2005 Integrated Electricity Planning (IEP)

Regional Information Sessions Fall 2005
Introduction and Agenda

• What is an Integrated Electricity Plan and why are we doing one?
• How are we getting input on the IEP?
• What have we heard in the process?
• What are your thoughts on BC’s energy future?
• What are the next steps?
What is an Integrated Electricity Plan?

• A long-term plan that describes how BC Hydro will meet its customers’ needs for electricity

• Plan covers 20 years, updated every 2 years

• Ensures we meet customer electricity needs while factoring in financial, social and environmental considerations
Demand-Supply Balance

Portfolio Resource Schedule - Firm Energy

Firm Energy Capability (GWh)

Fiscal Year (Year Ending March 31)

- Existing Resources
- Load Forecast without Power Smart
- High Load Forecast with Power Smart
- Load Forecast with Power Smart
### IEP Process

<table>
<thead>
<tr>
<th>Key Questions</th>
<th>Strategy #1</th>
<th>Strategy #2</th>
<th>Strategy #3</th>
<th>Strategy #4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Sufficiency</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
</tr>
<tr>
<td>Resource Mix</td>
<td>Green</td>
<td>Green</td>
<td>Low Cost Mix (including green, coal, and others)</td>
<td>Low Cost Mix (including green, coal, and others)</td>
</tr>
<tr>
<td>Demand Side Management</td>
<td>Power Smart 5  no retire</td>
<td>Power Smart 5 yes maintain for capacity</td>
<td>Power Smart 5 no maintain for capacity</td>
<td>Power Smart 5 yes maintain for capacity</td>
</tr>
<tr>
<td>Site C Burrard Generating Station</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
First Nations and Stakeholder Input to the 2005 IEP

First Nations Input as requested:

- Dec 04 - Apr 05

Province:

- Provincial Selected Committee undertook facilitated decision analysis process

Regional:

- Regional Information and facilitated sessions

Technical Resource Options:

- Open sessions to provide broad review of inputs to IEP process

Public Website / Polling:

- Public

First Nations, Provincial, Regional, and Public process:

- Resource Options Report

2005 IEP: 20-year study, 10-year Action Plan

Filed with BC Utilities Commission - Public Hearing Process
Input - First Nations

- Small hydro, biomass and Power Smart most desirable
- Placed high value on environment - land and flooded land, and GHG emissions
- Cost - least important attribute
- Employment & economic development opportunities are important to First Nations
Input - Your Region

- **Resource Options**
  - Power Smart widely supported - strong suggestion to expand and improve
  - Small hydro highly ranked
  - Support for synergized resource options
  - Biomass highly ranked (Prince George)
  - Large Hydro ranked high (Kitimat) but with concern of footprint and social impacts
  - some support for coal - qualified with mixing with other resources or ‘clean’ coal, however lowest ranking in all cases
  - Site C very contentious (Fort St. John)
  - Natural gas ranked low

- **Attributes**
  - Most important low cost and low air emissions
  - Attribute definitions require clarification
  - Many new attributes suggested
  - Temporary jobs least important

**Other Concerns**
- Power should be generated close to load (Fort St. John)
- Concern about inadequate information to base decisions
Normalized Swing Weights for Attributes:
Median by Region

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted UEC</td>
<td></td>
</tr>
<tr>
<td>GHG</td>
<td></td>
</tr>
<tr>
<td>Impacted Land - Footprint</td>
<td></td>
</tr>
<tr>
<td>Inundated Land (Water)</td>
<td></td>
</tr>
<tr>
<td>Local Emissions (Nox)</td>
<td></td>
</tr>
<tr>
<td>Permanent Jobs</td>
<td></td>
</tr>
<tr>
<td>Temporary Jobs</td>
<td></td>
</tr>
</tbody>
</table>

- All Regions
- Abbotsford
- Campbell River
- Castlegar
- Cranbrook
- FN Abbotsford
- FN Kamloops
- FN Nanaimo
- FSJ 1
- FSJ 2
- Kamloops
- Kitimat
- Nanaimo
- Revelstoke
- Squamish
- Vancouver
- Vernon
- Victoria
Examples of “What Matters” in Electricity Planning

- **Social Impacts**
  - Regional Equity, Ownership Structure, Employment

- **Environmental Impacts**
  - Land Impacts (across six categories)
  - Air Impacts
    - GHG Emissions (upstream, in BC, net of exports)
    - Local Air Emissions (across seven emissions)
  - Aquatic Impacts (on fish habitat)

- **Financial**
  - Average Costs (including GHG offset costs), Cost risk

- **Other**
  - Resource Diversity, % Green Energy, Reliability of Supply
Input - Public

- **Wind turbines** - High support expressed
- **Power Smart** - High support expressed
- **Small hydro** - High support expressed
- **New large hydro** - Medium support expressed
- **Gas plants** - Medium support expressed
- **Coal plants** - Low support expressed
- **Site C dam** - Medium support expressed
Demand Side Management: key questions addressed regarding calculation of costs, evaluation of savings, and new technologies. Suggestions made for rate design and energy efficiency technologies, programs and tools.

Environmental attributes: Discussion about the difficulties and challenges of representing planning level information on environmental impacts. Discussion about the treatment of upstream impacts.

Reliability & planning criteria: Improved understanding of planning criteria.
## Example of Key Resource Options by Region

<table>
<thead>
<tr>
<th>Resource</th>
<th>Interior</th>
<th>Kootenays</th>
<th>Lower Mainland</th>
<th>North</th>
<th>Vancouver Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Biogas</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coal</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Cogen</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Hydro</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Natural Gas</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Power Smart</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Small Hydro</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Tidal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Wave</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Wind</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Input - Provincial

• Provincial IEP Committee
  – Sixteen diverse participants representing a wide range of interests (First Nations, customer groups, environmental & social groups, BC Hydro, IPP Association, etc)
  – Met six times over fourteen days from December, 2004 to September, 2005.
  – Received input from:
    • 2004 IEP
    • Resource Options Workshop
    • Regional IEP Workshops
    • First Nations Workshops
    • subject area experts
    • BC Hydro electricity planning team
Addressed five high level questions:

- What degree of energy **Self Sufficiency** is appropriate for BC Hydro to pursue?
- What overall **Resource Mix** should be pursued?
- How much **Demand Side Management** to pursue?
- Future role of **Site C**?
- Future role of **Burrard Generating Station**?
# Proposed Strategies - Options and Tradeoffs

<table>
<thead>
<tr>
<th>Key Questions</th>
<th>Strategy #1</th>
<th>Strategy #2</th>
<th>Strategy #3</th>
<th>Strategy #4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Sufficiency</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
</tr>
<tr>
<td>Resource Mix</td>
<td>Green</td>
<td>Green</td>
<td>Low Cost Mix (including green, coal, and others)</td>
<td>Low Cost Mix (including green, coal, and others)</td>
</tr>
<tr>
<td>Demand Side</td>
<td>Power Smart 5</td>
<td>Power Smart 5</td>
<td>Power Smart 5</td>
<td>Power Smart 5</td>
</tr>
<tr>
<td>Management</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Site C</td>
<td>retire</td>
<td>maintain for capacity</td>
<td>maintain for capacity</td>
<td>maintain for capacity</td>
</tr>
<tr>
<td>Burrard Generating Station</td>
<td>retire</td>
<td>maintain for capacity</td>
<td>maintain for capacity</td>
<td>maintain for capacity</td>
</tr>
</tbody>
</table>
# Proposed Strategies - Common Elements

<table>
<thead>
<tr>
<th>Key Questions</th>
<th>Strategy #1</th>
<th>Strategy #2</th>
<th>Strategy #3</th>
<th>Strategy #4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Sufficiency</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
</tr>
<tr>
<td>Resource Mix</td>
<td>Green</td>
<td>Green</td>
<td>Low Cost Mix (including green, coal, and others)</td>
<td>Low Cost Mix (including green, coal, and others)</td>
</tr>
<tr>
<td>Demand Side Management</td>
<td>Power Smart 5</td>
<td>Power Smart 5</td>
<td>Power Smart 5</td>
<td>Power Smart 5</td>
</tr>
<tr>
<td>Site C</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Burrard Generating Station</td>
<td>retire</td>
<td>maintain for capacity</td>
<td>maintain for capacity</td>
<td>maintain for capacity</td>
</tr>
</tbody>
</table>
Proposed Strategies - Common Elements - cont’d

• Cost Risk
• Site C and past grievances
• Capacity Projects
• Transmission Projects
## Proposed Strategies - Outcomes

<table>
<thead>
<tr>
<th>Key Questions</th>
<th>Strategy #1</th>
<th>Strategy #2</th>
<th>Strategy #3</th>
<th>Strategy #4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Sufficiency</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
<td>A small buffer, for insurance</td>
</tr>
<tr>
<td>Resource Mix</td>
<td>Green</td>
<td>Green</td>
<td>Low Cost Mix (including green, coal, and others)</td>
<td>Low Cost Mix (including green, coal, and others)</td>
</tr>
<tr>
<td>Demand Side Management</td>
<td>Power Smart 5</td>
<td>Power Smart 5</td>
<td>Power Smart 5</td>
<td>Power Smart 5</td>
</tr>
<tr>
<td>Site C</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Burrard Generating Station</td>
<td>retire</td>
<td>maintain for capacity</td>
<td>maintain for capacity</td>
<td>maintain for capacity</td>
</tr>
</tbody>
</table>
## Next Steps

<table>
<thead>
<tr>
<th>November 2005</th>
<th>March 2006</th>
<th>Late 2006/2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>File IEP (with the Action Plan as the last chapter)</td>
<td>Revenue Requirement Application</td>
<td>Initiate 2007 IEP</td>
</tr>
</tbody>
</table>

- Continuation of Programs like Power Smart
- Continuation of Competitive Acquisition Process
- Continuation of Individual Project Development

Feedback will inform future IEP Engagement, competitive acquisition processes, and individual project development.
Any further questions or comments?

Thank you for participating in this discussion

Your views are appreciated