



Pollution Probe, the Pembina Institute and the BC Sustainable Energy Association

## Maximizing Energy Efficiency and Renewable Energy in British Columbia

Vancouver, March 22 and 23, 2006

### Workshop Notes

### Opening Address

#### **Greg Reimer, Deputy Minister, British Columbia Ministry of Energy, Mines and Petroleum Resources**

The Deputy Minister introduced the current BC energy policy and discussed the drafting of the new Energy Plan, as well as the work of the Alternative Energy Task Force. The motivation for the energy plan renewal was that the previous plan's action areas had essentially been completed. The Energy Plan Renewal will take place in three phases: first electricity and renewable energy; then oil and gas, then transportation and greenhouse gases. It will be much more comprehensive than the 2002 Energy Plan. It will also address skills, training and labour aspects, and it will take a longer-term perspective (10–20 years). The Province is facing several challenges: for example, oil and gas demand is increasing, but production is not. In terms of electricity, a 50 per cent increase in production is needed (last year, BC imported 12 per cent of its electricity) — the Ministry is considering exploring oil and gas in the Interior and offshore basins, as well as using more run-of-river hydro and wind resources. The Ministry of Energy, Mines and Petroleum Resources has a new service plan that emphasizes responsible development of BC's resources. It focuses on the new relationship with

First Nations and on community engagement. The four main themes in the new Energy Plan are:

- conservation, energy efficiency, and clean energy supplies;
- secure, reliable energy supply and public ownership of assets — BC is to become energy self sufficient within ten years;
- energy is to be seen as an economic generator for the province — growing the energy sector will pay for health care and other needs of British Columbians;
- responsible management and development of resource use in BC.

Inputs for the work on the energy plan include the BC Progress Board Report, the work of the Alternative Energy Task Force, and BC Hydro's Integrated Energy Plan. In the past, the Ministry didn't have very strong relationships with communities, but is now undertaking a community engagement strategy in north-eastern BC and has started a dialogue with environmental groups. A forum will be held on March 30, 2006, to which about 30 environmental groups have been invited. The Deputy Minister asked the organizers to make the results of this workshop available to the Ministry for its ongoing work on energy policy.

## Questions and Answers:

**Q:** What is the Ministry's approach to coal bed methane as an energy source?

**A:** The government is considering all options, including coal. It has not yet decided what to do with respect to coal. It may be a resource for the future.

**Q:** Will the government introduce feed-in tariffs?

**A:** I cannot answer that question at this point in time. We will only be able to say once we have developed the BC Energy Strategy.

**Q:** We need to consider that there is grid congestion south of the BC border, and grid capacity is a concern inside BC as well. Will you seek feedback from the various interest groups in BC?

**A:** The Ministry does not have all the answers. So we won't just receive input to consider, but will likely have additional questions coming out of the consultation process. I spoke to Ken Ogilvie earlier, and he promised to make sure that the results coming out of this workshop will be passed on to the BC government. We do not intend to simply hold a press conference to announce what the government has decided. There will also be interaction with the different stakeholder groups.

## Day One: Energy Efficiency

**Welcoming Remarks:** Ken Ogilvie, Executive Director, Pollution Probe

Ken Ogilvie introduced the workshop by welcoming the audience on behalf of the three organisers: Pollution Probe, the Pembina Institute and the BC Sustainable Energy Association (BCSEA). Ken explained that this workshop follows another workshop held in Vancouver two years earlier, and is the third in a series of provincial workshops on green power and energy efficiency, following two workshops held in the Atlantic Provinces and Ontario. He mentioned the 2002 report, *Green Power — A Look Across Borders*, which was the initial document of Pollution Probe's work on renewable energy, and which is available at [www.pollutionprobe.org](http://www.pollutionprobe.org). Much has happened since 2002, when Pollution Probe launched a five-workshop consultation process, which resulted in *A Green Power Vision and Strategy for Canada*, completed in 2004. The idea to support the formation of coordinating bodies in the provinces came up during the workshop series and is being pursued. Another idea came up to form an organization that groups together various environmental organizations in Canada — which became the Canadian Renewable Energy Association (CanREA, [www.canrea.ca](http://www.canrea.ca)). Each CanREA member leads on a different aspect of renewables and energy efficiency.

Ken went on to explain that the energy efficiency section of this workshop is designed to share experiences from various jurisdictions that have been successful in the field. He introduced Pollution Probe staff members, as well as the three BCSEA representatives present and Matt Horne from the Pembina Institute. Ken thanked the Oak Foundation, which has contributed to the renewable energy work of Pollution Probe, as well as the Vancouver Foundation, which also supported this workshop.

**Introduction:** Karen Campbell, Counsel, Energy Policy, Pembina Institute

Karen explained that she joined the Pembina Institute very recently. Her previous experience was mainly in the oil and gas sector, and not in renewables and energy efficiency. The Pembina Institute's work includes research, policy and advocacy. Karen introduced Pembina's other representatives in the room: Roger Peters, Alison Bailie and Josha MacNab. The subject of the first day is energy efficiency and the second day is renewable energy. The outcome from these sessions will be used to inform a public discussion on BC's new energy strategy. It is also the aim of this workshop series to build a national framework on energy. To achieve this, solid input from all jurisdictions is required. BC's revised energy plan will set the stage for the next 10–20 years. The Pembina Institute would like to see more formal consultations with Ministry planners. Karen also mentioned that the BC Progress Report and other reports have set the stage for the energy strategy. She then introduced the morning sessions and handed things over to Josha MacNab, the moderator for the day.

### **Panel 1: Energy Efficiency Experience in Other Jurisdictions**

**The California Experience:** Stephen Hall, Principal, Stephen F. Hall and Associates, California

California is the world's sixth largest economy, with 35 million inhabitants and approximately 55,000 MW of electric generation capacity. Over the past decade, California achieved 12,000 MW of energy efficiency savings, with 50 per cent of this due to codes and standards, and another 50 per cent due to programs.

The California demand curve is flat. The state is very proactive in terms of programs and standards. Take refrigerators as an example: there has been a 75 per cent reduction in average new refrigerator power consumption over the last 30 years. This

reduction occurred even though the volume of fridges increased over time.

Ninety per cent of California's natural gas is imported and 51 per cent of power generation is based on natural gas. Urban air quality is generally bad (ozone/SMOG). California's summer peak consumption is increasing and 30 per cent of existing generation capacity needs to be retired this decade. Energy prices are high: \$1.40/therm, 14 cents per kWh for power.

California's current policy is based on a public goods charge that provides the resources for its energy policy. There are three actors: The California Energy Commission, the Public Utilities Commission (CPUC) and the governor's office. Policy elements include:

- A utility energy efficiency program portfolio;
- Product codes & standards;
- Energy efficiency R&D;
- AB549, the building energy efficiency regulation;
- Voluntary LEED standards — all new public buildings must be LEED Silver certified.

The system benefits charge is overseen by the CPUC. \$300 million is collected per year, which is used to achieve 300 MW of reduced consumption. California codes and standards are grouped under Title 24 (for buildings) and Title 20 (appliances). The Governor's Green Building Initiative requires all government and commercial buildings to reduce energy consumption by 20 per cent by 2015. A report was completed to recommend measures for improving energy efficiency in existing buildings. The result was that energy information disclosure will be made mandatory for homes at the time of sale. The energy research efforts includes both "hard" (equipment efficiency) and "soft" technologies, such as improved housing design.

The CPUC's mandate is to acquire the equivalent of 5,000 MW of energy efficiency improvements between 2006 and 2017. Its current spending is about \$300 million per year. This was increased to \$500 million in 2006 and will grow to a further \$650 million in 2008 and to more than \$700 million per year by 2013.

Between 2006 and 2008, new generation would have cost \$5.4 billion. The energy efficiency investment during this three-year period is only \$2.7 billion (i.e., 50 per cent will be saved due to energy efficiency efforts). The average cost of energy efficiency is less than 2.9 cents per kWh — other options cost far more. California's first priority is energy efficiency; after that, renewable energy, then conventional power generation and then transmission upgrades.

Many programs target building retrofits and new construction. The Energy Star target is to achieve a 15 per cent improved building energy consumption below current practice. The requirement increases after each program cycle (i.e., the building efficiency needs to be increased more and more over time to still qualify). Another significant program is the six-year Super Efficient Gas Water Heater Initiative. Based on the California experience, energy efficiency program "best practice" means that efficiency is treated just like the procurement of new generation sources, and is made the first priority. A public benefits charge guarantees the long-term stability of the effort, and programs are highly segmented and include evaluation, monitoring, and verification of the results achieved. Coordination between programs and standards is required in regular cycles, and targets need to be moved up over time. Innovation allows for the continued improvement of energy efficiency as the programs are extended.

**The UK Experience:** Liz Kelly, Head of Strategic Planning, Homeworks/Eaga Partnership Ltd., UK

The situation in the UK is that the country faces an energy crisis: 38 per cent of power generation is based on natural gas, and 22 per cent is nuclear. All nuclear reactors will be decommissioned by 2020, whereas North Sea oil and gas production is decreasing. A recent 25 per cent hike in natural gas prices means that natural gas now costs 8 (Canadian) cents per kWh (energy), and gas-based power costs 30 cents/kWh. The UK's Kyoto target is a 12.5 per cent reduction in greenhouse gas emissions by 2012. This may be achieved, but not the national 20 per cent reduction target by 2010.

Following the 1970s oil crisis, the government deregulated the energy market. Price caps were

removed in the 1980s, and the 1990s saw energy efficiency emerge as an option to reduce energy costs. Energy prices keep increasing during the present decade. Against this background, energy efficiency efforts in the UK mainly focus on social inclusion and affordable energy — the low-income housing sector attracts a lot of government funding. There are 28,000 winter deaths in the UK each year due to people not heating their homes. “Fuel poverty” is defined as having to spend more than 10 per cent of household disposable income (money available after paying the mortgage) on utility bills. Normally, only two to three per cent of disposable income should be spent on utility bills. The government wants to eradicate fuel poverty by the year 2016. Currently, approximately 20 per cent of the population is affected — 23 per cent of all homes (5.6 million). In BC, about 18 per cent are estimated to live in fuel poverty, according to Statistics Canada data.

There are two main initiatives in the UK: the Warmfront Program is the principal government program, funded with £320 million per year. It is aimed at the fuel poor and targets improvements to heating systems, insulation, compact fluorescent lamps, information campaigns and income advice. The program affects 200,000 homes per year. Second, energy efficiency commitments are made by utilities. This leverages £150 million per year and reaches both the vulnerable “fuel poor” groups (50 per cent of funds) and the “able to pay” with the other half. These programs reach 400,000 homes per year and will achieve a 120 TW reduction in energy demand over three years. Together, 500,000 low-income homes are reached each year by these programs.

Energy efficiency measures are evaluated using a Standard Assessment Procedure (SAP) rating. Improvements under existing programs generally shift a home up 30 per cent on the scale, resulting in about £178 per year in fuel savings. This is equivalent to two tonnes of CO<sub>2</sub> emissions per year, per home, totalling 1 Mt CO<sub>2</sub> per year for the UK. There are also positive health impacts: reduced respiratory disease, heart disease and circulation problems. Falls and other accidents are also reduced. Other immediate effects are housing and income improvements, job creation and industry development. The industry risk is low due

to the availability of long-term funding over five to 10 years.

Demand-side management was shown to be the best and most cost-effective solution to address the energy burden in the UK. The centralised approach was found to work better than administering programs through local government agencies, which turned out to be too expensive and ineffective. There is a mix of public and private sector investment, as well as multi-stakeholder engagement. Utility needs are incorporated into the program, and the focus is on capacity building and the creation of a lasting industry.

#### ***Energy Efficiency Strategies in Canada and USA:***

Alison Bailie, Energy Policy Analyst, The Pembina Institute

A study commissioned by the Western Governors in 2005 found that energy efficiency best practices could nearly stabilise power consumption for the 18 states included. A large number of appliance energy efficiency standards exist both in Canada and in the US, passed by all levels of government. The most successful energy efficiency programs include self-evaluation as part of the process and enhanced collaboration among the parties involved, and are able to retain their staff long-term. Currently, at least 20 states have public benefits funds. The money raised is used both for energy efficiency and renewable energy projects. Sometimes, such funds are “raided” by the government or are used to support low-income households. Most programs target the electricity sector, but some also target natural gas and heating oil consumption. The cost of energy efficiency measures is between 2.3 and 4.4 cents/kWh.

Some states created independent agencies to pursue energy efficiency programs. Efficiency Vermont is such an agency. It was started in the year 2000, based on a contract that stipulates annual energy savings targets that must be achieved. The Energy Trust of Oregon is another example of such an agency.

Some states use Energy Efficiency Resource Standards. These standards function like a Renewable Portfolio Standard (RPS). Several states

have RPS targets for utilities; others have integrated utilities into their RPS. Several governments are leading by example and have set energy efficiency requirements for public buildings. Both state and municipal governments have such requirements.

The key elements of an energy efficiency strategy are that it must have long-term (10-year) goals and regular reviews; at the same time, short-term performance measures lead to tangible results. Collaboration, dedicated funding and staffing are also important. Evaluation, measurement and verification need to be part of any successful program. Programs must have enough flexibility to respond and change based on evaluation results.

### Questions and Answers:

**Q:** What would be the ideal way to maximize conservation in BC? Should BC Hydro's mandate be strengthened, or should we create a new type of organisation, or launch a private sector initiative, or a combination of all?

**A: Liz:** A combination of approaches worked best in the UK. The Energy Saving Trust took over training and standards. Each player needs to work well in its own sector.

**A: Alison:** This is exactly what we will discuss today.

**A: Stephen:** This is the key question! Energy efficiency needs to be decoupled from institutional constraints. We need a new organization that ONLY does energy efficiency as part of a conservation power plan.

**Q:** The Ontario Power Authority's (OPA) supply mix report made projections of future electricity needs based on expected supply and plant retirements. We will need new supply options if we cannot stop the increase in electricity demand. In the past, even low-growth projections still showed the need for new power generation, and the OPA has projected large increases in demand. An ICF report states that we need to gather information on better end-use efficiency data and new trends instead of making projections based on past trends. But if we don't know what's happening, we cannot correctly project future demand. Ontario made wrong projections twice already in the past: forecast

demand increases did not materialize and demand remained much lower than projected. How can we get away from the "new supply" culture? We must refine our projections so we can convince policy-makers about what energy efficiency can achieve. This seems to be the biggest stumbling block for Ontario decision-makers as they can't assess what's really going on.

**A: Stephen:** In California, a LOT of time is spent on market potential studies, etc., to find out what the energy efficiency potentials and costs are. Even without incentives, a 5,000 MW demand reduction was achieved in the 1990s. With incentives, the potential must be huge!

**A: Liz:** In the UK, we are using census data and housing condition survey data to make projections. In addition, data from energy efficiency programs has been collected by Eaga in a central database since the 1990s. At first there was not much funding for this effort. It took 15 years to build a knowledge base for the creation of energy efficiency programs. The important point is that it is critical to have the mechanism in place at the start. Data needs to be collected and evaluated in a single centralized place. As a result of that initial effort, it is now relatively simple to design a program as the data on the housing stock are already available.

**A: Alison:** Hopefully, the data question is not going to hold us up for the next 15 years. Many energy efficiency programs have gathered information from their own evaluations, which could be used.

**Q: Andrew:** Many governments and utilities are investing in energy efficiency. In BC, we are spending the same amount per capita as California does. There are PST exemptions, DSM programs (\$20 million per year), and federal programs, but our demand curve is still going up. Can you tell me what we are doing wrong? Do we just need to regulate how buildings are constructed, is that all?

**A: Stephen:** I would need two hours to explain this. There is a tendency to look at energy efficiency only in terms of providing information and then counting on voluntary action. However, experience shows this only means spending with little result due to

market barriers, problems with access to finance, and the need to help people from the beginning to the end of a project (people cannot all become efficiency experts). California put a LOT of resources into building an infrastructure through Energy Technology Centres (e.g., Howard Street in San Francisco) where industry professionals are being trained, interest is built, and the private sector is incited to create market solutions. The third point is that a high degree of coordination among agencies is required, also involving public interest groups and industry, which creates a constant drive towards innovation and tapping new potentials. Continuous improvement must be part of the strategy, and a high degree of emphasis must be put on evaluation, monitoring and verification to increase the confidence of policy-makers and to improve program effectiveness. Programs are made responsible to deliver targets that are set by government. Calmac (California Measurement and Advisory Committee — [www.calmac.org](http://www.calmac.org)) is co-chaired by utilities, which involves stakeholders and works towards improving energy efficiency programs. A lot of information on program evaluation results and other material is available on websites.

**A: Liz:** People are generally not interested energy efficiency. The most expensive part of delivering DSM is engaging the consumer. Once engaged, the industry infrastructure is needed to follow straight on behind and lead the customer into action. It needs to be easy for people to take the next step. Without that, you have spent a lot of money raising awareness, but little action takes place so demand continues to rise. In the UK, long-term investment in programs aimed at the low income sector takes the risk away for industry — it is attractive for them to invest an element of their business in this sector. These programs become the training grounds for the industry. Contractors learn about new equipment, installation standards, high quality service and customer care. They can then apply their skills to private sector customers. Providing the industry with a relatively risk-free environment in which to invest and build capacity led to the ultimate success of the UK program and ultimately prepared the industry for changes in

regulations and building codes that followed.

**A: Alison:** There should be short-and long-term targets, verification and adjustment. It remains a challenge.

**Q:** Energy efficiency requires long-term funding. Will the funding still be there in several years? There is no independent agency that coordinates the effort. We also need an infrastructure to deliver efficiency programs. What is the structure of the UK Energy Savings Trust? How do you develop the industry infrastructure, such as in San Francisco?

**A: Liz:** The Eaga Partnership was set up as a non-profit distributing company in response to the governments open tender for an organisation to manage its programs. In response to continual competitive tender situations (every three to five years) Eaga needed to change its constitution and is now an employee owned partnership, a social enterprise. Eaga also has a charitable trust. Profits flow into the trust, which then carries out research to addresses issues around energy efficiency and fuel poverty. Eaga's original mandate was to act as a "police man" for industry (i.e., certification, quality control). It set technical standards, quality standards and customer care standards, and still physically monitors five per cent of all the work accomplished through home inspections. Contractors have to re-apply regularly to maintain their status as accredited installers. Within the first year of operation, only 300 contractors were left from an initial 900 that registered with the program. Today, there are approximately 450 — the others did not qualify.

**Q:** I work as an EnerGuide expert. If I submit a report stating potential savings from energy efficiency improvements, these are usually not higher than the cable TV bill. Don't we deprive ourselves of an opportunity due to the low power costs in BC?

**A: Liz:** The cost of energy is indeed a huge factor in sending the right signal to the consumer. In the UK, increases in the rate structure are used to fund energy efficiency programs. Consumers generally respond well to increased rates if you show them how to save money at the same time so the net effect is lower bills, despite a

rate increase. It's critical to cushion low income homes as much as possible from rate increases, using energy efficiency, as otherwise you are making a bad situation worse.

**A: Stephen:** This question also came up in the Ontario context. It was claimed Ontario rates are not as high as those in California, so people would not be interested in efficiency. However, before 2001, California rates were as low as 7–8 cents/kWh — and still we had a lot of energy efficiency activity. An infrastructure needs to be in place to address barriers.

## **Panel 2: Energy Efficiency — Buildings**

**Energy Efficient Buildings: A Plan for BC:** Andrew Pape-Salmon, Senior Policy Advisor, Energy Efficiency, British Columbia Ministry of Energy, Mines and Petroleum Resources

There is no market supply of energy efficient (EE) housing in BC today. We need architects, builders and capacity building. In addition, financing mechanisms are missing. In public opinion, a link is made between EE and leaky condos (i.e., EE is (wrongly) accused as the cause of moisture inside buildings). The government sees itself as a backstop and regulates minimum standards, but the market needs to embrace energy efficiency, then the government can set targets, common practice guidelines, etc.

The BC Building Strategy sets six targets for each of the building sectors. Other areas the government targets include transport and industry energy consumption. The province wants to save \$1.2 billion over the coming 15 years.

Energy efficiency is cost-efficient and should be a no-brainer. So why are we not seeing more of it? It only costs \$3,000 to \$4,000 to make a home energy efficient — so why is there a market failure? The answer seems to lie in higher up-front costs, information barriers, low public awareness, and fragmented design practices. Often, decision-making for retrofits is made in a “panic mode” (e.g., if a water boiler needs to be replaced quickly). It is difficult for renters to influence retrofit decisions, and building owners will want to see an increased value of the building to regain

their investment. Product availability and delivery capacities may present challenges, as do fragmented energy programs without coordination and little public awareness of the environmental and social costs of conventional technologies.

The province of BC considers 30 per cent improved EE in new buildings achievable, and set the target at 25 per cent. Energy Star products are easy to specify and thus are a good strategy to achieve conservation. A market stimulus is provided through PST exemptions, but few citizens are aware of them. Voluntary targets are set for industry associations, utilities, the private sector and educational institutions. Likewise, municipalities are using voluntary targets. Regulation is used as a backstop, making minimum efficiency standards mandatory. The province is now considering regulating heating and building envelope products in BC.

What is the appropriate role of government in the energy efficiency market? To determine this role, the province looks at the choice of instruments and who pays for the improvements:

- Information, capacity-building;
- Market stimulus;
- Voluntary targets;
- Regulation.

When making policy, it is important to consider who benefits from each measure and if there are any equity concerns.

**Energy Efficiency and Renewable Energy in LEED Canada:** Ian Theaker, LEED Program Manager, Canada Green Building Council

The LEED-NC 1.0 standard for new construction was developed by the Green Building Council, which is the license holder for the US LEED standard in Canada. The Council also provides training for contractors and professionals, and is working on a home energy rating system. The Council has chapters in Ontario and BC, and is expanding into other provinces. Green Building Councils also exist in other countries around the world.

A “green” building is defined as having the following features:

- sustainably sited;
- clean, safe and efficient with water;
- energy efficient, renewable, and has low impacts;
- conserves materials and resources (ecological footprint — material selection), and;
- provides good indoor environmental quality.

LEED designated the top 25 per cent section of the building market. It provides recognition and credibility. LEED aims at market transformation. Several municipalities have adopted LEED silver or gold as the standard for their new buildings. There are 2,000 accredited professionals today in Canada. One-third of Canada’s green buildings are situated in BC. LEED recognises innovation, renewable energy, and various other features of buildings through credits in its rating system.

***From Yesterday to Tomorrow – City of Vancouver Strategies for Building Energy Efficiency:*** Sean Pander, Climate Change Project Manager, City of Vancouver

In 2003, the City of Vancouver completed its Climate Change Action Plan. All new buildings will be built to the LEED Gold standards and an emission reduction target was defined for city operations. In 2005, a Community Climate Change Action Plan was completed that foresees a six per cent reduction from 1990 emission levels by 2012. Fifty per cent of Vancouver’s GHG emissions come from buildings. Since the building stock is expected to grow only three per cent by 2012, retrofitting of existing buildings is an important strategy.

Vancouver’s strategy is built upon three main elements. First, the city encourages maximum participation in the EnerGuide program. Experience shows that 50 per cent of households that go through an audit will undertake energy efficiency measures. The Program provides unbiased advice and links in with available incentives (see: [www.onedayathome.ca](http://www.onedayathome.ca)).

Second, the city seeks institutional engagement to align other stakeholders with the goals it set. Finally, the city is working on connecting

improvement costs to property, instead of the owner, such that these costs can be passed on to the next owner in case of a sale. The so-called “Leaky Condos” are targeted for energy-saving renovations. A Corporate Leadership Council was established to engage the business world, and regulations will cover some more aspects of retrofitting houses.

For new construction, Vancouver is already a leader: Ten per cent of Canada’s LEED buildings are in Vancouver. The city has a high concentration of professionals, and the 2004 energy bylaw was updated to be the most rigorous energy bylaw in the nation. The city is exploring regulatory opportunities for emission reductions, supports federal initiatives and works with detached house developers.

Another strategy is to build the infrastructure to enable emerging technologies. The planning team is looking at neighbourhood (decentralised) energy utilities for the Olympic Village in Vancouver, exploiting low-grade energy for heat. A classical geo-exchange system, biomass and a sewer heat pump are being considered. Such measures would lower GHG emissions by 50 per cent.

#### **Questions and Answers and Comments:**

- Q:** Will we see a LEED standard for building retrofits, since 97 per cent of the stock is made up of existing buildings?
- A: Ian:** We are looking at work undertaken in the U.S. on this issue. In the next two years, we may get to existing buildings, but currently we concentrate on the standard for new buildings.
- Q:** How do you determine thresholds for giving credits for renewable energy systems and so on in the LEED evaluation system, and how do you balance energy benefits against other green benefits, such as lower water consumption?
- A: Ian:** LEED uses a checklist to identify these issues. It’s not quantified very well, but we want to start using life-cycle analysis in the future. A number of points need to be better aligned with the ecological footprint concept. Over the coming years, new draft guidelines will be issued and we will address how to measure each “green” aspect.

**C: Sean:** Vancouver wants to explore the use of local improvement charges to raise funds for energy efficiency measures. The questions we need to deal with include, how do you attach up-front costs of energy improvement measures to the property, and to the property tax regime? What happens if someone defaults on the improvement charges? It's a lot of work, but we're making progress.

**Q:** Policy instruments apply to utilities and the corporate sector only, not to government itself. Which aspects can government address and which ones should be dealt with by other parties? Will the province set clear targets for renewable energy and energy efficiency?

**A: Andrew:** There may be a role for government in several areas; for example, to create a provincial agency for professional training and to develop specifications for installers. The BC Safety Authority can also specify the size and types of equipment. Voluntary initiatives include the One-Tonne Challenge and EnerGuide. The government can stimulate the market through PST exemptions. Governments can also fund buildings for schools and other institutions, and can influence investment decisions in that way.

**Q:** We not only need an agency, but also long-term financing. The government needs to recognise that training is required and that it needs to take action, not just state the need.

**A: Andrew:** BC already has a charge that is levied through distribution utilities. Do we need to create a new bureaucracy in BC to collect public benefits charges?

**C:** What we have now in BC is not really a wires charge.<sup>1</sup>

**A: Andrew:** Encouraging municipalities is very important. A Community Charter can give

municipalities some flexibility in meeting their goals and objectives. Both municipalities and the province have jurisdiction over buildings. The province encourages municipalities to experiment with these mechanisms. For example, many municipalities now require buildings to be equipped with 6l/flush toilets; this was a voluntary feature before.

**C:** Communities with less financial capacity will be left behind, while others steam ahead. We need to make sure there is equity among municipalities.

**A: Andrew:** The government's program on Energy Action in Municipalities will address capacity issues.

### **Panel 3: Energy Efficiency and DSM – Equipment, Appliances, and Lighting**

**DSM at BC Hydro:** John Duffy, Manager, Economic Analysis and Legislative Strategy, Power Smart, BC Hydro

Electricity consumption in BC is growing at a rate of 1.4 per cent per year. Adding new generation capacity is costly and poses environmental challenges. We are now in year four of BC Hydro's 10-year DSM plan. The goal is to avoid one-third of forecast load growth (3,600 GWh/yr) through energy efficiency. So far, the results show that the savings achieved are above target (1,900 GWh/yr, equivalent to a 250 MW power plant) whereas the costs are below target. Achievements include a fivefold increase in compact fluorescent lamps (CFL) and a tenfold increase in LED traffic lights (nearly 100 per cent now), the replacement of 80,000 old refrigerators and the increased use of LED Christmas lights.

BC Hydro's residential programs target CFLs, refrigerator buy-backs, seasonal LED lights, New Home Programs (efficient insulation and lighting), renovations, variable speed furnace motors, and fuel substitution (mainly on Vancouver Island, for conversion from power to natural gas). Business programs include Power Smart energy retrofits and load displacements (for large industrial customers) to enable self-generation of electricity (for example, biomass power from wood waste).

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<sup>1</sup> **Q:** What is a "wires" charge?

**A: Penny Cochrane, Willis Energy Services Ltd.:** Where does the money for DSM come from, since there is no public benefits charge in BC? What is happening today is simply that utilities look at their avoided cost and finance energy efficiency out of their regular budgets. Introducing a system benefits charge would allow for funds to be passed on to a new DSM agency, which would use them for programs.

There are also product incentives for equipment replacements, such as sensors or LED lights for smaller business customers. BC Hydro encourages “High Performance Buildings” in new construction, distributes CFLs for free and has a traffic light LED initiative.

The utility also pursues some promotional activities, including advertising and school programs and materials. The Power Smart Alliance is a quality assurance initiative that engages accredited professionals to work on projects that are supported by BC Hydro. The E.Catalog database of energy efficient products helps consumers make purchasing decisions. Home Energy Profile energy audits help identify opportunities for energy efficiency retrofits. BC Hydro is also involved in legislative and standards development.

Fifteen long-term (20-year) goals have been defined by BC Hydro, one of which relates to energy efficiency: “to develop and foster a conservation culture in BC that leads to customers choosing to make a dramatic and permanent reduction in electricity intensity”. Strategies to achieve the goal include leading by example, advertising, giving price signals to consumers, DSM programs, innovation in technology and practices, the promotion of a regulatory environment that helps DSM, and influencing the development of policies and standards.

DSM has been established as a recognised and viable option in BC. The Power Smart brand is firmly established in the province. DSM is setting the stage for changes to energy efficiency regulations in BC (for industrial motors in 1994; for windows in 2008).

Some challenges remain, such as the need to explain energy efficiency to BC Hydro’s employees and to educate them about the business case for energy savings measures. Also, low electricity bills are an obstacle to get energy efficiency on customers’ agendas. Another challenge is getting agreement on the appropriate perspectives with which to evaluate DSM: economic efficiency and equity. Each perspective leads to different decisions.

### **DSM at Terasen Gas:** Mark Hartman, Terasen Gas

Terasen Gas is a utility with 900,000 customers throughout BC. It has had DSM programs in place since 1991, with all programs subject to standard-utility cost-benefit tests. Terasen Gas has a number of programs in 2006:

- The new construction program provides builders with a \$500 incremental cost to install a high efficiency furnace instead of the more common mid-efficiency furnace. On Vancouver Island, the incentive is \$1000.
- The ENERGY STAR heating upgrade provides a comparable incentive to the retrofit market, with a \$350 incentive for choosing an ENERGY STAR furnace or boiler.
- The Efficient Boiler Program provides incentives for larger commercial-sized condensing and near-condensing boilers in both the new construction and retrofit markets.
- Destination Conservation promotes energy education in schools.
- Terasen provides free energy assessments in high-use customers.

Over the past six years, Terasen’s DSM programs have engaged more than 100,000 participants in BC. It uses literature, radio ads, the World Wide Web, bill inserts, workshops, partner channels and TV advertising to promote energy efficiency. It also engages in training of contractors, building operators and mechanical engineers. Terasen Gas also conducts research through surveys, case studies and technology evaluations. The utility has a community outreach program and partners with governments at all levels on energy efficiency.

If Terasen increased the level of DSM expenditures, its recent Conservation Potential Review found the following savings would be achievable by 2015:

- Direct natural gas savings: 10 million GJ/year
- Fuel substitution: 3 million GJ/year (electricity savings of 300 GWh/yr)

The utility is also now considering introducing a new home program, a high-rise program, a number of new programs for the commercial and manufacturing sector, community-based activities, and low-income customer programs.

From past experience, the keys to success with such programs are: consumer education, training of professionals, involvement in community energy planning, partnering with third parties like government agencies, and consistent, long-term programs.

**Maximising Energy Efficiency and Renewable Energy in BC:** Penny Cochrane, Senior Consultant, Willis Energy Services Inc.

FortisBC is an integrated utility with an annual system peak of approximately 720 MW. Its service area is in BC's Southern Interior. FortisBC's resource portfolio includes DSM as the least-cost resource available to meet customer needs. PowerSense programming addresses all customer sectors and is designed to achieve improvements in energy use profiles (i.e., how and when customers use energy). While offering programs and products to the large number of small energy users, PowerSense also targets large energy users. Energy savings projects for large energy users, on a per kilowatt-hour basis, have lower transaction costs, are more visible, and may achieve savings more quickly. The annual PowerSense budget is approximately one per cent of annual electricity sales revenues. DSM programming has included continuous consumer oversight. FortisBC has had the benefit of an active DSM stakeholder committee since the late 1990s.

Energy efficiency savings by themselves are not enough to incent customers to act; savings come as a result of helping a customer to incorporate energy efficiency in what the customer has already decided to do. Helping customers by increasing the energy efficiency of their projects results in energy savings. The current PowerSense program targets lighting, HVAC, envelope treatment (windows, insulation), and process improvements (motors and industrial energy systems such as pumping, air compression and conveyancing). In setting up programs, it is important to identify the right target group, the decision-maker: is it the owner, consumer, operator, or bill payer? Confusion in this communication area often results in limited DSM program participation and customer inaction.

To achieve program success, the process needs to start with the identification of energy savings opportunities. As the next step, it is important to provide engineering resources to customers so they have the help necessary to implement projects. Assistance with financing is crucial, as is monitoring and evaluation of project performance and energy savings. Successful projects are used to promote similar measures to customers who have not yet participated.

The stakeholder committee, known as the DSM Advisory Committee, includes representatives from the customer base and the service regions. Under performance-based ratemaking, the committee oversees the incentive mechanism used to calculate the incentive the utility receives when annual targets are exceeded, and provides input for program design and for overall program direction. The stakeholder committee has had a significant part in the success of the PowerSense program.

#### **Questions and Answers:**

- Q:** What kind of policies do you think are needed in BC? Should we create a stand-alone organization for energy efficiency?
- A: Penny:** It is not clear that an independent agency would be a more cost-effective approach to acquiring energy efficiency savings. The focus should shift to a resource management approach. It should include power, gas and water use when designing DSM programs.
- Q:** The Ontario Energy Board created a shared savings mechanism for utilities to reward over-performance in relation to energy efficiency targets. Would this be a good model for BC? Also, concerning the recycling of CFLs, which contain mercury: Canada only recycles seven per cent of these lamps versus 24 per cent in the U.S. Can you speak to that?
- A: John:** There are currently four million CFLs in the BC Market. My colleagues are working on the recycling structure for these lamps. One program was delivered through light bulb retailers, but they were not very comfortable with taking over the recycling. Future

technology developments will reduce the mercury content in CFLs.

**A (from the audience):** Lost revenue is an issue for utilities. We hope that utilities in BC will not insist on the same type of compensation as those in Ontario.

**Q:** What about climate change within this context? Can we use pricing to encourage change? Why would we not use information about the future (such as climate change impacts) to create desirable trends?

**A: Penny:** Power prices in BC are low. While many think that the right price signals will encourage people to act, there is no direct correlation between energy efficiency and pricing. Utilities only have limited resources, whereas we need to make a monumental effort to get things moving to address climate change.

**A: John:** We have a group at BC Hydro that devises information campaigns. Their objective is to motivate people, and so far they've decided that warning people about climate change if they don't conserve energy isn't the most influential message. Changing the course of the "big ship" of society will take time.

**A: Mark:** Just information is not always enough to bring about change. As an example, even some people in this room who understand the importance of energy efficiency still drive SUVs and do not always act in an energy-efficient manner. Utilities alone cannot bring about a complete change in the way that consumers behave.

### Results from the Discussion Groups:

*Questions to be answered:*

1. *How do we set the right targets for BC?*
2. *What type of institutions do we need?*
3. *What are the roles of different stakeholders?*

**Table 1:** The province does not articulate the scientific challenges, such as climate change and peak oil, enough. It should mandate targets for aggressive GHG emission reductions, as well as for NO<sub>x</sub> and SO<sub>x</sub> emissions. The transportation sector needs to be included. To achieve the goals, the building code needs to be improved, which is a role for the province.

BC lacks a body with enough authority to take on energy efficiency. There is a need for municipal and sectoral input. There should be a Strategic Planning Group, a body like Alberta's Climate Change Central, which has an obligation to be consultative and that engages all levels of government. Utilities could improve their revenues through efficiency programs. The DSM investment of utilities is still low and there needs to be a dramatic shift. Utilities cannot do this for customer satisfaction purposes; they need other incentives and reward mechanisms.

**Table 2:** A different rate structure may incent consumers to become more energy efficient. For example, the first 90 per cent of energy could be offered at the market rate, the last 10 per cent at a premium. BC needs to talk about stable energy supplies and must move towards renewable energy sources.

A total review of the building code is required in order to include best energy efficiency practices. Different sections of the Code are currently not linked (e.g., air conditioning occurs in one area and refrigeration in another without connecting the two). Builders need to be trained in these fields so that consumers don't have to worry about such issues.

**Table 3:** Currently, there is not enough activity in BC on energy efficiency. We are missing institutions to take over this task, or at least existing institutions are not sufficiently active. The group is not sure there is more than one person working on energy efficiency within the Ministry of Energy, Mines and Petroleum Resources. However, there was no consensus as to what institutional change is required, and whether a new or existing body should take over this task. The body could also coordinate activities in the renewable energy sector.

We have heard that current provincial and utility targets are met at lower costs than predicted, so more can surely be done. For example, there is a lack of research on energy efficiency. A mechanism should be created that analyses the progress made each year and helps set new targets. It could be a coordinating body or a clearinghouse — but the

group had divergent views on which stakeholder groups it should coordinate.

The body could advocate policy change or simply gather data. Since the cost of energy is low, administrative costs may discourage action whenever the savings are small. The body could be part of government, or a hybrid institution with a trust fund and defined deliverables that it must produce on a regular basis. Its tasks could include training, providing incentives, data gathering, monitoring and verification. It could be a new NGO that studies progress, sets targets and functions as a watchdog. It could be part of the Pembina Institute, or of the auditor-general's office.

**Table 4:** Not enough is being achieved in terms of energy efficiency in BC, and the institutional structure seems insufficient. Provincial targets need to be challenging, not easy to achieve. We need both long-term and short-term goals: a long-term goal for all of BC over 15 years, and short-term goals for each sector.

An energy efficiency agency should be disengaged from utilities and must link up with municipalities. New Brunswick is taking this approach. The agency should also monitor and mandate the goals for various sectors.

#### Questions and Answers and Comments:

**Q:** Should energy efficiency management be taken away from utilities? We should not forget that it is being handled very well by utilities. Still, there is a lot more that can be done. If it becomes a new, independent body, while utilities concentrate on providing electricity services, would they be in competition with the new agency?

**A:** I don't agree that utilities have done a great job so far, but agree we should not create another organization that competes with them. It is not so much a question of who is doing it, but what the financial side looks like. The California public benefits charge has enabled the state to do much more than what was achieved in BC.

**A:** The UK situation and other examples, such as Oregon, have shown that this need not be a

concern. A certain amount of money is collected from consumers, and then utilities can either undertake DSM activities themselves or contract it out to the Oregon Trust.

Government oversight prevents abuse of the system. However, even with incentives, there will be a limit to what can be achieved by utilities. That limit is defined by the total resource cost test. Maybe this is a reason to take it away from utilities.

- C:** Utilities could be made to include other criteria than cost, such as environmental concerns.
- C:** Utilities must not only look at what can be achieved at the lowest cost. A system benefits charge can be promoted by convincing people of its benefits and by making it a long-term measure.
- C:** To set targets, it needs to be determined what is reasonable and why. Energy is an international question. Changes in pricing will have impacts on targets. The world will have changed in ten years. The oil depletion scenario will be a major impact for target-setting (it is 46 years away). We are now in a transitional period. Germany has set a 60 per cent energy efficiency target over the next 50 years — we need the same kind of long-term thinking.
- C:** Price volatility already started to occur last fall: natural gas prices went from \$6 to \$50 and then back to \$7. Why would one buy a boiler or heating that uses fossil fuels with this price volatility? Public policy should steer away from fossil fuels in the long-term. If international prices get too high, we will all be affected. Last year's price volatility shows what lies ahead (i.e., long-term energy solutions cannot be based on fossil fuels).
- C:** The BC Energy Plan will look at three areas: the electricity sector is first, then oil & gas, but it does not look at the other sectors. Decisions made now will have impacts on energy efficiency as well. These issues should all be integrated!
- C:** The Deputy Minister stated he is looking forward to getting the results from this workshop. Andrew Pape-Salmon even asked to be given some of today's results this evening. We should come up with a message that the

group wants to communicate to the Deputy Minister.

C: This morning we started out with a look at what is happening in other jurisdictions, the BC building sector, etc. The transport sector was left out because of time constraints. When we went into groups this afternoon we started to think long-term. Targets should not be set along the lines of a one per cent reduction per year, but as 40–50 per cent in 20 years. Even with the micro-targets, the current institutions were seen as lacking, and new ones are needed for managing both short-and long-term targets. We need new institutions on energy efficiency in a BC context — something needs to change. In our discussion, we did not reach agreement on how this would be funded, but energy planning needs to consider local, national and global impacts.

**Closing Remarks:** Ken Ogilvie, Executive Director, Pollution Probe

CanREA has representatives from most provinces as members. It has divided the issues of renewables and energy efficiency among its members. The group will meet again in April to take stock of the various workshops to create a national renewable energy and energy efficiency strategy with regional inputs and in an international context. We will then take that input to the federal government. In addition, CanREA wants to influence the Council of Energy Ministers, which seems to be the only country-wide forum in Canada to move forward on these issues. Thanks again to all who helped organise this day!

## Day Two: Renewable Energy

**Welcoming Remarks:** Ken Ogilvie, Executive Director, Pollution Probe

Last year was a record year for wind power globally: the industry saw a 43 per cent increase in turbine installations. The U.S. now has nearly 10,000 MW installed, Germany has 18,000 MW, Spain 11,000 MW. Canadian wind power capacities increased by 53 per cent, to 683 MW, and another 3,000 MW of wind farms is under development. Today's workshop looks at BC and its options in terms of renewable energy. One speaker panel will discuss power generation options, including geothermal, wave and tidal options. The second panel will look at non-electricity options and cooperative approaches.

**Welcoming Remarks:** Guy Dauncey, President, BCSEA

The British Columbia Sustainable Energy Association (BCSEA) was launched two years ago. One of its main concerns from the beginning has been climate change. According to James Hansen, NASA's leading climate expert, the last time temperatures were 3°C temperature higher, sea levels were 25m higher. California has set a target to reduce its GHG emissions by 80 per cent by 2050. Sweden has set a goal to end its dependency on fossil fuels by 2020. The U.S. army is very concerned about peak oil. It is becoming more and more urgent to look at energy substitution. Electric vehicles may put additional demands on the existing power supply system.

What is our potential for using sustainable energy in BC? We assessed the total, in addition to our current power usage, to be 84 TWh — with a job potential of 400,000 over 30 years. What is the best policy to get there? The answer: the advanced renewable tariffs. Since Germany introduced them, 135,000 new power generators have come on-line. Ontario just announced its own tariff system for systems under 10 MW, known as the Standard Offer Contract: 11 cents/kWh for wind, microhydro and biomass, and 42 cents/kWh for

solar PV, with contracts in place for 20 years. The impact on consumer bills is only 0.0005 \$/kWh. Cheap power has been an obsession in past years; we need to break out of this way of thinking.

**C: Ken Ogilvie:** One message should clearly come out of this workshop: don't be afraid to change your approach and learn from others.

**Smart + Green = Brilliant:** PS Reilly, CEO and President, Athena Institute and Lead Consultant for the Alternative Energy and Power Technology Task Force

The Athena Institute concentrates on technologies that are market-ready, but which have not yet penetrated the market. Its work includes market development, "Smart, Green and Brilliant" technology ventures, early technology development, financing, policy and the growth of innovations.

BC's Alternative Energy and Power Technology Task Force has a mandate to develop an Implementation and Resource Plan. It works with stakeholders, examines best practices around the world, refines BC's vision on alternative energy and builds a defined set of initiatives, as well as gives clear recommendations to government and industry. An informal submission of recommendations will be made in September, and a formal report will be submitted to the B.C. government in December 2006.

The Task Force's Sustainable Energy Vision for BC is: "BC will continue to enhance its energy system in a progressive and practical way to ensure the longevity and quality of life in the region, and will leverage these investments to grow the Sustainable Energy Sector and provide integrated solutions to the world."

Many influences converge on the energy sector today, such as climate change and energy security issues, which are causing industry growth. Advances in energy are creating new options for how we can generate, deliver and use energy.

Energy poverty, energy security, etc., are real problems that are facing the unprepared.

The sustainable energy cluster in BC already has about 3,000 employees and creates revenues of more than \$700 million per year. There is potential to more than triple this sector over the coming decade, creating growth among developers, technology providers and service providers.

New technologies need to respond to a market pull: what do people need? A sustainable energy sector growth strategy should target BC issues that have world-wide markets, including remote energy, sustainable urban practices, smart urban transport, smart grid and large-scale green power production.

For large-scale power production, the markets are expanding for renewables, but the path is still difficult. To build a strong resource and community of developers and technology solutions locally, integration problems with large hydropower need to be solved so that we can leverage this resource — but in a way that recognizes the risks. There are lots of domestic opportunities, but export is the real dimension for technology providers. BC can become a net exporter of green power.

For Smart Grid, we can create a smart and green electricity grid: the Pacific Northwest is already seen as a good place to develop and apply emerging technologies. They allow leveraging more from existing assets, making the system operate in a smarter way. The grid needs to enable renewables and distributed generation, and the integration of generation with end uses.

For Remote Energy, diesel-electricity in remote grids is expensive and puts lots of emissions into the air. But remote energy is more than electricity. Integrated remote energy systems must address all energy needs at the same time, including heat and transportation. Energy efficiency, microgrids and other innovations are key elements of remote energy strategies. The University of Victoria is actively researching these areas. There is a large opportunity worldwide to apply such solutions.

For Smart Transportation, BC needs to expand from its current perspective on hydrogen and build a portfolio of technologies and solutions. BC needs to think about Smart Transportation: for example, hydrogen research can contribute to creating a cluster for supporting automotive technologies for smart transport in BC — not necessarily car manufacturing.

For Sustainable Urban Practices, urban populations are increasing worldwide. Sustainability opportunities exist in areas such as building design, community design, building materials, energy efficient building systems and distributed/urban generation. The 2010 Olympics, the GLOBE conference series and other initiatives all take place in BC and can be harnessed to promote these ideas to a worldwide audience. These are great opportunities to bring buyers and sellers together.

Building industry clusters enables the commercialisation of ideas and the creation of a growing industry. Canada is not in a position to offer cheap labour and large domestic development opportunities, but it can be a place where innovative companies can prove their products and get to world markets with a higher probability of success. There are a lot of people here who think in terms of sustainability — this is the image that must be created for BC as a region to attract like-minded people. With a long-term government commitment and local markets that allow for technology demonstration, local companies can access world markets quickly. Longer-term, a coherent innovation strategy in the region will provide a continuous edge for lasting industrial leadership.

To make sustainable energy a mainstream phenomenon in BC, four initiatives are recommended:

1. Leadership through policy commitments with defined targets and accountability, an economic development strategy with clear goals and regular progress reports, and the establishment of a Premier's Council on Sustainability as a coordination point.
2. Commercialization through the creation of a sustainable energy project, the creation of a sustainable energy fund, and performance

targets for the network to enable industry to develop and deploy technologies.

3. A growth initiative that enables industry to reach world markets and establishes a reputation for BC as a sustainable solutions provider.
4. An innovation initiative that invests in training and awareness, and establishes Centres of Innovation where necessary.

IT'S MORE THAN INNOVATION — IT'S MARKET TRANSFORMATION and involves policy, education, building networks, planning and more.

Ultimately, this will happen in some form or another. A group of leading nations will lead and others that follow. The “enlightened” will lead, and then the greedy, and finally the fearful will follow. The new energy legacy will be the most critical one we will leave behind as energy assets are very long-lived.

#### Questions and Answers:

**Q: BCSEA:** If market transformation is both a social and cultural issue, where do we need to start to bring it about?

**A: PS Reilly:** Well, it has already started; long before by grassroots efforts of groups like yours and by others who talk about this as important before others see it that way, because there are no bad ideas, only bad timing. The key element to getting the timing right is achieving an alignment of interests and some critical momentum. You can start with grassroots organisations, business people or policy-makers. As I mentioned, often grassroots efforts have been in place long before the timing is right. Then significant things happen at the business stage, followed by policy-makers jumping in to help move businesses and individuals along even further. So if we've already started, then what next? In BC, we are now trying to align the interest groups across those sectors. As for where we start now, I'd argue it is time to focus on the commercial side of the equation and get businesses incented. Policy and business leadership need to see this sector as a growth opportunity and acknowledge it as an area of focus for the region. The sector needs to have

economic development goals. Ultimately, for this industry and where we are now, the real key to lasting success in market creation is to produce commercial energy. However, a grassroots effort needs to happen at the same time to help shape the environment that businesses will respond to. We are entering an exciting era in which businesses will jump on board. Here's a theory to ponder — businesses go through ideological waves: first people spoke about company structure, then it was quality management, then “company culture”, and for the last decade we've been focused on technology. My prediction going forward is that we'll put the sustainable back in sustainable competitive advantage, but that companies will put their own twist on it and use it to generate more value from the network of markets that they operate in. Once firms believe that this is the next source of competitive advantage — either for differentiation or to reduce costs, then you'll have them sending those messages out all the time. When people are bombarded by this from many different fronts, it will bring around others that grassroots efforts haven't reached yet and will bring more policy-makers on board. It becomes self-feeding.

**Q:** We are talking about maximising renewable energy: what do groups like ours need to do to make it happen?

**A: PS Reilly:** For renewable energy, much of it comes down to policy. The simplest way to maximize renewable energy is to put in place RPS standards that say that 100 per cent of energy needs to come from renewables, and if you can pressure government to put this policy in place then you have achieved your goal. But this approach isn't generally economical or politically possible, and in fact doesn't always lead to an optimized energy system. Maximizing renewables in a region is about getting the economics right, and having groups like yours align around a framework that puts renewables, traditional resources, energy efficiency and other approaches in context, rather than promoting one of those as the silver bullet at the expense of another. If advocacy groups got enough alignment with each other to have a consistent message, then

we can expect some movement. Right now, policy-makers get different messages from different groups (energy efficiency or renewable energy people, etc.) and they sometime explain their own inaction away by pointing at all of the mixed messages. We need to align ourselves into a coherent framework that leverages the various benefits from doing this right, instead of competing with each other over who is “most right” about the issue.

## **Panel 1: Maximizing Green Power for Electricity Generation**

**Introduction:** Brenda Goehring, Manager, Policy and Business Integration, BC Hydro

In looking at the theme of maximizing BC’s renewable energy options, as discussed yesterday, we need to first lower our demand and be more efficient with our resources before we look at advancing new resources. Then, in looking at new power options, to set some of the context for this panel, it’s important to recognize that we have a lot of resource potential in BC, which can be a blessing and a curse as it creates the desire to ensure we look at the best ways to advance renewable supply in a sustainable manner, but it also creates debate about which options to pursue. Other regions don’t have that luxury.

In BC, we are guided by the BC Provincial Energy Plan of 2002 that set the context for electricity, oil and gas development. An update to this plan is underway and will be released this year, and that coupled with the Premier’s Alternative Energy & Power Technology Task Force we just heard about will provide further guidance for BC in its future energy decisions. This is what is happening at the provincial level, and I know many people are engaged in those discussions, but I think there are other policy influences nationally that we also need to consider taking advantage of that I’ll raise here. There is the new standing energy offer in Ontario that people are interested in understanding its evolution. Pollution Probe has been conducting workshops the past few years to broaden the national debate, and there are also groups that we’re engaged with, such as the Clean Air Renewable Energy Coalition which partners to

gather industry, developers and ENGOs to look at mechanisms to support the further penetration of renewables with the federal government through initiatives like the WPPI and RPPI. These are examples of how we can take the ideas we hear in forums like this and channel them at various policy levels.

I think another facet we have to raise is that having the discussion in these rooms is important, but we also need to involve and engage other stakeholders, First Nations and the public in these discussions. As PS Reilly just noted, our greatest hurdle is coming up with a single voice to cut through all the independent perspectives to affect the change we wish to see and help focus policymakers on the right issues and approaches. When BC Hydro was engaging on our Integrated Electricity Plan, we sought to create a discussion on customer needs going forward, the options we have, the tradeoffs and the costs. We think it is a very important topic, but to the average person, it isn’t top of mind, and it’s up to all of us to collectively find ways to make sure that it is.

So, now I’m going to turn to the members of this panel to share some of their ideas on how we can maximize the potential for renewable energy projects in BC.

**Geothermal Energy:** Craig Aspinall, Manager of Public Policy, Western GeoPower Corp.

U.S. geothermal power generation capacity is now at 2,800 MW. This makes the United States the largest geothermal power producer in the world. Most capacity is concentrated in California; it represents five per cent of the state’s power generation and is slated to increase by another 50 per cent over the next six years.

In BC, geothermal energy has not been developed yet. BC Hydro spent 30 million dollars in the 1970s to explore it, and drilled three test holes in the 1980s and early 1990s. In 2002, the Green Energy Study identified 16 geothermal sites in BC, the six largest of which were rated at over 1,000 MW of capacity, or 9,000 GWh of annual production potential. The Meager Creek site could yield 200 MW of power. The temperature results from the beginning of this decade for the Meager

field were encouraging. A geothermal developer looks for high temperature, ground permeability, and high volume flow. At the moment the developers are not sure if they can reach the full 100 MW of capacity planned for the first phase; it may be a 50 MW or even a 20 MW facility in the end. Western GeoPower is also working on several options for transmission line routing. The power price for the future geothermal plant is estimated at 7.3 cents/kWh.

**Solar Electricity – Opportunities for PV in BC:** Eric Smiley, University-College Professor, Malaspina University and CanSIA Representative

Today, about 1 MW of PV panels is installed in BC. The potential for residential PV installations is 280 MW on rooftops, whether building-integrated (BIPV) or not. Currently, there is no cost advantage to integrate PV modules into roofs. The cost of electricity from PV panels is about \$1/kWh. Commercial BIPV systems can produce electricity at a cost of 44 and 68 ¢/kWh. There is less sunshine in BC than many regions in the US, so the cost is somewhat higher than the US\$0.22/kWh figure one may read about for grid-tied PV. The amount of installations is also reduced, increasing per-unit costs. The potential for remote communities is difficult to estimate, but diesel electricity cost in these areas lies between 50¢/kWh and \$1.50/kWh. This is still the largest market in Canada today.

There are no technical barriers to the use of PV. However, a lack of familiarity with the technology, high capital costs, low conventional electricity costs, difficulties to leverage financing (Does the system still work after 20 years if the cost is rolled into the mortgage? What if the client defaults on his payments — is there any residual value if the PV panel is repossessed?), and short-term thinking (i.e., lowest-cost thinking) are serious barriers to its deployment.

Overcoming these barriers requires a cost reduction and easier borrowing conditions. BIPV can improve economics because it displaces other building materials, inducing cost reductions. Updating the Building Code and creating a larger market through feed-in tariffs will also support PV. Finally, some “myths” need to be dispelled: BC is

not “solar energy poor” - Vancouver gets more sun than Tokyo or Hamburg! Edmonton’s insolation is close to that of Los Angeles.

**Renewable Energy in BC:** David Kiess, Manager of Project Development, Run of River Power Inc. and IPPBC Director

Ontario has just introduced “the most progressive renewable energy policy in North America in two decades”. The Advanced Renewable Tariffs are a good example for BC to follow.

The Independent Power Producers of BC (IPPBC) started in 1991 — it now has 230 members. It represents the following renewable energy technologies: run-of-river hydro, biogas, wind, geothermal, solar, biomass and ocean energy.

BC’s electricity generation portfolio is made up of 80 per cent by BC Hydro, 11 per cent by self-generators and nine per cent by independent power producers (42 sites). In 2001, BC became a net importer of electricity, and natural gas prices increased. A government change then brought about a turn in energy policy. BC Hydro has issued the fourth call for tenders, with a preference for clean energy sources. There are separate application streams for projects under 10 MW. Contract awards are expected for August 2006. Another call for tenders was announced for 2007.

David showed slides of a number of small hydro projects in BC. In general, they take 1.5 years to develop, two years to build and then they can be operative for at least 40 years. Wind prospectors are also active in BC, although no project has been completed yet. Other renewable energy sources used in BC today include landfill gas (Delta Landfill) and biomass, such as the 60 MW Williams Lake generation station.

**Maximizing Green Power for Electricity Generation – The Ocean Power Opportunity:** Chris Campbell, Executive Director, Ocean Renewable Energy Group

The Ocean Renewable Energy Group (OREG) has industry, government and academic members. Canada has massive ocean energy resources on all three coasts, affecting eight provinces and three territories. Ocean energy has a better energy

density than most other renewables. For ocean energy, Canada could be what Denmark has been for wind power technology. The federal government is working on an ocean energy atlas for Canada to highlight the potential for these technologies. OREG's target is to achieve 25,000 MW of installations by the year 2025. As many as 10,000 jobs could be created in an ocean energy cluster.

To see this happen, a policy that diversifies energy resources is required. Interconnection standards, power purchasing agreements and a bridging of initially higher prices for ocean energy can help overcome initial barriers. There should be a BC Hydro request for proposals targeted towards pre-commercial technologies for demonstration purposes. A development initiative for emerging energy options is needed. BC should join other provinces to develop ocean energy technologies. A streamlined R&D effort would avoid parallel work and should lead to the creation of a Center of Excellence on ocean energy in BC. Facilitation of the regulatory process, royalty holidays, grants, accelerated depreciation and green power credits can help the sector to achieve commercial viability.

#### **Maximizing Green Power for Electricity Generation**

— **Wind Energy:** Garry Hamilton, Environmental Assessment Project Manager, Hemmera Envirochem Inc. and CanWEA Representative

CanWEA was started up several years ago to kick-start the industry in Canada. It is now working towards sustainable growth, although in BC the industry is still in its kick-start phase. Critical policies and mechanisms to encourage wind power development include the federal Wind Power Production Incentive (WPPI), accelerated depreciation provisions (CRCE), land use policy, and provincial procurement targets. The BC wind resource is large, and several companies are currently proposing projects. Wind power provides environmental benefits, rural employment and moderate electricity costs, and its generation profile aligns itself well with BC's winter peak consumption pattern.

BC has no provincial target for wind power, unlike other provinces and the federal government. BC

Hydro has a voluntary target to source 50 per cent of new electricity generation from clean energy sources. Five Gigawatts of wind power potential were identified in BC. Wind power can easily be combined with large hydro as a backup source, and offers extra opportunities through green power export markets in the U.S.

BC Hydro's 2006 RFP requires a monthly firm bid with a liquidated damages provision for failure to supply. This puts intermittent technologies, such as wind, at a disadvantage, increases electricity costs and reduces the number of market entrants. A streamlined permitting process in BC, which is much more laborious than, for example, in Manitoba, also hampers wind power development. Both federal and provincial reviews are required, and the number of new project proposals has meant that capacities at the Ministry in Victoria are insufficient to deal with applications in a timely manner. A long-term provincial commitment would create a stable investment context that could further the industry in BC.

It is recommended that the specific characteristics of wind power need to be recognised in BC Hydro's procurement process. The government should collaborate with the wind industry on the new BC Energy Plan.

#### **Biomass — A Sustainable, Responsible Renewable Energy Option:**

John Swaan, Executive Director, Wood Pellet Association of Canada and Chair of the Board, BC BioProducts

BC's biomass resources include forest industry residues, fibre crops — which will probably not become relevant over the next years as forest residues are abundant — agricultural biomass (cereals, oilseed, manure) and municipal sewage and waste.

Wood residues can be converted to pellets or bio-oil — a process that is still pre-commercial. Agricultural waste through anaerobic digestion, lends itself to ethanol production, electricity or heat generation, and biodiesel production. Municipal waste can likewise be used for energy production, either densified or by anaerobic digestion for power production. Municipal landfill

gas can also be collected, compressed and integrated into the gas grid.

Pellet plants in BC currently only use sawmill residue. The industry uses drum dryers that are fired with wood, not with natural gas. There are 19 pellet plants in Canada, most of them on the West Coast. Seventy-five per cent of Canada's pellet production is exported to Europe, a small amount to Asia, and most recently a small amount for domestic greenhouses. The international pellet market will grow from 4 million tonnes today to 10 million tonnes in 2010. In the EU, pellets are mainly used by power plants, and/or district heat (CHP) as is the case in Sweden and Denmark. BC pellet producers shipped 450,000 tonnes of pellets to EU markets last year. The current production is 600,000 tonnes, and is projected to double over the coming 24 months. BC's pine beetle infestation is a huge challenge for the forest industry, but at the same time also an opportunity for pellet producers.

Biomass is carbon neutral and costs only half as much as natural gas. However, the industry faces perception problems, since biomass is still perceived as old and dirty in Canada. The EU therefore receives most of the pellets from BC.

### Questions and Answers and Comments:

*Questions and answers focused on three initial questions:*

1. *What are the barriers common to renewable energy technologies?*
2. *How can long-term targets be set?*
3. *What are priority areas for action?*

**A: David:** Advanced renewable tariffs are something we really want for BC. They address several barriers at once, such as financing, contracts and grid access. The first contracts BC Hydro issued in the 1990s were simple and easy to deal with financially. Today, contracts have become much more difficult, are well over 100 pages long, require liquidated damages, etc. Such trends should be reversed so it becomes easier, rather than harder, for business to implement projects. Environmental assessments, dealing with local governments, and including First Nations in the process, are

things the industry does very well already. However, the public does not understand the problems well enough. "Front Counter BC" was initiated in the Interior to consolidate government agencies — this would be a good concept for renewable energy permitting throughout BC.

- A: Eric:** Remote communities are often First Nations communities. Lots of government agencies work with them, so we have to deal with multiple agencies since there is no "one-stop shop". Consolidation would be helpful. The process works well with conventional technologies, but new ideas require a lot of consultation and networking, making things harder. It's necessary to look at a 20–100 year time scale. For example, natural gas is not a secure long-term energy source.
- A: Chris:** Interjurisdictional confusion causes delays in the permitting process. We need to articulate why we need a new policy — BC Hydro is only a part of the puzzle. The real opportunity is not "energy", but business creation, economics, the environment and sustainability. The energy policy must be a blueprint for the next 100 years. BC was built on dams; now we need bold decisions to build a new infrastructure for the next 100 years, based on diversity and energy security. It's impossible to predict how climate change will impact our energy portfolio, but we should hedge against future risks by using resources that are not vulnerable to climate change.
- A: Garry:** BC is already moving ahead. Recently, the energy minister visited a proposed wind farm site. However, there is still much scepticism about new energy resources and about the intermittency of wind power. People need to be educated about what is happening in other countries: we need to show it can happen. There are lots of models we can learn from and prove it works.
- A: John:** There are no technological barriers. Nevertheless, we are 20 years behind developments in Europe — it all starts in the minds of people. Advanced renewable tariffs are a good mechanism. For example, in

Belgium coal costs more than renewable energy due to policies that are an economic driver for using renewables. There is still work to be done to improve awareness and perception of renewable energy: policy-makers don't take them seriously yet. Recently, the University of Alberta determined that a biomass power plant is feasible, yet there are plans for building a 350 MW coal cogeneration plant. Coal is still being recommended to replace natural gas, instead of opting for biomass.

**Q:** The proposed large hydro "Site C" would produce 3,000 GWh per year. That means this market segment would be lost for alternative technologies. Do all on the panel agree that advanced renewable tariffs are the solution? These tariffs do not require a \$100,000 submission to enter into BC Hydro's RFP process. Will you write letters and advocate such a policy?

**A (from panellists):** Yes.

**A: David:** We have already advocated such tariffs excessively in the past.

**C: Ed Hale, OSEA:** The advanced renewable tariffs came out of the Ontario Sustainable Energy Association's work, not from the Ontario government. Two years ago, everyone in Ontario said it wouldn't happen. We then brought up consultant Paul Gipe from the USA and worked for two years to promote the idea, which made a difference there. Ontario farmers were engaged in the process. BCSEA could imitate this success; it can make a big difference!

**A:** IPPBC is preparing a submission to the BC Cabinet and participates in the Task Force process, but that process is much broader and includes fuel cells, DSM, etc. We will complete our own report on renewable energy in BC, which deals with questions like Site C and offshore oil & gas. We may have to restrict ourselves to a few issues as the energy question is very broad.

**A: David:** We want to tell the Premier that it will be impossible to reach the BC target unless we make the process easier.

**A: Chris:** As sectoral groups we can tell a story, but our points are often discounted because

we are perceived as pursuing our self-interest. A paradigm shift in public opinion is required. BCSEA needs to do the grassroots work to mobilise the crowds.

**Q:** We made a petition to the federal government asking if there was a level playing field for energy types in Canada. The answer we received from NRCan was that renewable energy is indeed on a level playing field with the oil & gas industry. Yet, Hermann Scheer spoke in California and explained that billions of dollars in subsidies go to the conventional energy sector worldwide. If this support were removed, things would change for renewable energy. Still, the federal government claims there is a level playing field — do you believe that?

**A: Eric:** I'd like to illustrate this with an example. For micro-hydro systems, the net metering policy is fabulous. It still takes a lot of effort, but having a net metering policy in place is a big first step. In one case, a micro-hydro system was going to cost \$5,000 to \$6,000. However, the cost of obtaining a water use license was also \$5,000 (i.e., the price of the system was doubled). These are specific barriers that need to be addressed. On the other hand, grid-tied PV is very easy to implement.

**C:** First Nations partnerships helped a lot with renewable energy development. As we all agree, let's get on with it!

**Q:** There are advanced renewable tariffs (ART) and renewable portfolio standards (RPS) — it would be helpful to get some clarification about these two approaches. Both policies have pros and cons, and BC has had sort of an RPS (50 per cent clean energy) already. Should the province reverse the existing approach and introduce an ART instead? What would be the consequences, and how would tariffs be set? Would tariffs be technology-specific? Why not let technologies compete against each other?

**A: David:** BC Hydro started out offering independent power producers 55 \$/MWh. However, the cost of labour, material and penstocks for small hydro systems has increased rapidly over the past years. Our cost

is more in the \$75 to \$85 range now — soon it may not be far under the 110 \$/MWh offered in Ontario.

- A: John:** In the EU, polluters are taxed (i.e., they impose environmental costs on using various types of energy). Every country is different in terms of the tax regimes and exemptions they offer. Renewable energy users often get tax exemptions, which includes biomass. There should be no different tariffs for different technologies.
- A: Chris:** Our RPS is not like in other jurisdictions; it does not redeem the real potential. At the moment, only the easiest projects make it through the RFP process. The next generation of projects may be more expensive and the ART must reflect future costs. Concerning ocean energy, other countries determined that it is a strategically important resource and ensured that the energy from these resources is leveraged (Portugal and the UK). There are always challenges in developing a policy, but we should make up our minds as we need these resources in 25 years, so we need to find a way to get them developed.
- A: Eric:** Feed-in tariffs are much better for small-scale technologies, such as solar PV. An RPS will not help distributed energy, but a set tariff will.
- Q:** All of us here are potential (distributed) energy suppliers. What can we do to make it easier for BC Hydro to integrate such solutions?
- A: Chris:** In our submissions to the government and boards, we suggested to change the rules under which BC Hydro operates. The current rules make it impossible to achieve significant penetration for renewable energy systems. The electricity component of the new BC Energy Plan is still underway, but at least the decision to revise the plan was made.
- A: David:** It would help to disseminate information to people in our neighbourhoods, including our MLAs. If the ratepayers push for it, BC Hydro will need to act.
- Q:** There are economic opportunities for First Nations around renewable energy technologies, such as hydro, biomass and ocean energy. What are your organizations doing for First Nations?

- A: Craig:** We fully recognise government policies around this issue and are not too legalistic in dealing with First Nations. Our experience comes mainly from our relationship with the Lil'Wat First Nation. Environmental and socio-economic studies are completed by consultants in cooperation with First Nations. We also enter into discussions about potential employment opportunities and financial benefits, such as royalties. We have relatively informal, personal relationships. We make presentations to the First Nation Council, it's a very friendly process.
- A: David:** First Nations have given rights, so as small hydro developers we negotiate with them. Their interest lies in developing a business and obtaining royalty payments. The small hydro community has worked well with these communities in BC and recognises their land claims.
- A: Chris:** Ocean energy technologies are not at the same stage of development. One project developer in Campbell River is preparing a project plan. Proponents have talked to the local First Nation community. Some industries actually started out through cooperation with First Nations.
- A: Garry:** Environmental assessments involve First Nations consultation by law. For the projects I participated in, we always involved local interest groups, including residents, schools and First Nations.
- A: John:** As the pellet industry mainly gets its feedstock from timber companies, it has not been an issue for us. The timber companies of course have arrangements with First Nations. The latest cut license issued for pine beetle wood was granted under the condition that negotiations take place with First Nations where they have interests.

**Brenda Goehring:** In closing, I think each of the panellists provided insights into the challenges and opportunities for their respective resource types. I think they also illustrated that some of the resources, such as small hydro, are mature while others are new to the province. I think there is an opportunity as an industry to share their respective learnings and support the further advancement of each type of resource, rather than strictly see them as competitors. And, as I also stated before, I think

the information we all heard can help in educating the public and interested parties about the challenges and costs, but also to help them know that these are the highest value, lowest impact renewable projects that can be built today and that we should support their advancement if these projects align with the public's values around future resource options.

## **Panel 2: Expanding the Options for Renewable Energy**

**TREC's Waterfront Wind Turbine Project:** Ed Hale, Toronto Renewable Energy Co-operative and Ontario Sustainable Energy Association Representative

The project was initiated in 1997 by a group of people who got together in Toronto and wanted to raise awareness about wind power. A year into the project, Toronto Hydro became a joint venture partner and provided the resources to sustain the initiative. It took five years to get all the necessary permits. The turbine was then commissioned in January 2003. A great success of the project is that it did away with "myths", such as noise and bird kills through wind turbines.

There had been a lot of enthusiasm, as well as a good wind regime at the chosen location, but as public authorities were unfamiliar with the technology and there were no previous models and templates for the process, the project required significant fundraising. A co-op model seemed to best express democratic principles, and the project was the first of its kind in Canada. Media interest increased and potential funders were motivated. Early funding was mainly used for education and outreach purposes. A database and a newsletter were created. Outreach to stakeholders and nearby residents was crucial — proponents actually went from door to door.

Education was key to success: it fostered local interest, got people thinking and talking, and created a buzz about the project. Proponents spoke to community groups and explained the benefits of wind power. It is important to reach the public before the public comes to the developer by themselves.

Barriers included the proponent team's lack of development expertise, the absence of an enabling policy, such as feed-in tariffs, and the lack of start-up capital. A power purchasing agreement was required. There was a clear need for training of team members on issues like organisational structure, project evaluation, the permitting process and equipment selection. A venue to share ideas and expertise was also central to the project's success.

In 1999, there was a combined effort of ten community groups in Ontario to further wind power, which later led to the creation of OSEA. OSEA then started providing help to other community groups, and now also provides input for provincial policy-making.

In Ontario, projects under 20 MW capacity cannot bid into the RFP process because the administrative requirements are too intricate, financial viability of the project must be established, and costly environmental studies undertaken. The proposed solution was standard offer contracts; in particular, Europe's feed-in tariffs. The Ontario government announced on March 21, 2006, that feed-in tariffs of 11 cents/Kwh now apply for renewables, and 42 cents/Kwh for solar PV.

OSEA now proposes to improve chances for community projects through the creation of a Cooperative Fund. This would be a \$10 million revolving fund, which would provide credit of up to \$400,000 per project.

**Expanding Options for Renewable Energy — The Ashlu Creek Green Power Project:** Randall Lewis, Environmental Coordinator, Squamish Nation

Five run-of-river projects have already been built in Squamish Nation territory. The barrier to the Ashlu Creek project was the question of harm to fish habitat. This was addressed by several studies and the inclusion of the creation of new salmon habitat. Plans were changed to the powerhouse, which was moved 170 m from its original location to remove it from the salmon spawning area. A fish ladder for steelhead was foreseen.

The benefits to the community are defined in a partnership agreement with developer. After 40 years, ownership of the facility will be transferred to the Squamish Nation. The project is suited to tie in with existing land use plans. After four years of studies, all approvals were obtained, apart from one from the local district due to fish and grizzly impact concerns. We are now working with the community to obtain this permit as well.

**The Solar Hot Water Acceleration Project:** Nitya Harris, SolarBC Project Leader, BCSEA and CanSIA Representative

Most people are well aware of solar PV, but are not aware of the potential of solar thermal. However, water heating accounts for about 30 per cent of home energy consumption. Solar hot water can reduce residential GHG emissions by up to two tonnes per home, per year. The technology can be easily retrofitted into existing buildings and can be added to existing heating systems.

A study done by the International Energy Association in 2001 shows that Europe has the highest concentration of solar thermal systems: 6.4 m<sup>2</sup>/1,000 people, followed by China (3.9 m<sup>2</sup>), with future targets for both areas. Canada only has 0.08 m<sup>2</sup>/1,000 people. Our target for BC is to install 100,000 solar roofs by 2025 (thermal or PV). Barriers to higher penetration include a lack of awareness and financial incentives, and a lack of qualified solar installers.

With federal and provincial funds, an initial project aims to see 100 systems installed over two years. The project advisory team includes members from CMHC, the provincial government, BC Hydro and the Solar Energy Society of Canada. Sponsors include NRCan, VanCity credit union, Western Economic Diversification and the Province of BC. We already have commitments for the first 50 systems, and BCSEA is now lobbying for extended financing from the federal government for the next batch of systems in order to complete the first 100 installations.

Other concepts that are currently under discussion to perpetuate the effort include interest-free loans or “solar utilities” that provide financing without charging the up-front costs. Another idea is to

have local improvement charges to enable municipalities to buy solar hot water systems then let local residents pay a user tax.

There are a limited number of manufacturers, but when the market grows, it is expected that the manufacturing sector will follow. No CSA certified systems exist, such that building inspectors have difficulties approving uncertified systems. Sadly, the CSA process is very slow. There is interest from all over the province, but as installers must be registered with the program, there is limited capacity to cost-effectively respond to demand. The project team is working with BC colleges to develop a program to train solar installers. To increase awareness, the team works with the municipalities of Dawson Creek and the City of Vancouver, as well as through the Ministry of Energy, Mines and Petroleum Resources’ energy efficiency program.

**Expanding Options for Renewable Energy – The Municipal Approach:** Laura Porcher, Executive Director, Community Energy Association

The Community Energy Association (CEA), composed of the Union of BC Municipalities, the Province, utilities, and the Planning Institute of BC, has a mandate to help local government promote energy efficiency and alternative energy through community energy plans and projects.

Renewable energy strategies for municipalities were outlined for municipal operations, and for the community at large. For municipal operations, three renewable energy strategies were proposed: procurement, municipal buildings and infrastructure. Several BC municipalities are purchasing green power certificates. For municipal buildings, solar water and solar air heating, photovoltaics, ground — or water — source heat pumps, and ocean/lake cooling were suggested. In municipal infrastructure, district heating (e.g., Revelstoke biomass-based district heating; Okotoks solar heat storage), waste heat usage (from sewage, ice rinks, or industrial sources), biofuels, green power from municipal water supplies (e.g., West Vancouver micro-hydro facility), and landfill gas utilization were highlighted.

Encouraging the use of renewable energy in the community can be done through:

- Policies: Official Community Plan statements, civic building policies/LEED standards, varied development cost charges, or local improvement charges;
- Bylaws: (e.g., district energy zones mandating buildings to use district energy systems, solar access requirements, density bonuses and energy codes); or
- Community engagement (e.g., information, training, education, labelling, awards, and incentives, such as the BC Solar Hot Water Acceleration Project).

Challenges to renewable energy development include risk averseness of engineers and designers, longer payback periods, high capital cost at the early stage of market development, lack of financing, low electricity purchase prices, public opposition and air quality implications of biomass.

**The Net Zero Energy Home:** Konrad Mauch, Director of Advanced Development, Xantrex Technology Inc. and Net Zero Energy Home Coalition Representative

Many people in Canada would like to buy an energy-efficient home, but cannot do so easily. It works in Germany, so what is keeping us back in Canada?

The goal of the Net Zero Energy Home Coalition ([www.netzeroenergyhome.ca](http://www.netzeroenergyhome.ca)) is a transformational change of the use of renewable energy and energy efficiency in the residential sector from a niche application to a mainstream technology by:

- increasing awareness;
- making distributed energy become an element of supply mix strategies;
- establishing Canada as a leader in distributed energy;
- creating a conducive regulatory framework;
- leverage funding from industry, government and consumers;
- providing a forum to exchange ideas and for networking.

A “zero-energy home” (ZEH) is a home that zeros out on energy over the period of one year. This means the home can still use conventional technologies. Progress towards ZEH can be incremental (i.e., improvements occur over time until achieving zero net energy use). The concept requires a “whole house” strategy — integration entails cost reductions. The first step is always energy efficiency. An EnerGuide rating of 85 or higher is desirable. The required technologies are already available. The ZEH concept builds upon R2000, Energy Star, EnerGuide and similar initiatives.

The U.S. launched a ZEH initiative back in 2001. The Department of Energy intends to develop marketable net-zero energy homes. In California, a ZEH commands a \$18,000 price premium, but still sells well. At this point, ZEHs still need subsidizing, net metering, time of use metering and rates, as well as BIPV. It was shown that ZEHs sell best as a standard, not an add-on option (for example, pay more to either integrate a hot tub or get a ZEH).

One challenge is that there are long-term investment risks for builders and manufacturers — especially in Canada for suppliers without export capacity, as the domestic market is not well developed. The Coalition focuses on government for one reason: experience in other jurisdictions has shown that government support is crucial to market penetration. ZEHs require financial support for early adopters, the clearing up of institutional bottlenecks, and a roadmap exercise involving all stakeholders. The latter removes some risk and creates a long-term perspective. The government needs to set a direction before industry can confidently move into the market.

In July 2005, the government announced a \$1 million demonstration program for NZEHH (healthy homes). At the first stage, 10–15 homes are to be completed over a period of 18 months. The Coalition sees its role as a centre for advice and expertise, and continues to do nationwide advocacy and networking.

## Questions and Answers and Comments:

Questions and answers focused on three initial questions:

1. What is the potential for these types of projects in BC?
2. What is needed to expand and support them?
3. Are there any policy measures that should be priorities?

**A: Ed:** Standard offer contracts are already driving the market in Ontario; many projects have been waiting for the new rules to come into force. The tariffs will encourage individuals to start developing their own projects. We should lobby for the same mechanisms to be introduced in BC; this push will not come from BC Hydro.

**A: Randall:** We are working on three major projects in the Lower Mainland; especially projects in rural areas that will benefit those communities. They are great opportunities for First Nations communities.

**A: Nitya:** If 10 per cent of homes use solar water heaters, we will have achieved our target of 100,000 systems in BC. This is quite a realistic target. The policy measures to support the target include

- standard offer contract — also for heat portion of renewable energy systems;
- regulations like the Barcelona (Spain) ordinance requiring solar thermal for new residential buildings; and
- the inclusion of solar thermal in R&D programs — it's a simple technology, but has amazing potential.

**A: Laura:** Local governments need to be empowered, and barriers like outdated building codes must be addressed in combination with established GHG emissions reduction targets. Municipalities need to integrate energy considerations into all their processes and projects. Victoria now has integrated triple bottom line considerations into its projects. The training of designers and engineers, and financing through revolving funds, will help the market come along. There is huge potential in all municipalities, and we

have a long way to go yet. The BC government needs to take action, but there is also a strong role for BCSEA in public education. Action does not come about unless the grassroots support is there.

**A: Konrad:** Standard offer contracts are the obvious mechanism to support renewables. BC should try to attract ZEH demonstration projects so local builders get some experience.

**Q:** Is there anyone in the room who would not support standard offer contracts. If so, can you tell us why?

**A: Ed:** We need to be careful with solar PV and standard offer contracts. The original pricing model was established by economist Bernard Chabot from France. He wanted a tariff of 82 to 85 cents/kWh for PV systems. However, the solar industry only wanted 42 ¢/kW. In order to build their capacities, they need to build an infrastructure. If the 80 cent range were offered, too many installers would come in from the States and there would be no guarantee for proper installations. We need to take our time to build a strong industry. It takes two years to put the infrastructure in place, and by then the price of solar systems will be lower.

**Q:** Is our transmission system flexible enough to deal with distributed generation, or do we need transmission upgrades?

**A:** When BC Hydro examined wind power, it assigned a zero firm power value to it because of intermittency. Now it uses a 25 per cent firm ratio. We need to study what is required to bring the grid up-to-speed to implement these technologies. In Oregon, it was found that the grid had a much larger capacity than what was initially considered feasible. Don't forget that BC could also export green power to the U.S.

**A:** DG feeds nicely into small grids. Major lines do not need to be built and it probably fits in better than large-scale.

**A: BC Hydro:** This is a large opportunity for BC Hydro. The U.S. can use all the power we can generate. Some projects are easy to interconnect, but so far we have only picked the best and cheapest sites. Standard offer contracts would surely be a great incentive,

especially as they build market confidence. Ontario is in a somewhat different situation because the electricity mix contains nuclear and coal and is running out of generation capacity. We are not at that stage yet.

**A: Ed:** Ontario may have transmission problems because the grid was built to suit centralised power stations. Now, distributed wind power is added and causes problems in weak grid areas, such as Lake Erie. There are also voltage control problems along Lake Erie because of power going from Niagara to Chicago. Hydro One did not want to add wind power in this area, but now new technology is available that makes wind power voltage supportive around Lake Erie. It's a constantly moving field.

**Q:** BC as a major exporter of electricity. What would the impacts of green power exports be? Will that affect the level of renewable energy development in the province? If BC had a mandated 100 per cent RPS, how would that compare to a standard offer contract?

**A: Ed:** My question is: how do I bid into an RPS? It may work for large projects, but only when there is a large capital investment involved. With feed-in tariffs, when the project is ready, you can connect it to the grid. Standard offers are a necessary component for small community-owned projects.

**A: Konrad:** Feed-in tariffs are mainly for small projects. If they applied to larger projects as well, too many of them would be developed too suddenly, and the transmission system capacity may be exceeded. So a capped growth scenario may be easier to manage.

**C:** There are more positive points about standard offer contracts, such as community involvement. Experience from Denmark and Germany shows that projects are much more

acceptable when communities are involved, rather than an outside developer coming in. The goal of standard offer contracts is to build a local industry, not just to increase electricity supplies. The success can be seen in Europe, which has become the main exporter of these technologies.

**C:** We need to make some hard decisions. The message to carry to our constituencies is, before we invest more in new infrastructure we need to look at other options.

**C:** We have been talking a lot about grid electricity and utilities, but there are huge problems with the transport sector and energy poverty, such as heating in Northern BC.

**C: Randall:** Transmission line impacts could be mitigated through Christmas tree planting and salmon habitat creation underneath.

**C:** "Peak oil" is expected to come. What will happen if everyone turns to electric vehicles (EV) instead? EVs only cost \$7 per month to run, whereas a gasoline car costs \$50 — so everyone will want to move towards EVs. Where will that electricity come from? The impact of climate change is so severe that we should develop our maximum potential, even for export. California wants to stop importing coal-based electricity and is looking to buy elsewhere. We could make a difference here.

**C:** This dialogue must be maintained. How can we keep it going without Pollution Probe and the Oak Foundation? I suggest you become members of BCSEA and support this work. Bring your own perspectives into the discussion!

## Closing Remarks

### **Guy Dauncey, BCSEA**

Based on what we heard today, the message on climate change must get through to decision-makers. How will our economy survive with rising fossil fuel prices? Renewable energy should be included when analysing the future of the economy. Targets should be set for all technologies. The BCUC should be given a mandate to interpret the phrase “the public interest” much more broadly than just keeping the price of electricity low. Standard Offer Contracts should be introduced for small-scale technologies to start. The permitting/RFP process is too cumbersome and needs to be streamlined. Conditions should be set so community projects are flourishing in BC, such as in Denmark. Powerex should engage in this process to sell excess green power to the U.S. Support in terms of low-interest loans should be provided for distributed energy systems. We could mandate solar hot water systems as they do in Barcelona, where every new house must have a solar hot water heater. We need a new vision: the BC Energy Plan must be a blueprint for our economy and our future. A major rethink at BC Hydro needs to take place because of higher and volatile natural gas and oil prices. We all need to get involved in the Energy Plan making, and there needs to be much public education to leverage grassroots involvement.

### **Karen Campbell, Pembina**

Yesterday, the Deputy Minister talked about the Energy Plan. The government wants to promote energy efficiency and renewables, and has created a Task Force to achieve this goal. Many of the insights gained today will feed into this process. We heard yesterday that BC does not get enough energy efficiency for our investment, compared to California — we need to work on that. Energy is an economic generator in BC. Oil and gas are economic generators now, and there are great opportunities for energy efficiency and renewables to take over this role in the future. Make this part of the Energy Plan, instead of focusing on oil and gas and coalbed methane. These are only short term solutions, but what we talked about here today is the long-term solution. We have had a lot of discussion and networking in this room. There is a sense of urgency, and many of us are concerned. It is important to get these ideas out beyond this room, and the Pembina Institute has an important task to do so.

### **Julie Green, Pollution Probe**

We have had a great dialogue, and I am looking forward to seeing more initiatives. Pollution Probe will complete a follow-up report, and will partner with the Pembina Institute and BCSEA, as well as other CanREA members. We will notify you when it is published. That will likely take one or two months. All the presentations from this workshop will be on the Pollution Probe web site very soon after the workshop. You can also access previous workshops — you are encouraged to look at those presentations as well so we can keep in touch with other initiatives. Please also fill in the questionnaire and let us know how we can improve the quality of our workshops.