Exploring Our Clean Energy Future

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The Clean Energy Act

Minister Bennett
Energy, Mines and Petroleum Resources

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Hydro 101

Cam Matheson, Director, Integrated Resource Planning

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BC Electricity System

Clean Energy Act Objectives

For British Columbia:

- Electricity self-sufficiency by 2016
- 3,000 GWh’s insurance in 2020 and thereafter
- Conservation and DSM targets
- At least 93% from clean and renewable resources
- GHG emission reduction targets
- Net exporter
Clean Energy Act Objectives

Continued:

• Innovative technologies
• Encourage switching / reduce GHG emissions
• Reduce waste (waste heat / biogas / biomass)
• Economic development and job creation
• Foster development of First Nation and rural communities

Load Forecast
Traditional Grid

Modern Grid
2011 Integrated Resource Plan

Process expectations and timelines:

• Plan due for submission in Nov 2011

• Key Phases:
  ➢ Phase 1: Jun-Dec 2010 (Develop Inputs)
  ➢ Phase 2: Jan-Jul 2011 (Analysis and Draft Plan)
  ➢ Phase 3: Aug-Nov 2011 (Final Consultation & Submission)

Smart Metering and Infrastructure Program

Fiona Taylor, Acting Director, Smart Metering and Infrastructure
The Case for Revitalization

- 20th century investments in our grid have not kept pace with today’s global economy.
- While technology continues to advance, our grid remains unchanged.
- Every industry has gone digital… except the one the others rely on!

Global Agreement on Smart Metering

- US: $120 million annual federal grid R&D, 5% smart meters
- EU: $1.2 billion annual federal grid R&D
- Sweden: 100% smart meters
- China: 100% smart meters by 2013, $170 billion grid stimulus
- Middle East: GulfCities
  - Sustainable cities
- New Zealand: 100% smart meters
Smart Metering & Infrastructure Program (SMI)

- Replace existing meters with smart meters
- Expand telecommunications system
- Install meter data management and collection systems
- Integrate IT applications
- Provide in-home displays and feedback tools
- Offer time-based rates
- Deploy theft detection solution
- Install advanced infrastructure upgrades

SMI Benefits

- **Conservation tools**: Families and business owners can choose from a variety of new conservation tools, such as an in-home display or web portal, that provide more information about electricity consumption. Customers who choose to take advantage of these tools and new time-based rates could save from $145 to $450 per year.

- **Save energy and money**: System optimization will help to reduce wasted electricity, delivering power with more stability and fewer fluctuations. Additionally, such system efficiencies contribute directly to keeping rates among the lowest in North America.

- **Faster outage restoration**: Smart meters will send a signal to BC Hydro when the power is out, enabling electricity to be restored more quickly.

- **Reduce theft**: Smart metering infrastructure will help identify electricity theft quickly, improving public and employee safety and, again, providing direct benefits to customers.
Smart Home of the Future

Energy Efficiency and Conservation

Lisa Coltart, Executive Director, Power Smart
Our Province

A New Goal

• BC Hydro to offset at least 66% of load growth through DSM
• Why?
How we can Make a Difference

Buildings

People

Planning

Buildings in the Community

Thompson Nicola Family Resource Society

Lynn Canyon Ecology Centre
Buildings - Dockside Green Community

“North America’s first fully sustainable residential and commercial development…”

…achieved LEED platinum rating with highest number of points ever received worldwide.

Buildings - Passive House Design
People Who Care

People - Community Challenge

Community Challenge

How is your community doing?
Locate your community below to see how many people have set a reduction target.

<table>
<thead>
<tr>
<th>Community</th>
<th>Members</th>
</tr>
</thead>
</table>

BC hydro for generations
People - Volunteers in Action

Planning – Sustainable Communities

- Payment of up to 50% of the total cost of a Community and Energy Emissions Plan to a maximum threshold
- Payment of up to 100% of the total cost to add an energy component to the Design Charrette up to a maximum threshold
- District Energy Pre-Feasibility & Feasibility Study – up to 50% of study cost to a maximum threshold
- Capital incentives
Supporting You....

Community Energy Opportunities

Joanne McKenna, Senior Project Manager, Distributed Generation

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Community Energy Opportunities

- Distributed generation (DG) is one opportunity for communities to have greater participation over their energy decisions – including demand and supply side options.

- DG can be described as an approach that primarily utilizes smaller-scale generation of electricity located close to the load it is intended to serve, often located at customer sites and/or involving our customers.

“Customers as suppliers”

DG Demonstration Projects

<table>
<thead>
<tr>
<th>Location</th>
<th>Project Description</th>
<th>Goals/Learnings</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Quesnel</td>
<td>1.7 MW ORC (organic rankine cycle) using waste heat from industrial partner</td>
<td>Demonstrates waste heat/hog fuel ORC &amp; District Energy, transferable to other industrial sites</td>
<td>Letter of intent signed by partners, negotiations towards EPA next step</td>
</tr>
<tr>
<td>Ethical Bean</td>
<td>20 kW ORC ) organic rankine cycle) project utilizing waste heat</td>
<td>Demonstrates small scale generation from waste heat with other small commercial customers</td>
<td>Letter of intent executed, negotiations towards EPA next step</td>
</tr>
<tr>
<td>Louisiana Pacific</td>
<td>7 MW biomass self-generation project</td>
<td>Explores value of system reliability benefits with creative approach (EPA + load curtailment agreement)</td>
<td>EPA - customer review, load curtailment agreement near final</td>
</tr>
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<tr>
<td>Nanaimo (Hydrogen Chloride Plant)</td>
<td>2MW Internal Combustion Engine (ICE) using waste hydrogen – innovative given scale of project</td>
<td>Industrial load displacement pilot for program development</td>
<td>Power Smart funding in final approval stage</td>
</tr>
<tr>
<td>West coast of Vancouver Island (First Nation community)</td>
<td>2MW small hydro project to serve existing load</td>
<td>Distribution system reliability &amp; capacity improvement ; potential revenue stream for community</td>
<td>Early stage - opportunity exploration</td>
</tr>
<tr>
<td>Abbotsford (residential dairy farm)</td>
<td>20 kW anaerobic digestion project (utilizing animal waste for electricity production)</td>
<td>Demonstrates small scale anaerobic digestion for application to larger farms (greater than 50 cows) addressing restrictive ALR.</td>
<td>Power Smart demonstration funding approved</td>
</tr>
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</table>

Other Community opportunities.....

- Recently BC Hydro has been actively involved in piloting Municipal and BC Hydro collaborations to further integrate our collective efforts around energy production and savings
  - City of Vancouver – conservation
  - University of BC – living lab in sustainability
  - City of Surrey
  - City of North Vancouver
- Next Steps: seeking additional communities in the Northern Region & 2 First Nations communities
Other Community opportunities…..

- BC Hydro offers funding for:
  - District Energy Systems

- Next steps – contemplating an integrated approach with communities to seek supply/demand side solutions

Feed-in Tariff and Greenhouse Gas Reduction Measures

Les McLaren, Assistant Deputy Minister
Energy, Mines and Petroleum Resources
Greenhouse Gas Reduction Measures

• Government can authorize utilities to take measures that reduce emissions by encouraging:
  – fuel switching to electricity or clean or renewable energy
  – natural gas, hydrogen, or electricity in vehicles

Feed-in Tariff

• Intended to create a market for electricity from BC’s renewable resources and:
  – foster innovative technologies
  – ensure competitive rates
  – reduce BC greenhouse gas emissions
  – encourage economic development
  – development of First Nation and rural communities
  – reduce waste

• Consultation open now – closes September 30
Site C Clean Energy Project
Susan Yurkovich, Executive Vice President

About Site C

• Third dam and generating station on the Peace River
• Approximately 900 MW of capacity, 4,600 GWh of energy
• Clean and renewable power for more than 100 years
• Significant economic benefits for communities, First Nations and province
About Site C

- Site C would produce more than 30% of the electricity of the W.A.C. Bennett Dam with only 5% of the reservoir area

Reservoir Area (hectares)

<table>
<thead>
<tr>
<th>W.A.C. Bennett’s Williston</th>
<th>SITE C</th>
<th>Peace Canyon’s Dinosaur</th>
</tr>
</thead>
<tbody>
<tr>
<td>177,300</td>
<td>9,310</td>
<td>890</td>
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Multi-Stage Evaluation

Stage 2 Activities

- Consultations with the Public, First Nations and Property Owners/Leaseholders
- Environmental and socio-economic studies
- Engineering studies and technical review
Stage 2 Key Findings

- Continues to be a cost-effective option for ratepayers
- Project design requires refinement and updating
- Significant capacity to facilitate clean energy sector
- Would create up to 35,000 direct and indirect jobs
- Low GHGs, per gigawatt hour, compared to other options

Next Steps

- Complete updating of historic project design
- Advance environmental and socio-economic studies
- Continue consultation and engagement
  - Regional and local government liaison
  - Aboriginal groups
  - Business liaison
  - Property owners/Leaseholders
  - Public and stakeholders
- Prepare for the environmental assessment process

bchydro.com/sitec
Thank you

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