours then deduct from gross demand and then we come up with a new net demand and the hard assets we need to meet that net gap.
Q: Neal Nicholson: That leads me to wonder if you believed the current plan would be successful in getting the reduction that it targeted but never mind. You talk about the possibility of additional gas fired generation and there is the Columbia River power or maintaining Burrard Thermal as a backup site but if you take the first and third options then they are dirty, if you will excuse the use of that word, and Burrard Thermal ran 12 days last year and to maintain a plant it seems completely uneconomic to do that if you are going to run it 12 days a year and is there simply nowhere else to go?

A: Doug Little: Burrard Thermal provides a number of benefits; it is run in mode that provides voltage support for the transmission system and that allows us to transfer more electricity from the north. So it is supporting voltage in the Lower Mainland and that is an important benefit. Burrard Thermal is an excellent insurance policy and if in a dry water year here in B.C. and in the Pacific Northwest market purchases could be very high and we saw that in 2000 and 2001 with the California energy crisis when the prices were sky high. In that period we were thankful that we had Burrard Thermal. I don’t know how many of you remember that big ice storm in Quebec but oh boy I bet Hydro Quebec was wishing they had a huge generating station close by in Montreal. Burrard Thermal is a good low cost insurance policy and by extending back use for a longer period of time it functions as a bridge until Site C comes on.

Q: Chad Peterson: Part of the plan is to buy more power and IPPs are looking to supply power and we’re also looking for some certainty and hydro facilities can live up to 80-years but IPP contracts are shorter and when they go to renew them you are treating that as a chance to get power cheaper as you say that the facility is paid for but when you build you build for a long term – how are you going to treat IPPs in the longer term and not hold them hostage when they renew?

A: Doug Little: I don’t think we hold them hostage however that is an interesting point and they are good assets and we would continue to buy electricity but at the same time we have intense pressure on rates and as one of our top priorities, we hear from customers all over the province that we need to find a way to manage our cost and rate increases. So across the board everything that we do we are focused on minimizing impacts on rates so when old IPPs come up for renewal, we have said we need to get that at a price that is going to help us manage the impacts on rates. Many of the projects are paid off. What we have said is if there is a need for some new capital investment to keep those facilities running for say another 20 years, the we are willing to consider that and adjust the price to enable that capital to be justified and invested in those facilities. We have a common interest with the owners of the IPPs and we want to see the capital reinvested but we want to come to commercial terms that make sense for both parties. We have been sending a message that we won’t pay renewal rates at the same rate as a new facility rate when the facility is aged.

C: Ray Pillman: My final comment – I am concerned because at one time there was the distinct possibility of IPPs exporting to California and if they are big enough there will be consolidations because that always happens and they could hold BC Hydro ransom and they will say that they will sell to California if you don’t pay higher prices.
Doug Little: Right now in the Pacific Northwest the market looks very poor and actually a lot of generation doesn’t qualify right now to sell into the California market – BC Hydro is aware of the risk and is monitoring it.

Ray Pillman: Remember Enron and when they shut down California.

John Appleby: Is BC Hydro a common carrier?
Doug Little: For wholesale transactions yes it is.

Doug Little wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.

The record notes the meeting ended at 2:50 p.m.
## MEETING DETAILS

**BC Hydro Integrated Resource Plan**  
*A Clean Energy Plan to Meet B.C.’s Future Electricity Needs*  

Vancouver – Multi-Stakeholder Meeting  
June 12, 2012, 1:00 p.m. – 3:00 p.m.

SFU Vancouver - Harbour Centre Segal Centre  
555 West Hastings Street, Vancouver, B.C.

### PURPOSE

Notes from a multi-stakeholder meeting for the BC Hydro Integrated Resource Plan held with Stakeholders and representatives of the Integrated Resource Plan on June 12, 2012 at the SFU Vancouver, Harbour Centre Segal Centre, Vancouver, B.C.

### FACILITATOR

Judy Kirk, Kirk & Co. Consulting Ltd.

### PRESENTER

Randy Reimann, BC Hydro

### ATTENDEES

Naved Amirzada, CPV Canada Energy LP  
Corey Aurala, Knight Piesold Ltd.  
Gwen Barlee, Western Canada Wilderness Committee  
Brad Bastien, C.O.P.E. 378  
David Black, C.O.P.E. 378  
Rod Carle, City of New Westminster  
Martin Clarke, Metro Vancouver  
Robert Coelho, Eclipsol Energy  
Matt Charleton, Secor Group  
Pam Deveau, AltaGas Ltd.  
Bob Douglas, Mitsubishi Electric  
Jonathan Drance, Stikeman Elliott  
Elaine Golds, Burke Mountain Naturalists  
Jake Gray, Elemental Energy  
Doug Grimes, Knight Piesold Ltd.  
Ron Hankewich, Elemental Energy  
Peter Helland, Midgard Consulting Ltd.  
Tony Irwin, Western Tidal Holdings  
Tim Kwan, McCarthy Tetrault LLP  
Rupert Legge, Alterra Power  
Jeff Matheson, E.B.A. Tetra Tech  
Jeremy McCall, Outdoor Recreation Council of British Columbia  
Derek MacDonald, Alstom Power  
Tanya Miller, Kinder Morgan Canada  
Ron Monk, Kerr Wood Leidal Associates Ltd.  
Julius Pataky, Secor Group  
Janice Plumstead, PricewaterhouseCoopers Canada  
Kevin Stolz, Encana Corporation  
Catherine Taylor-Bell, *GL-Garrad Hassan*  
Richard Tennant, Vancouver Port Sterilizers Inc.  
Rory Tennant, University of British Columbia
### MEETING DETAILS

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### BC HYDRO INTEGRATED RESOURCE PLAN PROJECT TEAM

- Michael Walsh, Midgard Consulting Inc.
- Josh Walters, McCarthy Tetrault LLP
- Jim Weimer, Weimer Consulting Inc.
- Lori Winstanley, C.O.P.E. 378
- Brad Woods, Borden Ladner Gervais LLP
- Dan Woznow, AltaGas

- Kenna Hoskins, BC Hydro
- Lindsay Fane, BC Hydro
- Kristin Hanlon, BC Hydro
- Steve Higginbottom, BC Hydro
- Mike Savidant, BC Hydro
- Paul Stanley, BC Hydro
- Susan Campbell, Kirk & Co. Consulting Ltd, Meeting Recorder

### AGENDA

1. Introduction  
2. Draft Integrated Resource Plan Overview  
3. Consultation Topics – IRP Recommendations  
4. Question and Answer  
5. Feedback Form

### KEY THEMES

- Some participants expressed an interest in the pricing of new supply and whether proposed LNG plants would pay all or some of the cost of new supply.
- Some participants expressed an interest in knowing how soon BC Hydro would implement a procurement process to purchase new IPP energy. Some said the execution of IPP projects being built and online by 2016 – 2018 was optimistic.
- Some participants expressed an interest in knowing more about IPPs and how BC Hydro will utilize potential energy and capacity.

### DISCUSSION

*The record notes that the meeting was called to order at 1:00 p.m.*

*(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)*
1. Judy Kirk – Welcome and Introductions
   Judy Kirk welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Judy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. Randy Reimann– Consultation Discussion Guide
   Randy Reimann reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

**Introduction pp. 1 - 9**

Q: **Jeremy McCall:** I am surprised that there were two graphs, isn’t it a given that the conservation plan would be put into effect? Are there any conceivable circumstances in which it could not be put into effect?

A: **Randy Reimann:** We don’t want to lose sight of DSM\(^1\) savings going forward and we need our customers to participate with us to achieve those. We always want to recognize that in the graphs and say we know that this is hard work and these are hard targets, but this is step one. We will take time and we don’t want to lose sight of that.

Q: **David Black:** Is the same chart available on a monthly basis rather than an annual basis? This chart just annualizes the demand and supply but we know that there are seasonal fluctuations in both - do you have a chart that shows that fluctuation on a monthly basis?

A: **Randy Reimann:** The way weight capacity works is we need to have enough to meet the highest peak when there is the most demand on the system, and so we will build to that to make sure the system is reliable. However, with respect to your question around an annual monthly peak demand chart, yes we could look at that.

Q: **Michael Walsh:** With respect to the graph on Page 8 there is slight erosion as you go from 2018 - can you explain that?

A: **Randy Reimann:** That reflects the end-of-term contracts for IPPs and we haven’t presumed that the biowaste contracts will be renewed given the uncertainty around fuel supply constraints; and, it also takes into account a contract with Alcanin there and once they have upgraded their smelter and it goes online the graph will go down.

Q: **Jake Gray:** Page 8 – the capacity gap only shows 2031 and it would be helpful to see that over time?

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\(^1\) Demand Side Management
A: **Randy Reimann:** This discussion guide is a high level summary and the application is online on the BC Hydro website and energy and capacity graphs are online for the 20-year period. As well the appendices have further detail and are also available online.

A: **Judy Kirk:** I would just like to take this opportunity to note that the information is written so that lay people could understand however there is more technical information available online.

Q: **Richard Tennant:** Looking at the capacity supply graph on Page 8 is that just export or is it just domestic?

A: **Randy Reimann:** It is for domestic markets and we will talk about export later.

Conserve More pp. 10 - 11

Q: **Ron Hankewich:** How far along is BC Hydro in achieving the 8,800 megawatt an hour savings?

A: **Randy Reimann:** The 8,800 is what is left in the energy savings targets that were originally set in the 2008 LTAP\(^2\) which was then 10,000 GWh and so since 2008 we have achieved a lot. There are two factors; the target was by 2020 and some DSM programs last for 10 years so if we started in 2008 the benefit of the savings start dropping out in 2018 so the savings is around 3,500 GWh is what we’ve achieved to date. We are still looking to target 8,800 by 2020 however we’re bumping that up to 9,800.

Q: **Ron Hankewich:** You are projecting a moderate increase in gas prices and people looking at this might conclude that gas was a future option but how would that pricing impact your implementation of DSM pricing because that would be a significantly less costly approach rather than paying extra for DSM savings. For example, take a gas-fired plant and that could produce electricity probably under $50 a megawatt hour and that would change the DSM so maybe the cheaper option is more supply rather than DSM although one has a carbon impact on the planet and one doesn’t.

Q: **Judy Kirk:** So your question is about the balance of the lower gas price and not meeting conservation targets?

A: **Randy Reimann:** We looked at five scenarios of market prices (including gas) and they were not all based on low gas prices but we did look at the low price and that is probably our most likely current view that it stays there for a while. Restriction on using gas comes from the 93% clean objective and we’ve designed this plan to maintain that mix of generation. What we’re seeing in the actions going forward is that the limited amount of gas room we have we want to reserve for capacity resources as opposed to energy. As we get through the 20 year period borrowing some other capacity resources like pump storage becoming available that we will be using gas. What that means is that the comparison is DSM to clean resources and those are the ones that we’re trading off. The reason we land on a particular level of DSM isn’t so much because of the marginal cost, it has as much to do with whether or not we can convince everybody to undertake the programs target and achieve the savings that we’re looking at. When you look at the supply curve for DSM,

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\(^2\) Long Range Acquisition Plan
not that many of the savings go up to the price where they go head-to-head with the clean resources. Most of them are competitive with gas. Our numbers, including carbon tax leveled over 20 years is about $70 a megawatt hour for combined cycle. The reason we land on DSM isn’t based on cost rather it is whether we can convince everyone to use the programs and not that many of the savings go up and remain competitive with clean energy.

Q: Jeff Matheson: Are smart meters incorporated in energy smart models in here?
A: Randy Reimann: DSM is not based on having smart meters in place but we do think there is potential for savings.

Q: Gwen Barlee: With respect to the negotiations with liquefied natural gas terminals what is the price they will pay per megawatt hour to access the grid?
A: Randy Reimann: Jumping to Page 18 – we want to ensure B.C.is competitive in LNG markets, maintain leadership on climate change, and keep rates affordable for our customers. LNG producers will pay the full cost of supply. Our cost was a bit ‘north’ of $100 a megawatt hour but it is not at all determined and is still subject to negotiation.

Q: David Black: There has been a fair bit of scholarship on the effect of time-of-use rates and is there any scholarship on what the effect of voluntary time shifting? Are any other jurisdictions attempting it on a voluntary basis and if so how successful are they?
A: Randy Reimann: For these actions we are estimating a couple hundred of megawatt hours we could target but it is fairly unknown and we need to go out and see if we can achieve it. The US has done a fair bit of this and has been fairly successfully but they are summer focused utilities and I suspect that it is a lot easier to persuade people to turn an air conditioner off when it is hot than it is a heater when it is cold.

Q: Doug Grimes: It has been done because I know I participated in a pilot project and while I didn’t end up with a big result it was because I was already doing much of the measures however I think you need to talk to the smart meter folks.
A: Randy Reimann: I would like to make the distinction between voluntary time-of-use and self-selection and with this we are looking at a way to control devices because they are different actions and it is uncertain whether it would apply to a larger population.

Build and Reinvest More pp. 12 - 16

Q: Dan Woznow: When was the cost estimates put together for Site C?
A: Mike Savidant: These cost estimates are nominal as spent dollars and the estimate was put together in late 2010. BC Hydro still feels it is accurate and we believe that the project will come in within that cost.

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3 United States
Q:  *Ron Hankewich*: Do you have a commercial in service date for when Site C comes on stream?
A:  *Mike Savidant*: December 2020, however we are currently reviewing that given that we have a regulatory process and timeline in front of us. We anticipate 2020 – 2021.

Q:  *Richard Tennant*: You say you have 1,110 megawatts of firm capacity, and of that, what percentage is reserved for peak?
A:  *Randy Reimann*: We look at dependable capacity as what is there to meet our system peaks – both.

Q:  *Ron Hankewich*: Obviously Site C is a good project, but is there a ‘Plan B’ if Site C is not built?
A:  *Randy Reimann*: We have a number of contingency actions we are looking at and we are looking at future sources of capacity. If Site C did not go ahead we would acquire additional IPPs as we move along.

Q:  *Jake Gray*: In the market purchases are you incorporating transmission upgrades from Alberta or Washington State especially given the tight nature of the capacity market in the Washington market in the timeframe you are talking about?
A:  *Randy Reimann*: The trick is to get the capacity from the south through that region of transmission to the border. We do try and look out 10-20 years and we look at what others are doing and we are pretty comfortable that we can get 500 megawatts delivered in that timeframe.

Q:  *Jeremy McCall*: With regards to Revelstoke 6, it may increase peak load capacity, but it isn’t putting water behind the dam so in fact it doesn’t increase overall capacity? Is there a way to put water back in to the lake in the off-peak period?
A:  *Randy Reimann*: The amount of capacity is how fast you can allow the water out of the dam. For example, if we add 6 units instead of 5 we can run it that much harder/faster, however it doesn’t put any more water in the dam. If you run it harder for capacity in peak periods it means you have to run it less hard the rest of the year. That needs to be combined with IRP energy to meet that energy gap.

Q:  *Elaine Golds*: With respect to Burrard Thermal operating for 12 days a year that is hardly operating at all and certainly there is an opportunity to run it more in winter and not have smog conditions. So how much more could you get if you ran it more?
A:  *Randy Reimann*: We know there is a cold snap in the winter that lasts about 12 days and we don’t need it more that. That is just an indication of how it would typically run and that’s to meet capacity needs. We’re not permitted to run Burrard for energy purposes unless it’s an emergency. So we wouldn’t run it for anything more than to meet the capacity need. What this recommendation is proposing is that if we did need it for capacity purposes more than 12 days per year, we would do that but it would be our last choice.

Q:  *Ron Monk*: Can you talk about the Columbia River Treaty and when it expires and what assumptions are being made beyond that?
A: **Randy Reimann:** With respect to the Columbia River Treaty each party must give 10 years notice if they want to get out and so the earliest date notice could be given would be 2014 to terminate in 2024. The government is in discussions around that and there is some uncertainty about the availability of that resource and how much we can count on it.

Q: **Bob Douglas:** On Revelstoke it was my understanding that its reserve would be able to sell power back to Alberta to create revenue and off-set the costs of IPPs?

A: **Randy Reimann:** Adding a unit to the dam doesn’t change the link to markets but it does create capacity to the system that may allow us to optimize it more. PowerEx, BC Hydro’s trading partner would trade to Alberta and would optimize to increase the value of the system and that value would go back as a benefit to the rate payers.

Q: **Bob Douglas:** Regarding the order of these recommendations, is that your priority or are they just a bundle of recommendations because I think that upgrading Revelstoke would be a “no brainer” to do.

A: **Randy Reimann:** No, there is no implied priority to the recommendations rather they were presented in the order they are in for ease of understanding - all are needed.

Q: **Lori Winstanley:** Is LNG paying the cost of supply, subject to negotiation, and does that also include transmission?

A: **Randy Reimann:** Yes.

Q: **Michael Walsh:** What is the completion date of the ILM\(^4\) and what is the date to supply the Lower Mainland?

A: **Randy Reimann:** 2015 I believe, but I have to check – what drives the building of transmission into the Lower Mainland is the need to meet the load here. As you look out 20-years the ILM takes us out a fair chunk and the question is where does capacity get built in the future? So depending upon where future capacity is located and if it is not in the Lower Mainland we may need another line towards the end of the period.

Q: **Jeremy McCall:** When will the northwest transmission line be completed?

A: **Randy Reimann:** 2015 – it is just starting.

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4 Interior to Mainland Line (transmission line)
5 Feed-in Tariff Program
here and we looked at tidal or wave but they are a little down the road in terms of viable technology and more research needs to be done and so at the end of the day we didn’t think there was a need. As well, some of the prices on the FIT programs we’ve seen in other jurisdictions have resulted in some pretty big rate increases.

Q:  
Gwen Barlee: In the next call for clean power what do you see the cost of a megawatt hour for IPPs?

A:  
Randy Reimann: You can do it two ways – we are seeing on the supply curve that some projects are at a lower cost and then it goes up. A project comparison looks at price on the last call and it was adjusted up to $129.

Q:  
Gwen Barlee: What about the spring freshet period and the overbuild of wind in the Pacific Northwest and low electricity prices – so what percentage of power from IPPs during freshet is there and is BC Hydro constrained for taking advantage of the negative or very low prices for low carbon energy that is available on this market because of contracts with IPPs?

A:  
Randy Reimann: The ability of our system to absorb energy during freshet is limited. Our existing hydro system has significant inflows and we can have a lot of variability in the energy that we get into our system – 10,000 GWh from critical to high water. Over the last few years that we have been buying IPP contracts, we have recognized that we can only absorb so much energy in the freshet and right now under high water we have more energy than load and we have to spill or shut off and going forward we will have to be mindful of that. Each time we do a call we will have to assess and we will want to restrict what is available during freshet and at the end of the day maybe run-of-river is still cheaper than wind all factors considered.

Q:  
Elaine Golds: When you talk about renewable energy what about municipal solid waste?

A:  
Randy Reimann: Yes, in the IRP Chapter 3 it flags to an appendix and we looked at municipal solid waste and there are not that many dollars per megawatts available and as people recycle and compost more the number goes down. However, we are open and typically the clean calls are an open process and we will accept any technology that is available and reliable if it’s a low cost project.

Q:  
Elaine Golds: I don’t know that anyone would say that municipal solid waste is a clean source because of all the plastic, etc. however I notice in the appendix you show 745 gigawatts hours a year from additional municipal solid waste incineration so where is that from?

A:  
Randy Reimann: Hydro doesn’t do these clean energy projects – we leave that to the IPP industry to go out and develop them and to bid in and we will evaluate that bid and price it.

Q:  
Jake Gray: Earlier you were talking about accessing cheap pacific wind and you can’t get it from the Columbia River because there are several transmission constraints so that is not a supply option. The $124 is that the average of the signed contract price or is it the average of the projects actually going to be built? Does it include projects not built from 2008 and what is the fall-out rate? Did you look at 2006 versus what was bid and built?
A: **Randy Reimann:** Do we consider attrition - that is our best estimate. The price of the last call was $124 and it was an adjusted bid price to the Lower Mainland for just the energy component – which is now $129. Signed contracts or built – I don’t think we have seen a lot of attrition on the last call. With respect to awarded contracts, 2006 was a different beast and coal was in there so that would have been a significant difference – we look at the price of the last call and that is the 2010 price.

Q: **Ron Monk:** With respect to Recommendation No. 8 – it talks about needing this energy in the 2016 to 2018 time frame and I am interested in BC Hydro’s thinking of the conditionality of this action item relative to the short time frame? How certain is it that it will go ahead? In reality, four to six years to get projects in service is pretty tight. If you really want to do that in that timeframe, then you would need to proceed now.

A: **Randy Reimann:** The timeline for delivery is important we need to consider that in how we design the acquisition process. We’ll probably start designing that process fairly soon and maybe consulting with the industry on that. The call itself will probably not be launched until late 2013.

Q: **Mike Walsh:** In relation to freshet, how is Site C modeled in terms of its contributions or load (generation) profiled seasonally?

A: **Mike Savidant:** Site C will be located downstream of the GMS Williston Reservoir and Peace Canyon. When we look at the annual energy contribution of Site C, seasonal generation is modeled assuming current operation of upstream operations. It is not driven as much by variations in inflows in terms of stream flow except in how that effects the operations of the industry. It assumes all water from GM Shrum and Peace Canyon would pass through. So 5,100 gigawatts hours and load profile similar to GM Shrum and Peace Canyon.

**Prepare for Potentially Greater Demand pp. 18 – 20**

Q: **Naved Amirzada:** I am wondering will BC Hydro use pump storage or IPPs?

A: **Randy Reimann:** BC Hydro is limited by policy to large existing generation so no we will be looking to IPPs to be the developers.

Q: **Naved Amirzada:** So while there won’t be existing time and usage to rate payers, would that have to apply to pump storage?

A: **Randy Reimann:** There are two ways to develop pump storage. In the US, where they have highly liquid electricity markets and there are price swings between daylight and evening hours and people build on that basis but we are thinking of a turnkey product where IPP would build it and make it available that BC Hydro would operate.

Q: **Derek MacDonald:** How does pump storage make economic sense if we don’t allow for price differential?

A: **Randy Reimann:** We need capacity in the system. Looking at cost effective storage, if not pump storage, the trade-off would be gas-fired generation; however, we have constraints on the amount of gas that we can burn.
**MEETING DETAILS**

**BC Hydro Integrated Resource Plan**
**A Clean Energy Plan to Meet B.C.’s Future Electricity Needs**

Vancouver – Multi-Stakeholder Meeting
June 12, 2012, 1:00 p.m. – 3:00 p.m.

SFU Vancouver - Harbour Centre Segal Centre
555 West Hastings Street, Vancouver, B.C.

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C: **Julius Pataky:** It’s a supply cost issue decoupled from time of use and demand pricing.

Q: **Jake Gray:** If industry is to develop potential pump storage sites, the need to access would have a shortened time frame. On the other side of that, we know that pump storage is a long and expensive lead time development process, so how would you incent industry to put that time, money and effort into something when you’re not really providing any certainty or procurement?

A: **Randy Reimann:** We have been looking at the issue and we have some preliminary thoughts around it however it would have to be addressed in the future.

Q: **Ron Monk:** Looking at Recommendation No. 9 and gas-fired generation and I am interested in opportunities where district systems would be installed, UBC will only install a heat plant and not generation and that is a lost opportunity I think. They are in the market place now and hiring designers.

A: **Randy Reimann:** There are good opportunities out there and BC Hydro would work with them on the bigger picture.

Q: **Doug Grimes:** With respect to the Northeast Transmission Line and the gas extraction load in Horn River would be supplied by gas fired generation rather than at the well head?

A: **Randy Reimann:** That would be the intent.

Q: **Richard Tennant:** In regard to providing incentives for pump storage hydro, IPPs are building pump storage - would you be integrating run-of-river and wind in?

A: **Randy Reimann:** We would need capacity and would contract for and use in the system where we need it. In that application, if we had winter peak capacity requirements, we would pump at night and run during the day. There are other times in the system, in freshet or Peace icing times where we have limited amount of generation. In these cases you could change the operation of the pump storage or perhaps the timing to be pumping for example when the wind blows a lot and to be generating when the wind doesn’t. By alternating what is happening with the wind, you help can integrate those resources.

Q: **Richard Tennant:** So you could integrate run-of-river freshet into pump storage?

A: **Randy Reimann:** Not so much with this pumped storage. We’ve been looking at daily storage - pump for 12 hours and use for 8 hours and anything more than 12 hours doesn’t help with the freshet.

Q: **Ron Monk:** With respect to Recommendation No. 9 – there have been improvements in wind turbines and innovation in moderate wind resource regimes and it is not reflected in the wind resource in the IRP because it was a timing issue - how would they stack up if wind costs were reduced by 20% or 30%?

A: **Randy Reimann:** At the end of the day we are not really selecting resources. Whatever gets bid in will be selected. With respect to Site C, it offers energy capacity and integration capability. If we don’t end up with those things, then we’ll probably end up running a lot of thermal which runs afoul with the 93%. Price drops have occurred and wind does appear to have made efficiency
gains but looking at price curves over 8-10 years on wind turbines and price gains what we know is what gets bid into the call and I don’t think it will make a significant difference into what is bid into the IRP.

Additional Comments

Q: **Derek MacDonald:** Wind turbines – what is the cost of existing turbines in the province?
A: **Randy Reimann:** 35% capacity range. I’m not sure the existing wind farms are up to that number or not. We think that they will be in that order.

Q: **Ron Monk:** I commend you on a comprehensive IRP report and a challenging planning period and you’ve done well – one question is around that 93% clean energy constraint and speaking as a rate payer and not speaking against clean energy but gas generation could be an option.
A: **Randy Reimann:** We have to build to clean energy requirements.

Q: **Bob Douglas:** I notice No. 1 is very heavily associated government policy and I am not sure it is a fair statement, however it looks like you need a large amount of cooperation on the conservation side and if the government is in agreement with this concept (and I have no idea why they wouldn’t be), it should be well-advanced in creating programs and so where do we sit and where is it going?
A: **Randy Reimann:** DSM makes sense regardless of government policy. It appears to be cost effective and it is a winner if people participate and for the environment. We have been at this game a long time and learning as we go and fine-tuning and adjusting as we go.
A: **Judy Kirk:** Last year as we consulted around the province we heard participants say they wanted BC Hydro to be proactive but cautioned balancing mandatory and voluntary measures and BC Hydro has tried to find that balance.

Q: **David Black:** Page 22 – with respect to your long-term projection and tying that back to Page 7 and electric cars and distributed energy storage, are there any forecasts on that?
A: **Randy Reimann:** BC Hydro has started forecasting electric vehicles and in the near 10 years it is relatively modest due to the availability of electric cars and there may be an ability to use for storage however these are early days.

Q: **Derek MacDonald:** I apologize as I was late to the meeting – are oil pipelines included?
A: **Randy Reimann:** LNG yes – but I don’t think oil pipeline expansion was reflected; however, the plan is annually updated.

Q: **Gwen Barlee:** This is a sidebar – given the considerable non-compliance with IPPs and particularly run-of-river and meeting their terms of agreement with their environmental assessment certificate and with their water license, does their non-compliance with run-of-river IPPs impact the energy agreement with BC Hydro?
A: **Randy Reimann:** We will make note of the question because I am not sure of the commercial terms.
Q: Naved Amirzada: 2,400 megawatts capacity supply for 2031 and 1,100 Site C and Revelstoke is in there so is there a 800 megawatts RFP\(^6\) for pump storage or gas or will the Columbia River Treaty and other resources be looked at as part of capacity? Where is it coming from?

A: Randy Reimann: Part is when we buy intermittent IPPs there is some capacity contribution to the system so the intermittent resources works with our large hydro variability and uncertainty to give some contribution – that is part of the answer. The rest of the answer is pump storage or gas fire generation.

Randy Reimann wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.

The record notes the meeting ended at 2:50 p.m.

\(^6\)Request for Proposals
### MEETING DETAILS

**BC Hydro Integrated Resource Plan**  
**A Clean Energy Plan to Meet B.C.’s Future Electricity Needs**

Abbotsford – Multi-Stakeholder Meeting  
June 13, 2012, 1:00 p.m. – 3:00 p.m.

Best Western Plus Regency Inn & Conference Centre – Conference Room ABC 32110 Marshall Rd, Abbotsford, B.C.

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### PURPOSE


### FACILITATOR

Nancy Spooner, Kirk & Co. Consulting Ltd.

### PRESENTER

Basil Stumborg, BC Hydro

### ATTENDEES

- Allan Asaph, Abbotsford Chamber of Commerce  
- Stu Barnetson, D.F.O.  
- Jeremy Bekar, Maple Ridge & Pitt Meadows Chamber of Commerce  
- Regina Dalton  
- Earl Erickson, Township of Langley  
- Pauline Favero, City of Abbotsford  
- Tara Friesen, City of Chilliwack  
- Rick Grant, District of Mission  
- Elizabeth Gray  
- Darcey Kohuch, District of Kent  
- Rainer Kraft, B&D Excavating  
- Charlie Scott  
- Brent Schmitt, City of Abbotsford  
- John Van Laerhoven, District of Kent

### BC HYDRO INTEGRATED RESOURCE PLAN PROJECT TEAM

- Charlie Weiler, BC Hydro  
- Kathy Lee, BC Hydro  
- Steve Higgenbottom, BC Hydro  
- Emilie O’Genski, Kirk & Co. Consulting Ltd, Meeting Recorder

### AGENDA

1. Introduction  
2. Draft Integrated Resource Plan Overview  
3. Consultation Topics – IRP Recommendations  
4. Question and Answer  
5. Feedback Form

### KEY THEMES

- There were no key themes raised in this meeting
The record notes that the meeting was called to order at 1:00 p.m.

(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. Nancy Spooner – Welcome and Introductions
   Nancy Spooner welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Nancy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. Basil Stumborg – Consultation Discussion Guide
   Basil Stumborg reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

   Introduction pp. 1 - 9

   Q: Darcey Kohuch: Is the load forecast for just B.C. customers?
   A: Basil Stumborg: Yes, and there is some uncertainty about what will happen to the load so the grey span in the diagram shows that uncertainty and part of this IRP is determining what the forecast is.

   Q: Regina Favero: I was just reading the note underneath the pie chart. It says approximately a third for each customer. If you take in the two other constituents or do they complete the 100%?
   A: Basil Stumborg: Yes those two constituents make 100%. We have relationships with Fortis and with the City of New Westminster that are within our load area as well.

   Q: Allan Asaph: The lines seem to flatten around 2017-2018. Is there a reason for that?
   A: Basil Stumborg: We have significant load growth because we have some large customers coming on the coast; our LNG\(^1\) Loads. When we get those large chunky loads that will ramp it up and then we’d get back to a regular load growth. There is some extra mining growth as well.

   Conserve More pp. 10 – 11

   No comments

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\(^1\)Liquefied Natural Gas
Build and Reinvest More pp. 12 - 16

Q: Regina Favero: The little bit I know, can you give us some negatives or some reasons for why people would not want it? In case there are concerns.

A: Basil Stumborg: We are recommending it goes ahead. There are still regulatory processes. BCHydro, as a Crown corporation, has a duty to consult with the public and First Nations. One question we’ve looked at is just the footprint of this project. It takes a large river and flooding an area around it. What we’ve asked ourselves is “what has a smaller footprint” and what we’ve found that over a large number of conditions, putting Site C in your portfolio would use more land than if you did biomass, run-of-river and others. The question becomes, if you have a large land impact, then do you want it concentrated or do you want it spread around the province. That’s one thing that part of the regulatory process will work through.

C: Nancy Spooner: There is a Site C consultation that just finished and there is a lot of information on the website with specific feedback from the community. You’ll be able to see a lot of the impacts if you look at those sites.

C: Basil Stumborg: We also look at the need. Do we need to have such a large project – can’t we just increase our energy conservation? As we discovered, even with the most aggressive energy conservation programs, we still a growing gap between supply and demand.

C: Nancy Spooner: The feedback form is available online and you could do some research and then complete the feedback form.

Q: Rainer Kraft: What would be the best way and most aggressive way to conserve energy that BC Hydro is looking at?

A: Basil Stumborg: We chose the most ambitions conservation plans that we thought could deliver energy savings. Even if we went aggressively on the rates side and meet rising demand then there may be some backlash from the public. We are going with the most aggressive that is feasible. The others that we looked for is more aggressive codes and standards for house building for example.

Q: Rainer Kvolt: Codes and standards and rates?

A: Basil Stumborg: Yes, that’s right.

Buy More pp. 17

No comments

Prepare for Potentially Greater Demand pp. 18 – 20

Q: Darcey Kohuch: What do you mean by LNG3?

A: Basil Stumborg: LNG3 is a consortium of companies, but it’s working on one project that may be built in stages, but is still only one project. Then there are additional LNG production projects.

Q: Rainer Kraft: Looking at all the options, would waste energy or bioenergy be considered IPPs in that case? What is the definition of those?
A: BasilStumborg: Yes, when we have our calls for power we are looking at capacity rich resources. As time goes on, we will be interested in resources with capacity. I know that bio-mass is considered a clean source but I’m not too sure about burning municipal waste.

Q: Elizabeth Gray: On the export issue, can you tell me if the North American Electricity Reliability Corporation has any influence on that type of project? When crossing borders, things like fees, levies or fines?

A: BasilStumborg: When you have an interconnected grid, there is a set of rules that these groups have to abide by. In that sense they have an influence, but I’m not sure about specific fines and levies.

C: Elizabeth Gray: We used to deal with FERC, but now there is this new corporation and I was just wondering.

Q: Pauline Favero: In reference to the pump storage, is there a cost difference between low demand and high demand. Currently, we can’t use TOU rates; you don’t have that tool to be feasible? Do you anticipate a change in government direction?

A: BasilStumborg: It’s been pretty clear and has taken hints from the public that they don’t want them playing with rates right now. It doesn’t mean that pumped storage isn’t feasible. It takes about 1/3 of the energy to pump water up hill. When the value of capacity rises, it makes sense to have a resource that produces capacity. That’s the value difference that makes pumped storage make sense.

Q: RainerKraft: Wouldn’t the rate make a consideration if you have to buy externally because in that case it is an internal consumption? So it has more of a cost increase.

A: BasilStumborg: From a planning point of view, we look at what is the cheapest way to produce. That’s right.

Additional Comments

Q: John Van Laerhoven: One thing that I haven’t heard is the use of the energy in various B.C. inlets from tidal energy. Or are there too many wildlife issues to deal with that?

A: BasilStumborg: Within the IRP we have a resource options report and we meet with private sector proponents and we canvas the province to find out what is out there in terms of capacity or energy projects. That is something that we have identified as a source of energy and capacity and it’s particularly attractive because we are getting energy from run-of-river hydro. When there is a wet year, when there is a freshet, it’s challenging for us to absorb it because there is just a lot of energy that we don’t need at this point. We are also interested in wind but there is a limit to how much wind we can use. We’ll be interested in those projects and it has potential. That being said, it hasn’t been developed in a utilities scale and no one has figured out how to make it profitable proposition. Given that we need to find new sources that are dependable, I think it’s going to be coming soon.
Q: Regina Favero: I like Site C and I don’t know if we should be considering that but it doesn’t seem like there is enough money in B.C. coffers or BC Hydro. Are we looking at a P3 for Site C?

A: Kathy Lee: We aren’t down that road yet. We are just at the stage of regulatory approvals.

C: Regina Favero: I would be opposed to a P3 project. When we looked at a P3 project for water here in Abbotsford, we heard that borrowing at the public level it would be 4% but at the P3 level it would be 7%. We should keep it as low as possible.

Basil Stumborg wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.

The record notes the meeting ended at 2:00 p.m.
| MEETING DETAILS | BC Hydro Integrated Resource Plan  
A Clean Energy Plan to Meet B.C.’s Future Electricity Needs  
Webinar #1 – Stakeholder Meeting  
June 25, 2012 12:00p.m. – 1:00p.m. |
|-----------------|--------------------------------------------------------------------------------|
| PURPOSE         | Notes from a Webinar for the BC Hydro Integrated Resource Plan held with  
Stakeholders and representatives of the Integrated Resource Plan on June 25,  
2012 |
| FACILITATOR     | Madelaine Duke, Kirk & Co. Consulting Ltd. |
| PRESENTER       | Basil Stumborg, BC Hydro |
| ATTENDEES       | Chris Aikman  
David Barrie  
Michelle Chislette  
Rachel Darvill  
Cliff Grandison  
Heather Johnstone  
Laura Miner  
Ryan Mowat  
Phan Nguyen  
Eric Redmond  
Zaheer Shivji  
Stephen Somerville  
Robert Twa  
David Warner  
Shannon Wever  
David Winer  
Josette Wier  
Ron Zeilstia  
Edmondo Zoro |
| INTEGRATED RESOURCE PLAN PROJECT TEAM | Kathy Lee, BC Hydro  
Brandee Clayton, BC Hydro  
Marc Beauchemin, BC Hydro  
Jennifer Gin, BC Hydro  
Emilie O’Genski, Kirk & Co. Consulting Ltd, Meeting Recorder |
| AGENDA          | 1. Introduction  
2. Draft Integrated Resource Plan Overview  
3. Consultation Topics – IRP Recommendations  
4. Question and Answer  
5. Feedback Form |
Some participants were interested in learning the details behind BC Hydro’s load forecast, and how it compares to previous load forecasts that BC Hydro has made.

There was some interest expressed by participants in discussing resource options, and how BC Hydro was planning to rely on power produced by Independent Power Producers in the future.

The record notes that the meeting was called to order at 12:00 p.m.

( Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. Madelaine Duke – Welcome and Introductions
   Madelaine Duke welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Madelaine informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. Basil Stumborg – Consultation Discussion Guide
   Basil Stumborg reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

   Introduction pp. 1 - 9

   C: Phan Nguyen: What are the cumulative probabilities associated with your low/high ranges for both before and after conservation forecasts?

   A: Basil Stumborg: The graph that we look at on page 16 shows demand before and after DSM1. The upper and lower portion is the P10 and P90 range for this demand. This is only taking into account the Load Forecast uncertainty. For a more complete picture, I’d have to direct you to the IRP on the website and that document has a joint probability distribution around that.

   Q: Josette Wier: I would like to know if you’ve done similar forecasts and where can I find the forecast from 2000-2010?

   A: Basil Stumborg: Are you talking about the load forecast?

   Q: Josette Wier: I want to see the same graph that was presented from the decade before.

   A: Kathy Lee: The load forecast graphic contains the historical forecasts.

   Q: Josette Wier: I want to know how well you’ve done with the forecasts in the past 10 years. How can I trust this one? Show me the same graph.

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1Demand Side Management
**MEETING DETAILS**

BC Hydro Integrated Resource Plan
A Clean Energy Plan to Meet B.C.’s Future Electricity Needs

Webinar #1 – Stakeholder Meeting
June 25, 2012 12:00p.m. – 1:00p.m.

A: **Madelaine Duke**: You can find information about previous forecasts on the BC Hydro website. There was a 2008 LTAP and a 2005 Electricity Plan. Those presented the same forecasts.

Q: **Josette Wier**: Can you give me an exact location on the web? I don’t have time to navigate the website. Can someone help me?

A: **Madelaine Duke**: We can send you an email with the links to the specific documents.

C: **Josette Wier**: That would be great. I would like to see the accuracy with the previous predictions. I want to know if we can trust the forecasts.

**Conserve More pp. 10 - 11**

Q: **Unknown**: One of the recommendations in the draft IRP was to purchase additional energy. What is currently being planned to address the barriers to purchasing power from small distributed clean energy projects? Currently, if a farmer wanted to build a small 50KW biogas project he would be charged $600 to connect to the BC Hydro grid under the net metering program. However, if he were to build a 100KW project he would be charged $500,000 to connect under the Standing Offer Program. Can you please comment on this?

A: **Basil Stumborg**: If I may, this is touched on in Recommendation # 8 so I will get more in depth in that section but in short, we will be turning to the IPP sector and looking for new sources of supply.

C: **Madelaine Duke**: Just as a reminder, we would like to see these comments also reflected in your Feedback Forms that we would appreciate you completing after this webinar.

**Build and Reinvest More pp. 12 - 16**

Q: **Josette Wier**: The speaker mentioned that Site C is the most affordable option. What is the estimated price of electricity generated by the construction of Site C?

A: **Kathy Lee**: In terms of unit cost, we estimate $87-95 per MWh\(^2\). In terms of project costs it is estimated to cost $7.9 billion to build Site C.

Q: **Josette Wier**: Looking at MWh, what price will you sell the electricity at?

A: **Basil Stumborg**: The way we do that within the IRP is we take the current supply and load growth, after energy conservation, and find the least cost way to plug the gap between supply and demand. We don’t track the sales to the customers. We find combinations of resources that meet our needs in the least cost way.

Q: **Josette Wier**: It doesn’t feel feasible to build something at $95 per MWh and sell it at less than that. Is it?

A: **Basil Stumborg**: Again, we look at the number of combinations, so existing projects wind, small hydro, biomass, Site C and we have a optimization program that runs through millions of combinations and we come up with the least cost way to meet the gap. The way we recover the costs from customers is not part of energy planning.

Q: **Josette Wier**: Really. Why not?

A: **Basil Stumborg**: Because it has more do to with rate setting, which is a different exercise from Integrated Resource Planning.

Q: **Josette Wier**: Who pays for the upgrading of the transmission lines from Prince George to Terrace? How much will it cost? Because it’s not for us, it’s for the LNG\(^3\) plants and Enbridge.

\(^2\)Mega Watt Hour

\(^3\)LNG

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BC Hydro Integrated Resource Plan – A Clean Energy Plan to meet B.C.’s Future Electricity Needs
Webinar – June 25, 2012
Page 3 of 7
A: Kathy Lee: I can answer the how much question. It will be $95 million direct capital cost.

A: Basil Stumborg: Typically, when there are upgrades it goes into the general cost and the rate payer bears that. We will come up to LNG in later slides where we talk about new customers and large customers, and how they pay.

Q: Josette Wier: I read the executive summary this morning and I was pretty annoyed. There is a massive confusion that B.C. is doing this for British Columbians and you are just catering to two LNG plants and the mining industry. Is Shell Gas British Columbian? I think there is a misinformation there. Is it for rate payers? They are not all British Columbians.

C: Madelaine Duke: Josette, we appreciate your comments and we hope you include that in your Feedback Form.

Q: Phan Nguyen: What is the percentage of load growth for your energy saving? What is the percentage of peak demand growth for your capacity reduction?

A: Basil Stumborg: Our load growth is growing at 2% per year over the planning horizon that varies a little bit between our customer classes. I think that’s true for both capacity and energy, given that they are both increasing by 50% over the timeframe.

Q: Madelaine Duke: What is the percentage of peak demand growth for your capacity reduction?

A: Basil Stumborg: For capacity, given that it’s growing by 50% over the planning horizon I think the growth is around 2% per year, before DSM.

Q: Unknown: Recommendation #6, are the options presented in the order of preference?

A: Basil Stumborg: Recommendation #6 is how we are bridging our short-term need for capacity. BC Hydro has identified that we will go to the market and the Canadian Entitlement to meet our capacity needs first. Then we will turn to the Burrard Generating Station. BC Hydro is making a definite distinction between leaning on the first two. Then we will turn to the Burrard Generating Station second.

Q: Unknown: Site C is $7.9 billion to build 1,100 MW, is that correct? That is $7 million per megawatt to build?

A: Kathy Lee: Yes that is correct. However, it’s important to remember that Site C could provide significant energy contributions. So we should not just focus on dollar per megawatt, but look at it providing both capacity and energy over time.

Buy More pp. 17

Q: Rachel Darvill: It’s a question in regards to Site C. How many long-term jobs are predicted to come from Site C?

A: Basil Stumborg: On our website, we have a section devoted to Site C and some of the key stats are provided there. I don’t have the direct number on my finger tip.

Q: Rachel Darvill: Your website is massive so please send me that information.

C: Madelaine Duke: We can send you links to that information.

3Liquefied Natural Gas
Q: Rachel Darvill: I’d like to see the past predictions for electricity demand. What would the power for Site C be used for if the development was approved?

A: Basil Stumborg: Site C will be part of our integrated system. The timing of these two occurrences is important to note. Our initial LNG projects in our base resource plan are coming in 2017 and Site C, if passes through the regulatory processes, would come on Fiscal 22. Those two are separate issues. Even if those initial LNG projects don’t come online we will still need Site C.

Q: Rachel Darvill: Sounds like you are really counting on Site C to come online. What happens if the approvals aren’t met?

A: Basil Stumborg: Within the IRP, we have a base resource plan. We recognize that Site C does have to pass through a regulatory process. As one contingency, we have identified the steps we would take if Site C does not come online in the timeline we expect, or if it doesn’t come online at all. As a short answer, we’d have to turn to IPP’s and lineup and acquire energy from them instead Site C.

Q: Josette Wier: Site C is really artificial to separate it from LNG and pipeline development. I was shocked to read in the Integrated Resource Plan that natural gas plants need to be electrified. Can you elaborate on that? It’s something that ratepayers will pay for, not Shell.

A: Basil Stumborg: We will turn to the LNG question momentarily. As a quick answer, there are a number of options available and providing power from BC Hydro is one option. If that is the option, then this is how BC Hydro would respond. But again, I’d like to emphasize that it’s one of many options that are one the table.

C: Madelaine Duke: That is the topic on the next section that we will be looking at.

Q: Josette Wier: I really wanted to know why ratepayers, British Columbians, are subsidizing the mining and gas industry? I want to emphasize that.

Q: Unknown: One of the recommendations in the draft IRP was to purchase additional energy. What is currently being planned to address the barriers to purchasing power from small distributor clean energy projects?

A: Basil Stumborg: Currently BC Hydro has a number of programs that purchase power from smaller IPP’s. We have a Standing Offer Program, for projects that are less than 15MW as well as the Net Metering Program for small residential and commercial projects. That’s for projects where folks have a small source of power, or if they are going to put up solar panels and they produce more electricity than they need, they can sell it back into the grid. Now, these are at a scale that is below the Integrated Resource Plan. We are looking at a more provincial level. But there is ongoing work to continue to make these more accessible for people.

C: Kathy Lee: The Net Metering Program in terms of the farmer example you gave, we are currently revisiting the maximum capacity that eligible for that program.

Prepare for Potentially Greater Demand pp. 18 – 20

Q: Josette Wier: I want to get the legal definition of clean. It appears that it’s a sliding scale; natural gas is now considered clean energy. Is there a legal definition of clean energy?

A: Basil Stumborg: Clean energy is defined by legislation, so we have to turn to the legislation to see how it is defined.

Q: Josette Wier: Is the legislation the Clean Energy Act?
A: Basil Stumborg: It’s defined in another piece of legislation. We can send you that link.

Q: Josette Wier: I’ve been looking for it, because I think conservation is being abused. Secondly, you are looking at mining and two LNG plants, and there will be more, but you ignore Enbridge. They will have 10 pumping stations and they are planning on using significant hydro power by hooking up to existing lines. Is there enough electricity? I’ve asked this question to BC Hydro and haven’t received an answer, maybe you can let me know.

A: Basil Stumborg: On the load forecast, when we forecast future loads in the industrial sector we focus on a small number of large loads, we don’t have many industrial customers, on company by company basis. We have key account managers that work with these customers as well so we have a sense where their business is going in terms of electricity demand. That’s how we build up our industrial load forecast. I’ve been talking about liquefied natural gas and mining as way to put some names to some of the large industrial load. But we are looking across the province at all industries.

C: Josette Wier: There word pipeline is nowhere to be seen? There is natural gas pipeline, potentially Northern Gateway Pipeline, they are highly significant. Are you saying that they are diluted into mining? I do not understand why you don’t put pipeline, it’s very significant.

A: Basil Stumborg: Our load forecast for the industrial sector goes through all sections of industry, and company by company, we go through and we make forecasts for each type of company.

Q: Josette Wier: So how much does it cost a company to hook up to existing transmission lines that we will build $95 million to upgrade for them?

A: Basil Stumborg: That’s a level of detail that I can’t answer. I’m sorry.

Q: Josette Wier: Do you have a link or a person’s name? I don’t get answers from BC Hydro. I’ve written two letters and I don’t get answers. Who do I ask those questions to?

Q: Madelaine Duke: Thank you for asking those questions, and we do have your contact information. We will be sending you information. If you would like to look at any details of the Integrated Resource Plan it is on the IRP Website.

A: Josette Wier: I asked to be given a contact so I can have my question answered because so far I don’t get answers from BC Hydro.

C: Madelaine Duke: After today we will be sending you an email and you will have contact information.

Q: Josette Wier: Will you send me three things, the link for the previous load forecasts from 2005 and 2008 so I can see how accurate the forecasts have been; the definition of clean energy and a contact person from BC Hydro. When you email or phone BC Hydro you get no answer, it just gets lost.

A: Madelaine Duke: We do commit to getting you that information.

Q: David Warner: Will thermal sources be required to have carbon capture and storage systems?

A: Basil Stumborg: Under current legislation, all thermal generation has to have GHG\(^4\) emissions 100% offset. The one exception to that are new coal plans. They need to have their own carbon capture. As for the second part, will the generation be subject to carbon tax, I’m going to turn that over to Kathy who handled the modeling for this.

\(^4\)Greenhouse Gas
A: **Kathy Lee:** Any combustible thermal resources, especially used in generation, are subject to carbon tax.

Q: **Ryan Mowat:** What is the timeframe for reviewing the cost of interconnection for greater than 50 KW connections?

A: **Kathy Lee:** I think this is referring back to my earlier comment; we are reviewing the maximum capacity eligible for the Net Metering Program. We are not specifically revisiting the cause for interconnection. I don’t have the schedule for that.

Q: **Phan Nguyen:** How can you be sure you’ll get energy from IPP’s whenever you need it? Some of them may be run-of-river hydro.

A: **Basil Stumborg:** We recognize that some of the renewable resources are intermittent in nature. For example, wind turbines may provide energy if the wind is blowing. Run-of-river hydro may provide electricity when rivers are flowing. Within our planning criteria we take that into account. We take historical look at regional sources of these projects and we make an estimate on average how much electricity we can count on from these particular sources of power. We build that conservative estimate into our planning criteria and we base that for our supply stack.

*Madelaine Duke wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.*

*The record notes the meeting ended at 1:00 p.m.*
**MEETING DETAILS**

| **BC Hydro Integrated Resource Plan**  
| **A Clean Energy Plan to Meet B.C.’s Future Electricity Needs**  
| Webinar #2 – Stakeholder Meeting  
| June 26, 2012 12:00pm – 1:00pm |

| **PURPOSE** | Notes from a Webinar for the BC Hydro Integrated Resource Plan held with Stakeholders and representatives of the Integrated Resource Plan on June 26, 2012 |
| **FACILITATOR** | Judy Kirk, Kirk & Co. Consulting Ltd. |
| **PRESENTER** | Basil Stumborg, BC Hydro |
| **MULTI-STAKEHOLDERS** | Ken Bennett  
| | Cynthia Burton  
| | Lynn Chapman  
| | Donald Flintoff  
| | Terry Ghen  
| | Ana Grisales  
| | Meera Haque  
| | Beverly Nollert  
| | John Partyka  
| | Jared Spourle  
| | Shista Kadonaga  
| | Helen Wigmore |
| **STAFF ATTENDEES** | Kathy Lee, BC Hydro  
| | Brandee Clayton, BC Hydro  
| | Jennifer Gin, BC Hydro  
| | Marc Beauchemin, BC Hydro  
| | Emilie O’Genski, Kirk & Co. Consulting Ltd, Meeting Recorder |

| **AGENDA** | 1. Introduction  
| | 2. Draft IRP Overview  
| | 3. Consultation Topics and IRP Recommendations  
| | 4. Questions and Answers  
| | 5. Feedback Form |

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<th><strong>KEY THEMES</strong></th>
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| • Some participants raised questions and concerns about the recommendation to proceed with Site C.  
| • Some participants questioned whether BC Hydro could achieve the conservation target that is included in the draft IRP.  
| • Some participants were concerned that the increase in demand for energy and capacity created by proposed LNG projects may not be realistic. |
DISCUSSION

The record notes that the meeting was called to order at 12:00 pm.

(Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment)

1. Judy Kirk – Welcome and Introductions
   Judy Kirk welcomed participants to the multi-stakeholder meeting, explained the format of the meeting and introduced the discussion guide and feedback form. Judy informed participants that the meeting was being recorded for accuracy. Roundtable introductions followed.

2. Basil Stumborg – Consultation Discussion Guide
   Basil Stumborg reviewed the introduction to the Discussion Guide, including ways to participate in the consultation, the schedule of open houses and the list of consultation topics.

Introduction pp. 1 - 9

Q: Lynn Chapman: I’m interested in knowing what is determined to be clean sources. The previous slide said that the government required the clean or renewable resources to be 93%.
A: Basil Stumborg: The definition of clean energy includes small hydro, wind, biomass and also the Site C project. The government has recently amended the Act and suggested that it may include some natural gas powered plants use in a particular way and in a particular place, but we haven’t seen the details yet so I can’t be sure what the change will look like.

Q: Lynn Chapman: What extent does clean mean for Site C. I don’t understand how Site C would be called clean energy?
A: Basil Stumborg: As a preface, when it gets down to looking at the sources of energy and capacity, it’s determined by specifics within the legislation as to what is in the category and what isn’t. When you get down to it that’s how we fit resources into the clean category.

C: Judy Kirk: Just to clarify, no matter what answer Basil provides, I encourage you to include your comments about clean energy and how it’s defined in the feedback form or through the webinar.
A: Basil Stumborg: Generally speaking, when people are talking about clean, renewable or green energy, they are looking at the source of the fuel. Typically, hydro projects tend to fall into this category because they are using water.

C: Lynn Chapman: The energy coming from the movement of the water is what has it fall into the clean category.
A: Basil Stumborg: I’m speaking in a much more general way. When you get specific within BC the CEA lays out what is clean or not.

Q: Lynn Chapman: The definition of clean is in the CEA? It’s not BCHydro’s definition per se?
A: Basil Stumborg: Yes, that’s right. I can’t speak specifically as to what is the motivation behind each category.

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1Clean Energy Act
C:  *Ken Bennett:* I think the vast majority of demand is for mining and LNG\(^2\) over the next 5 to 20 years. Does the demand for LNG seem realistic given the international competition among other LNG projects? Maybe it’s not as great and we don’t need LNG like we think we do. It should be a question. If that’s the case we should save the LNG cost. We wouldn’t need Site C. Then we could burn the natural gas instead of shipping over to China. Peak demand is manageable by smart meters, pricing and other methods. The demand is industrial. I question whether we need to spend millions of dollars into that program.

A:  *Basil Stumborg:* Our forecast demand is split in three categories – industrial, commercial and residential. We are seeing growth of 2% in each of those sectors over 20 years and that’s without the LNG loads coming online. A good part of the plan is looking at how BCHydro responds if we do need to serve them and what if we don’t have to. We need the flexibility and that’s a key part of the plan.

Q:  *Ken Bennett:* What would you be burning at Burrard Thermal?

A:  *Basil Stumborg:* The way it’s configured now is that it is a natural gas plant.

Q:  *John Partyka:* It appears that there is a big degree of reliance on the DSM\(^3\) savings in the plan. I’m guessing it represents 100% certainty of occurring. As I look at it the LNG plants will bring hundreds of millions of dollars into the province and yet those loads are being treated as a scenario as part of the base load. I know there are two LNG’s proposed here. I’m surprised that something as soft as DSM is being treated as certainty but these other loads are only treated as a scenario.

A:  *Basil Stumborg:* We’ve recognized that DSM is a low cost resource but we are not certain it will show up. How we build it into our stack of resources we can count on and how we deal with the uncertainty is treated extensively with the IRP?

**Conserve More pp. 10 - 11**

Q:  *Lynn Chapman:* I am really interested in the notion of energy conservation and reducing voluntarily. They are valuable ideas. One conservation ideas that I’m not sure where it is placed in the IRP is a way of conserving energy is consumer education from the residential perspective. I think there is serious commercial and industrial education needed. I’m wondering are there specific directions inside of the plan that looks at how we can get that voluntary conservation and increase even more.

A:  *Basil Stumborg:* Yes, clearly providing information to consumers is important and you’ll see those ads on bus stops and on TV targeted at the residential sector, but what you don’t see is what is targeted at the commercial and industrial sector. We have one-on-one contact with them through their BC Hydro key account managers. In fact, in some areas we have people who are responsible for energy management within the large industrial sites. On the commercial side, we have Power Smart partners so the general public won’t see it going on but it is an important part of our plan.

Q:  *Lynn Chapman:* It’s an important thing for people to be aware of. Residential consumers don’t see that big users are being educated. How is the accountability managed there?

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\(^2\)Liquid Natural Gas  
\(^3\)Demand Side Measures
A: **Basil Stumborg**: BC Hydro’s view of industrial customers is a commercial function. We are relying on our rate incentives for them to be driving towards saving money.

C: **Judy Kirk**: Isn’t it also true that to date, BC Hydro has engaged in voluntary conservation programs. One thing in this IRP that is different is saying under the conservation recommendation is exploring more codes and standards and rate options which would not be voluntary. Thank you, Lynn, for your suggestion about raising awareness so the public knows more about these programs.

Q: **Cynthia Burton**: Regarding the statistics to date on conservation efforts, PowerSmart has been around for several years but is there any data for success rate?

A: **Basil Stumborg**: Measurement and verification is an important part about how PowerSmart group works. BC Hydro has an excellent record for hitting targets, but a provincial level it’s a more difficult nut to crack. No jurisdiction across North America has been able to prove that what we are doing is translating into energy conservation but we are confident that it does transfer on a provincial level.

Q: **Cynthia Burton**: I’m a bit skeptical on how conservation sectors can be in both the personal and corporate sectors. I’m glad to see that the plan has more balance this time around. I would like to comment that respect to codes, standards and rate options. The mandatory measure that comes to force, in the tough economic times, I hope you’re looking at impacts to business.

C: **Judy Kirk**: Thank you. We have heard that around the province and that message is coming through.

Q: **John Partyka**: As I look at DSM going forward, this is the single biggest tool you have going forward. Yet, it’s difficult to measure. How long before you can decide whether or not it is meeting your expectations? If this measure doesn’t live up, then all of a sudden you have five years lead time for substitute measures. What can be done if there are only seven years between the gap appearing?

A: **Basil Stumborg**: A key part of the draft IRP is having contingency plans. Part of the IRP is to have quick responses so we can fill the gap when it shows up.

Q: **Terry Ghen**: How much has been spent on DSM to date? What is the best estimate about what has been saved to date? I would appreciate numbers.

A: **Basil Stumborg**: I don’t have those numbers at my fingertips but we can follow up with you.

**Build and Reinvest More pp. 12 - 16**

Q: **Ken Bennett**: The Site C one really bothers me. In your report, you’ve indicated that BC Hydro can meet demand of the first two LNG plants. The demand is hinging on the third LNG. How do we really know that it’s necessary given the world market developing out there? We are spending a lot of money and in the meantime building Site C and ruining the environment up north. Why are we going after Site C now? It really bothers me. Site C should be put on hold and we need an economic analysis of that plan.

C: **Judy Kirk**: Thank you for that comment. I encourage you to fill the feedback form if you feel that way. Basil, can you answer the rest of his question?
A: Basil Stumborg: To clarify, looking at the need for Site C was an important part of the IRP analysis. Load will grow over time even without the two LNG plants in our forecast. We will still find there will be a need for Site C in the next 10-20 years.

C: Ken Bennett: You are still assuming Site C will be necessary but it could be a flexible platform like LNG while we find cleaner sources in the interim. I don’t buy Site C being necessary.

Q: Lynn Chapman: I also am very concerned about building Site C and thinking that the cost that is projected to be $8 billion just for the development of it. How is that a feasible project given we don’t know who will be paying for that. Not just the groups that will benefit from the development of Site C. Secondly, what is BC Hydro’s mandate about developing alternative energy sources. What about increasing residential, industrial, and commercials use of alternative energy sources so we don’t need dams since that’s old technology. We know that Ontario Hydro is working with residents to put in alternative energy equipment. What are you doing to address what is the projected increase in demand as an alternative to damming rivers?

A: Basil Stumborg: In our IRP we have an optimization program looking at supply-side resources. We look at over the 20 year period; we look at thousands of combinations to meet the supply and demand. Site C is included over the vast majority of scenarios. The price tag seems like a lot but it is the lowest cost combination of supply side resources.

C: Terry Ghen: Site C is slighted to cost $87 to $95 a MWh, after cost overruns it would probably be $100 a MW hour.

A: Basil Stumborg: In terms of having a mandate, BC Hydro is interested in alternative sources of energy. Through power calls, we encourage those to come forward. The government has been clear that the private sector should be exploring new technology to bring this to market.

C: Terry Ghen: IPP’S cost $74 to $104 a megawatt or about $30 in taxes. So why build Site C?

Buy More pp. 17

Q: Donald Flintoff: If the market conditions change, and the plants are part of the consideration, what happens? We are competing in a global situation and working on a price differential. Are we dealing with any stranded assets?

A: Basil Stumborg: We are aware that the requirement for electricity depends on the LNG plants. If you read through the draft IRP, we’ve built in some options. We’ve built off ramps into the recommendations so we don’t build expensive assets if we don’t need it.

Q: John Partyka: I’m trying to make sense out of the lead times. With five to six year lead times, procurement doesn’t happen for a year and a half, how are these projects going to be delivered?

A: Basil Stumborg: The timelines are extremely tight. Our procurement group is gearing up to start discussion so if the demand is solid we can form faster.

Q: John Partyka: The IRP document said there is a year or more of discussions around the forum that is going to take place and we are looking at maybe 2014 before it gets triggered.

C: Judy Kirk: Fair comment and I think Basil has provided a good answer. I encourage you to put that in your feedback form in addition to the notes we are taking today.
Prepare for Potentially Greater Demand pp. 18 - 20

Q: Shista Kadonaga: Do you have details about how to determine how many gigawatt hours you will need?

A: Basil Stumborg: Right now the gap is 3,500 gigawatt hours. We will go to market for 1,500 and IPPs for 2,000. As demand is firmed up, we’ll check to see if that gap is larger or smaller and then adjust based on that. The 1,500 and 2,000 gigawatt hours seems to be a cost effective split.

C: Terry Ghen: Is BC Hydro negotiating pump storage contracts at the moment? Who are they and will there be a tender for pump storage?

A: Basil Stumborg: I don’t know the exact details right now. We are in the exploratory stages so we are not negotiating actual contracts.

Q: Lynn Chapman: One question I have is regarding the IPPs. Currently, BC Hydro is paying IPPs and idling their power from existing dams. There are projected new IPP’s that are applied for. I’m wondering why we are going to the most expensive options first like Site C and why that is recommended over Revelstoke or working with IPP’s or LNG or natural gas generation. I find that the cost benefit analysis for Site C is not making sense to me given what we know we will lose. It’s not clean energy even though the province says that it is.

A: Basil Stumborg: If you look over time, demand is growing even after we put in place DSM. Within our timelines we will need power from IPPs and Site C and we are also looking at natural gas into our supply stack. We need them all and the sequencing may vary.

C: Ken Bennett: I appreciate that you are doing a demand analysis and monitoring the northeast gas sector. I agree that Site C doesn’t seem to line up with this. I don’t see that it’s necessary.

Q: John Partyka: It occurs to me that in a number of cases, it’s not a decision but a plan to analyze. You will be forced to build gas fired plants and the north east is a good example of this. What are you doing to negate that risk?

A: Basil Stumborg: As you highlight the timelines are tight. We need to decide but we don’t want to commit until we have certainty of the load.

Q: John Partyka: What does certainty mean?

A: Basil Stumborg: Certainty is depending on their request from BC Hydro which comes out of the commercial negotiations between the producer and the province.

C: Lynn Chapman: I want to comment that it seems to me that perhaps I can support this more if I could see a reduction in the order. It seems to me that with Option 11a, there is capacity to be more flexible with generation. I know this is a political decision. I want to recommend you for looking at alternatives. I want you to look at a change in order so Site C is further down the list of options.

Judy Kirk wrapped up the meeting and encouraged participants to complete the Feedback Form and asked participants to encourage friends and others to participate.

The record notes the meeting ended at 1:00 p.m.