2004 Integrated Electricity Plan

Discussion with the Joint Industry Electricity Steering Committee

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13 January 2004

Outline

- Objectives for Today
- What is the Integrated Electricity Plan
- Background
- BC Hydro's Existing Plan
- Developing the New Plan
  - Process
  - Progress
  - Stakeholder and First Nations Engagement
- Your Input on the Plan

Today's Objectives

- Provide information on the development of the 2004 Integrated Electricity Plan.
- Discuss key questions regarding electricity planning:
  - High Reliability
  - Low Cost
  - Environment Responsibility
  - Resource Options

What is the Integrated Electricity Plan?

- The long term (20 year) plan for how BC Hydro meets its customers' demand for electricity.
- Includes:
  - Long term (20 year) outlook
  - Medium term (10 year) direction
  - Short term (4 year) action plan

Background

- BC Hydro provides low cost reliable electricity to over 1.6 million customers in BC.
- We have an obligation to serve our customers.
- Electricity is an “essential” service to our province so we take our obligation to provide reliable service very seriously - this means we will error on the side of being conservative in ensuring adequate supply.

Background

- Developing a long term plan for supplying our customers. The November 2002 Energy Policy highlights the need for open and transparent planning. IEP is a key component of BC Hydro’s plans that input to initiatives such as Revenue Requirements.
- Guided by the BC Energy Plan (Nov 2002)
  - Low rates
  - Secure, reliable supply
  - Private sector acquisition - competitive calls
  - Environmental responsibility - 50% voluntary clean target
- Regulated by the BC Utilities Commission (BCUC) and plan to comply with Resource Planning Guidelines (Dec 2003).

Background

- Stakeholder and First Nations Engagement – Steps:
  - Taking input & considering views
  - Policy direction from our Board
  - Discuss outcomes with stakeholders and First Nations.
- The draft Action Plan was filed with the BCUC December 15, 2003 as part of the Revenue Requirements Application.
- Plan to issue drafts of parts of the 2004 IEP for comment very soon:
  - Introduction and Objectives
  - Demand Supply Outlook
  - Resource Options
- Tight timeframe to complete the balance by spring 2004 before Revenue Requirements Hearing.

Opportunities for Stakeholder Input

Opportunity for stakeholder comments on BC Hydro's perspective regarding:

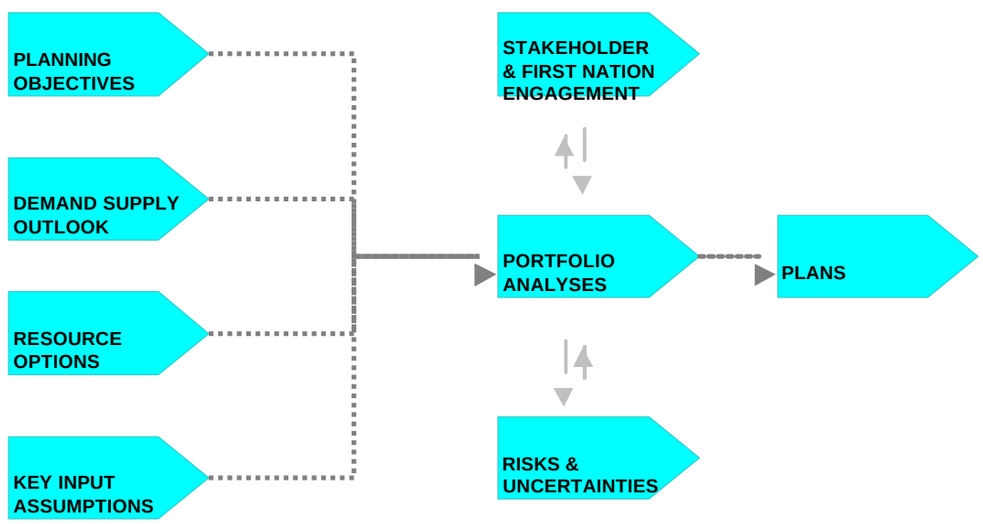
- High Reliability
- Low Cost
- Environment Responsibility
- Resource Options

In late 2001, BC Hydro revised it's Resource Acquisition Strategy for 2002-12

	2012 Target (GWh/year)	2004 Target* (GWh/year)
Power Smart:	3,500	810
Green, Customer Generation & future Independent Power Producer calls	3,300 - 4,200	430
Vancouver Island:	1,200 - 2,100	0
Resource Smart:	1,100	520
Total	**10,000**	**1,760**

*March 31, 2004 Target

Developing the New Integrated Electricity Plan



Planning Objectives

- Low electricity rates & public ownership of BC Hydro
- Secure, reliable supply
- Private sector development of new electricity generation
- Environmental responsibility & no nuclear power sources

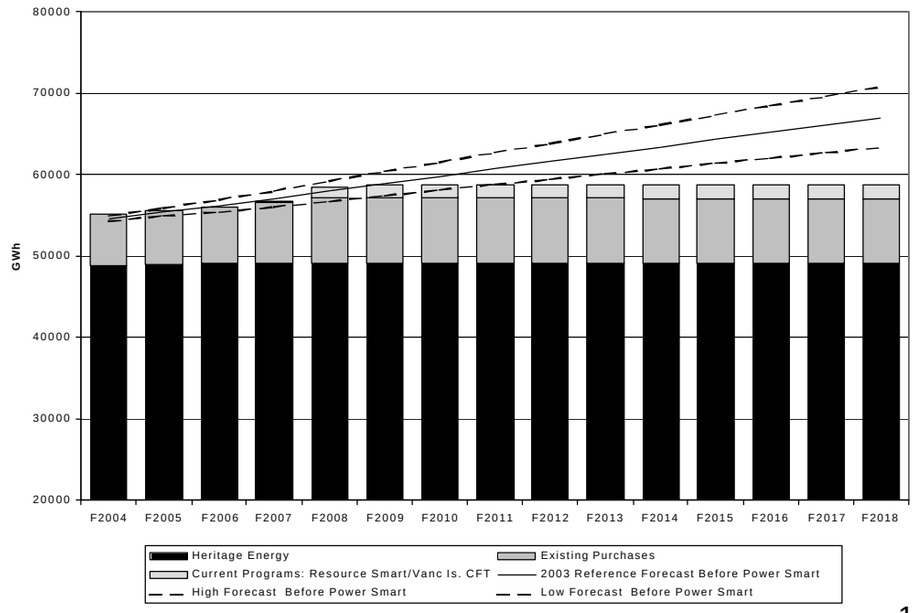
(from the BC Energy Plan – Nov 2002)

Demand Supply Outlook

Demand:

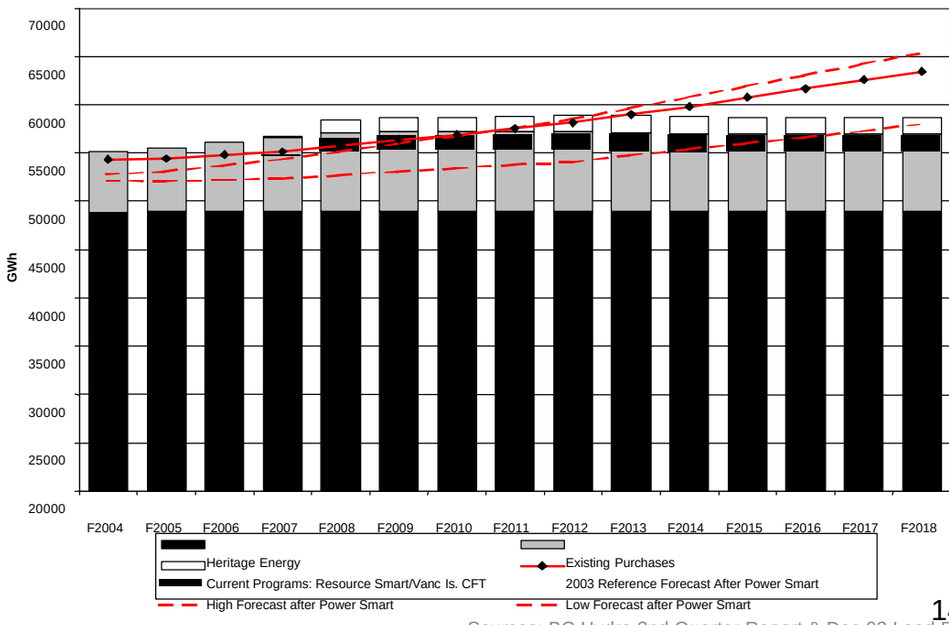
- BC Hydro's customers use over 50,000 GWh per year
- Peak usage nearly 10,000 MW (in the winter).
- Breakdown – about:
  - 1/3 residential
  - 1/3 commercial and small industrial
  - 1/3 large industrial.
- Fore example, residential:
  - Average household use 10,000 MWh per year
  - Over 1.5 million households served by BC Hydro
  - Total residential customers ~ 15,000 GWh per year.
- Electricity demand is forecast to grow at ~ 1.5% per year (before Power Smart).

Demand Supply Outlook: Energy Before Power Smart



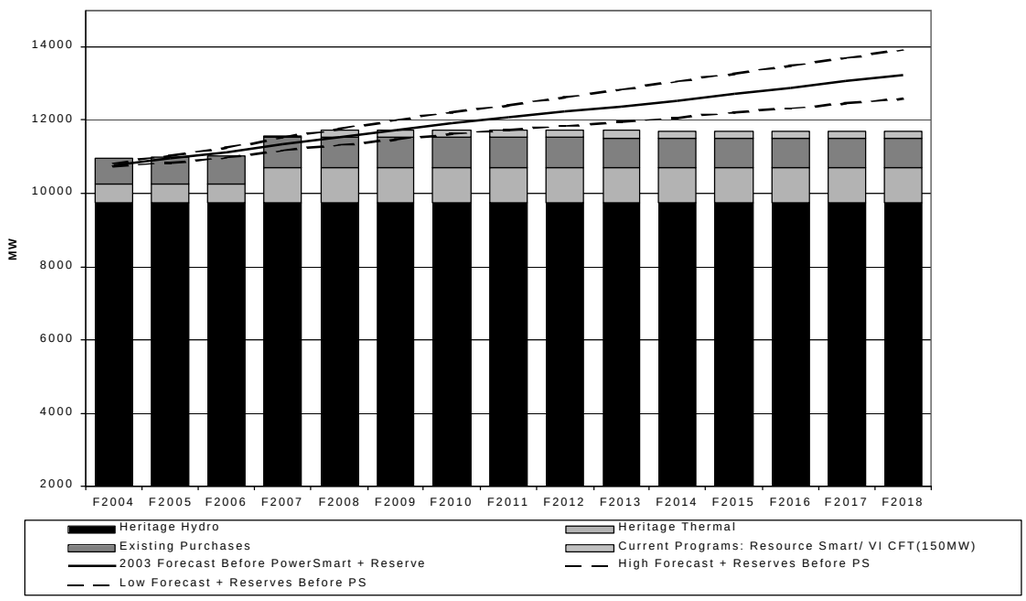
Sources: BC Hydro 2nd Quarter Report & Dec 03 Load Forecast

Demand Supply Outlook: Energy After Power Smart



Sources: BC Hydro 2nd Quarter Report & Dec 03 Load Forecast

Demand Supply Outlook: Dependable Capacity Before Power Smart



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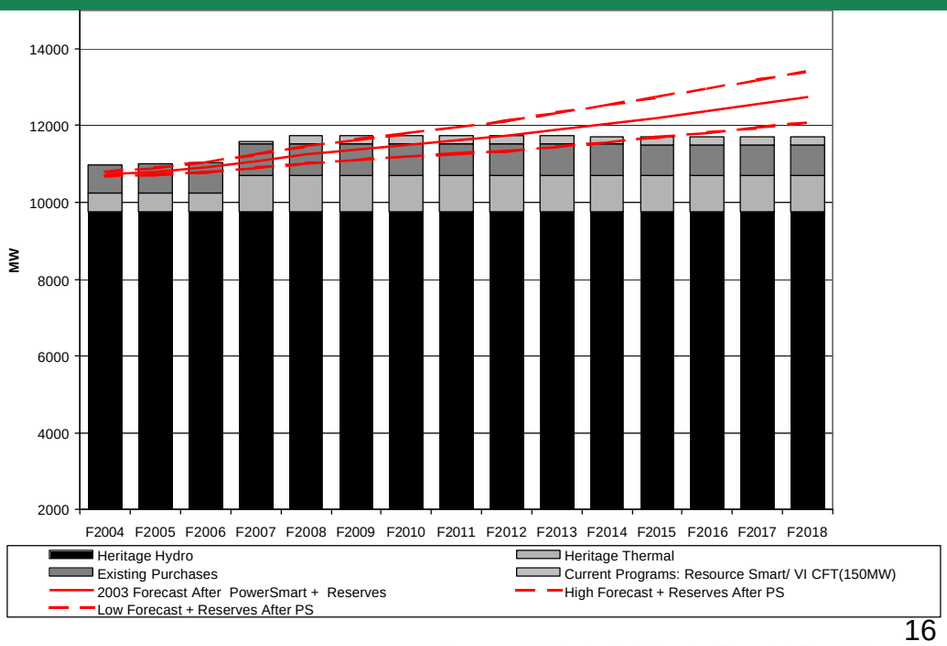
Demand Supply Outlook: Dependable Capacity After Power Smart

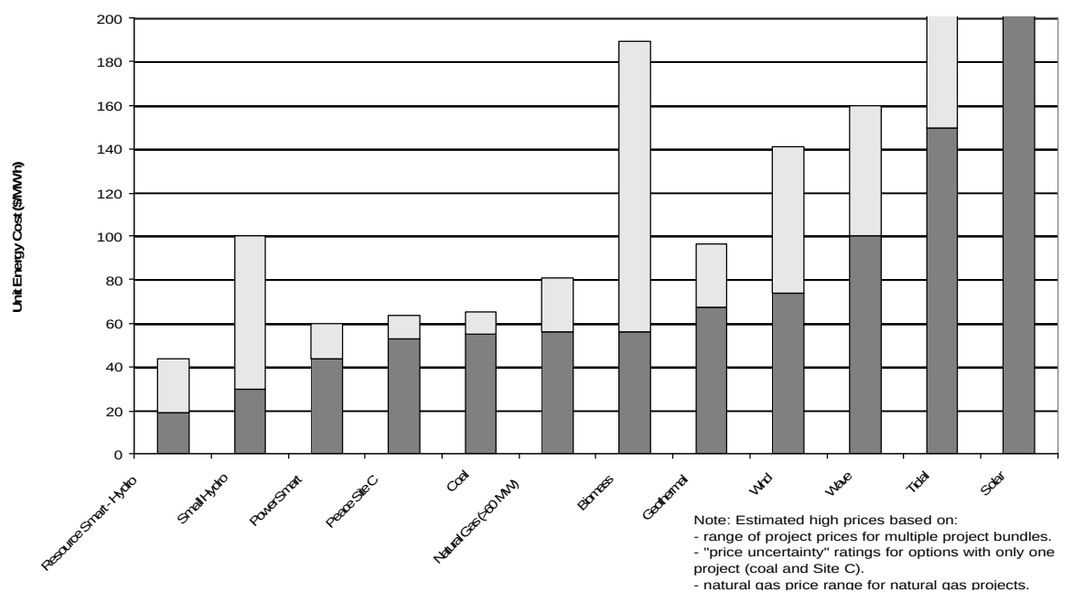


Sources: BC Hydro 2nd Quarter Report & Dec 03 Load Forecast

Resource Options

- Range of different electricity resource options to meet customers demands.
- Different economic, environmental and community implications.
- Future development will be from competitive calls to sell electricity to BC Hydro

Resource Option - Unit Energy Cost Comparison



Note: Estimated high prices based on:
- range of project prices for multiple project bundles.
- "price uncertainty" ratings for options with only one project (coal and Site C).
- natural gas price range for natural gas projects.

Performance of Resource Option

	Power Smart	Green (Small Hydro, Wind, Wood)	Large Hydro
Low Rates	Good	Good to moderate	Moderate
High Reliability (dependable capacity)	Moderate	Moderate to Poor - need dependable capacity	Good
Environmental Responsibility	Good	Good – water and land impacts	Moderate to Poor – water and land impacts

Performance of Resource Option

	Natural Gas	Coal	Long Term Imports
Low Rates	Moderate, uncertain - gas price variability	Good and low uncertainty	Uncertain
High Reliability	High	High	Moderate to High
Environmental Responsibility	Moderate	Poor – air quality impacts	Depends – impacts outside BC

Stakeholder and First Nations Engagement

- Focus Groups (summer 2003)
- First Nations & stakeholder meetings (fall 2003)
- Regional information sessions
  - 1st Round - Jan & Feb 2004
  - 2nd Round - Mar 2004
- Consider & document comments. We will explain how input was considered.
- Policy direction comes from our Board.

Portfolio Evaluation Overview

Objectives:

- least cost

- minimize risk

- secure reliable supply

- private sector role

- 50% BC Clean in 10 years & Environmental responsibility

Portfolio Analysis is underway - results will be discussed during the planned second round of information sessions

Portfolio Evaluation Overview

- Portfolios: evaluating a broad range of portfolios with Hysim (Operational Simulation) / MATA (Multi-Attribute Trade-off Analysis) across 5 gas & electricity prices.
- Uncertainties: We are identifying uncertainties and screening portfolios to identify the least cost portfolios, with least risks, that meet BC Energy Plan requirements.
- Risk: We are evaluating risks for each portfolio (magnitude of risk = range of variability of Attribute).

Long- term Portfolios

- Contain a collection of resource options (existing and new) arranged to meet BC Hydro's future energy and capacity needs over a span of 20 years.
- Portfolios being evaluated will include:
  - Power Smart
  - Green/alternative
  - Natural Gas
  - Coal
  - Imports/Transmission
  - Large Hydro
  - Hybrids
  - Regional

Uncertainties

- Supply Uncertainties (New and existing resources dispatched based on hydrology & electricity market price forecasts)
- Demand Uncertainties (load forecast increase or decrease)
- Transmission Uncertainties (projects, lead times and deferrals)
- Environmental uncertainties (costing: GHG, local emissions)
- Financial Uncertainties (discount rates, exchange)

Uncertainties

- Electricity Market - 5 gas & electricity price scenarios:
  - Energy Information Administration
  - Confer
  - National Energy Board Techno-Vert
  - High gas
  - Low heat rate
- Range $C 4 to 7/GJ for gas and $C 40 to $65/MWh for electricity (in 2007)

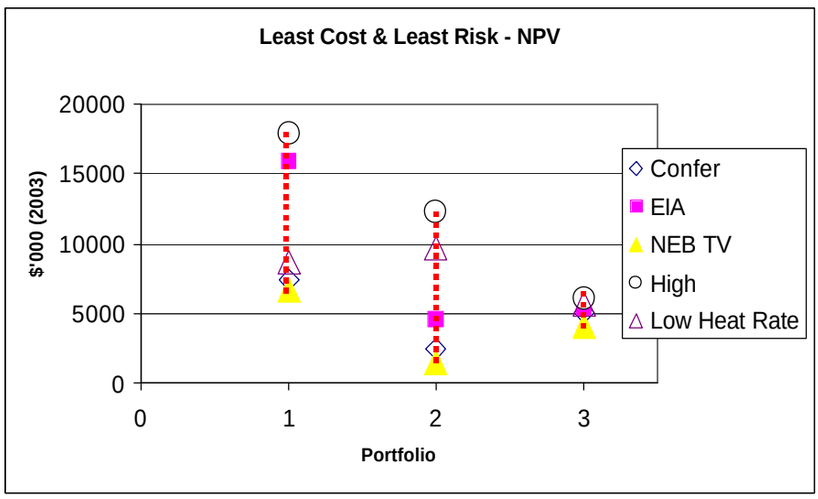
Risks

- Quantitative/Stochastic Risks, e.g. Hydrological variability
  - Can be numerically represented
  - Statistical process used to represent variability (e.g. fluctuations about an expected value)
  - Associated with ‘business as usual’
- Scenario Risks, e.g. Gas & Electricity Price Forecast, Green House Gas (GHG) costs, load forecast
  - Parameter variability is not represented by a statistical process (i.e., no probability associated with values)
  - Risks tested in portfolios by evaluating sensitivity to specific scenarios
- Paradigm Risks, e.g. BC Energy Plan, technological acceptance, social approval
  - Cannot be effectively represented by a number or statistical process
  - Typically associated with changes in market structure or business practice
  - Addressed qualitatively.

Attributes

	PORTFOLIO LEVEL	
	Portfolio Attribute	Units
1	Net Present Value	2003 $
2	Dependable Capacity	Dependable MW Vs. Installed MW
3	Private Sector Involvement	% MW & GWh from private sector
4	Clean Target	% of Clean Energy in Portfolio
5	Diversity	# of products & price structure
6	Employment	Short & long-term (Person yrs)
7	GHG & Emissions	Tonnes CO2 eq. & Local Pollutants
8	Total Footprint	ha
9	Communities	High/Med/Low
10	Rate Impact	cents/kWh

Least Cost & Least Risk



Example for Illustrative purposes

Next Steps

- Consider stakeholder & First Nation input & complete 2004 Integrated Electricity Plan by spring 2004.
- Parts under development include:
  - Risks and Uncertainties
  - Portfolio Analyses
  - Stakeholder and First Nations Engagement
  - Plan - Long Term Outlook , Medium Term Direction, & Short Term Action Plan
  - Summary.
- Second round of information sessions planned for March 2004

Key Question #1 – High Reliability

- Power on 99.97%, outage duration average 2 hours.
- We plan the system to ensure your light, heat and power are on when you need it.
- Cold Weather - For example, January 5, 2004 between 5 and 6 p.m., new peak of 9619 MW.
- Reliability dependent on:
  - Generation - plan based on adequate generating capacity during peak demand with allowance for generator outages
  - Transmission – plan for largest single element out of service
  - Distribution – plan for quick repair response - outages typically due to weather, animals, motor vehicle accidents, equipment failure.

High Reliability

- Generation reliability can be increased by carrying more planning reserve at additional cost.
  - This increases ability to serve demand during peak periods (such as January 5, 2004) creates surplus during other periods which can be traded.
  - Trade has benefited ratepayers in the past and helped to keep rates low between 1993 and 2003.
- Transmission reliability can be increased by adding more lines at increased financial, environmental and social cost.
- Distribution reliability - not the subject of these discussions but is a key contributor.

High Reliability

- BC Hydro conducts loss of load analysis based on forced outage rates of plants. Results in planning reserve of 14%. Was increased recently due to higher forced outage rates of aging plants.
- Agree with this approach or have a suggestion?

Key Question #2 – Low Cost

- BC Hydro customers enjoy rates among the lowest in North America - due to low cost generation from existing hydro and thermal “Heritage” plants
- Industrial pay about $35/MWh. Of that about $25/MWh is generation the balance of $10/MWh is transmission and customer service.

Low Cost

- Rates have not increased since 1993. Proposed rate increase of 7% this year, 2% next year
- Demand is growing at about 800 GWh per year (before Power Smart) and we must add new supply that costs about $55/MWh to serve load.
- Adding new customers means we must add new generation at higher cost. We must pass this on to customers and this increases rates.
- Choice of new generation impacts how much rates have to increase and what customers will pay in the future.

Low Cost

- Within this context, aging infrastructure and BC Energy Plan, BC Hydro is trying to keep rates low.
- Low cost considers several factors
  - electricity rates (charge per kWh)
  - customer usage (which can be reduced through Power Smart)
  - customer cost to implement Power Smart
- Agree with approach or suggestion?

Key Question #3 – Environmental Responsibility

- Electricity options with less environmental & community impacts often have higher costs.
- BC Hydro's main contribution to environmental responsibility is the 50% voluntary BC Clean target.
- Negative environmental and community impacts are minimized during project development.

Environmental Responsibility

- Different resources have different impacts:
  - Power Smart – usually low impact
  - Hydro – impacts on water, fish, recreation
  - Green (e.g. Wind – impacts on land)
  - Thermal – impacts on local air quality and Greenhouse gas emission
  - Transmission – land and aesthetic impacts

Environmental Responsibility

- Plan to meet BC Clean Target through
  - Power Smart
  - Resource Smart
  - Green
  - Customer Based Generation
- Minimize negative environmental and community impacts with projects
- Agree with BC Hydro's approach or offer suggestion?

Key Question #4 Resource Options

- Large range of options considered
  - Power Smart
  - Green/alternative
  - Natural Gas
  - Coal
  - Imports/Transmission
  - Large Hydro
- Purchased through competitive calls
- Ideal is low costs, low risk, high reliability and low environmental impact. Trade-offs required.

Resource Options

- Identify options through planning
- Invite project proposal through calls for tender
- Agree with BC Hydro approach or offer suggestion

Wrap Up

- Summary of Key Discussion Points

- Next Steps
  - Present at a future meeting in March 2004?

Joint Industry Electricity Steering Committee (JIESC)
BC Hydro's 2004 Integrated Electricity Plan (IEP) Presentation and Discussion Meeting
January 13th, 2004 2:30-4:30
Location: Mining Association of BC, 1111 Melville Suite 910, Vancouver, BC

Attendees:

Dan Potts	Joint Industry Electricity Steering Committee
Kirke MacMillan	MacMillan Consulting Ltd
Lloyd Guenther	LSM Consulting
Stephen Hilder	Canfor
Dennis Fitzgerald	Norske Canada
Kim Logan	Weyerhaerser
Mike Filippelli	ERCO
David Newlands	Elk Valley
Dal Scott	Highland Valley Copper
R. Brian Wallace	Bull Housser
Lisa Doig	Nexen
Ray Kettle	Pope and Talbot
Bill LeGrow	West Fraser
Dave Humber	West Fraser
Lorne Grasley	Mining Association of BC
Walt Halipchuk	Kemess Mines Ltd.
Pierre Lamarche	Howe Sound Pulp and Paper
Mary Hemmingsen	BC Hydro
Ron Monk	BC Hydro
Anne Wilson	BC Hydro

Presentation Materials:
Handout of 2004 IEP – Discussion with the JIESC Presentation

Presentation and Discussion

Background

Ron Monk introduced the regional information sessions on the 2004 IEP being held around the Province, and started in with the presentation. The following highlights discussions (questions/comments/responses) originating from the slides.

Slide 2

- A question arose about what types of issues/questions is BCH getting from the First Nations. The response was similar questions but BCH has designed a separate process because of the issues around First Nation capacity to engage is electricity planning issues, land access issues and unique legal consultation requirements.

Slide 3

- It was suggested the IEP objectives should be broader and include the issue of providing opportunities to develop resources in the province for export. The response is the mandate of the IEP is to meet domestic customer demand.

- A question arose as to whether BC Hydro considers load curtailment and demand side management to meet demand. JIESC members don't seem to hear about it. The response was yes, BC Hydro does consider this, examples include Power Smart, Pilot project with Teresen looking at peak shifting, and rate options.

  It was brought up that there are huge opportunities for load curtailment and industry has been wrestling with that for years – there is really not a crisis on Vancouver Island if all of the options are considered. Looking across Canada – Manitoba and Quebec offer curtailment. Load curtailment can buy time, and can help to reduce transmission needs. Industry would like the right to bid on curtailment options. In addition, it looks like implementing stepped rates is not a priority for BC Hydro as the hearing is not scheduled until the fourth quarter of 2004.

  Ron Monk summarized that he heard that the JIESC members wanted to see (1) load curtailment options, and (2) movement on stepped rates.

  Mary Hemmingsen mentioned that BCH will be releasing the draft Resource Options report and are looking for feedback. Load management is a supply option.

  It was acknowledged that JIESC members are a great resource because of their knowledge and experience from other jurisdictions.

Slide 5

- Comment that a JIESC member would like to see BCH build at the margin, rather have too much than too little generation (this is not the opinion of all JIESC members)

- A question as to what is the margin? Response was that for capacity it is 14%. This number is derived from an examination of loss of load probabilities, and the need to meet WECC industrial guidelines for short term operating reserves. BCH institutes an allowance of 400 MW for market purchases (which effectively brings down the percentage to 10%). It was clarified that the recent increase was from 12% to 14% which considers the increased outage rate of aging infrastructure.

Slide 7

- Question as to how BCH gets information on the load forecast for certain sectors (such as the mining sector), does BCH look at forecast potential? Response that BCH hires consultants to determine the outlook for each sector.

- A comment that the industrial forecast is down and there is some dispute among people as to accuracy, why is BCH showing the industry forecast down? Mary

responded that a main contributor is the planned closure of Highland Valley Copper, in addition Power Smart could also contribute to the decreased load. BCH also looks at a range of forecasts to capture the variability that exists in forecasting load.

Slide 9

- Question as to what happens if Burrard is shut down next year? An immediate Burrard shutdown would have challenging implications, BCH would encourage a more realistic timeframe if shut down is proposed. The IEP is looking at a number of options for Burrard.

- A comment on the call for tender process was that in some instances this excludes certain resources if a call is issued for a resource need within 2 years. This short timeframe would exclude a coal plant or large hydro. This is not only for timing, but also for size. It was noted that BCH is in dialogue with stakeholders about acquisition issues.

Planning Process

Slide 10

- A question as to where input comes in at each stage? The response is mainly with the Portfolio Analysis. The first three Parts are being released as drafts for comment, although at this point BCH will not be able to consider large changes (eg. methodology of load forecasting).

- A question arose as to the timeframe for revising the IEP. The current plan is every 2 years, however this may depend on the business environment.

- A question arose as to how this planning process fits with BCTC. The response is that BCTC has been involved on the project team, they carry out transmission related analysis for the portfolios. However, this does not usurp the process of filing a Network Integrated Transmission Service Application for future needs. The BCTC also can build more than what BCH asks for to serve other customers using the transmission system.

Demand Supply Outlook

Slide 12

- Comment that average household use should read 10,000 kWh per year (not MWh)

- Question as to whether the demand growth was energy or peak? Response that it is energy.

Slide 13/Slide 14

- Comment that new energy (after Power Smart) is not needed until 2013

- Comment that these two slides should use the same scale

Slide 15/Slide 16

- Question as to whether BCH has included a percentage for the outcome of WUPs. The response is not at this time, not until the WUPs are approved by the Water Controller.

- Clarification that dependable capacity is capacity that can be reliably generated on peak cold days given constraints such as aging plants and stream flows.

- Question as to whether BCH considers 'undependable capacity' – grouped together BCH may get more out of the system. The response was that in actuality BCH does draw on all parts of the system capacity.

- A comment that JIESC member was surprised BCH has so much idle capacity, only average 60% utilization of generation. In other industries the product can be stored, but not with electricity.

- A question as to whether BCH benchmarks. BCH does benchmark through the Canadian Electricity Association (CEA) and other comparisons.

Resource Options

Slide 18

- Ron mentioned that JIESC members may want to comment on the unit energy costs in reviewing the draft document.

- Question as to whether the assumptions are listed. Yes, and if the information is not there, please let him know.

- Question as to whether BCH has built in environmental costs. Yes, BCH has attempted to include costs for things like emission controls. Have not applied a CO2 cost.

- Question as to whether these unit costs are net present values? Response is that they are levelized costs.

- Question as to whether 6% is the right discount rate to use. 6% captures BCHs cost of capital. Question about whether BCH should be using the customers cost of capital.

Slide 19 and 20

- Comment that the values placed in the boxes under performance of resource options depends on your perspective. For example, large Hydro may be seen as more environmentally responsible than moderate to poor; and coal may be more environmentally responsible than poor.

- Concern that the rating for coal encourages a misconception about its current impacts.

- There was a general concern that these slides are less credible than the rest of the information in the presentation, and BCH is encouraged to present a balanced view. Ron acknowledged that the intent was to provide a high level summary, and not to provoke any misconceptions; and these slides will be revised before they are shown to a broader public.

Portfolio Evaluation

Slide 26

- A question as to whether the Confer forecast has been updated. Confer has just updated their forecast.

Slide 27

- Question as to whether all of the attributes are equally weighted? The response is that attribute weighting will be up to the Board.

Further Questions/Comments

- Question on slide 35 as to why there is a bullet stating industrial customers pay $35/MWh? Response was that it was tailored specifically for this audience.

- Question as to whether BCH is looking at opportunities of using future generation from Fort McMurray, Alberta. Response is that BCH is aware of that potential resource and it is being considered. A further comment that it appears the BC Govt is more interested in giving opportunities to IPPs in BC rather than acquiring least cost resources.

- Comment on Slide 24, that there is no portfolio specifically relating to load curtailment. Response was that yes, that is true and BCH will add a rate options portfolio.

Next Steps

Slide 29

- General agreement that this presentation was useful and Ron Monk and Dan Potts will set up a time for a follow up presentation/discussion with the JIESC members sometime in March. The JIESC also in the meantime may respond individually, or as a group.

- Ron reiterated a request for people to send comments from what they heard today, and/or respecting the drafts that will be up on the website shortly.

Action Items:

Number	Responsibility	Action	Due
1	Ron Monk	Distribute Draft IEP Part 3: Resource Options to JIESC members for comment	Jan 20
2	Ron Monk	Ron will notify JIESC members when the first four draft sections are put on the IEP website	Jan 20
3	Ron Monk	Revise slides 19 and 20.	Jan 20
4	Ron Monk	Add a rate options portfolio	TBD