

CEA-NRCan Alternative Energy Workshop held in Ottawa, November 25, 2002

Summary and Possible Follow-up Actions

The Canadian Electricity Association (CEA) and Natural Resources Canada (NRCan) co-sponsored a one-day workshop aimed at identifying opportunities to diversify the generation mix, as part of their ongoing efforts to ensure that Canadians have the most reliable, affordable, and environmentally preferable electricity supply available. The workshop provided an opportunity for officials at NRCan and other departments, representatives of CEA member companies, and other stakeholders, to identify and discuss issues, and propose next steps in the continuing effort to ensure such diversification.

In preparation for the workshop, CEA produced a brief backgrounder identifying a range of key questions in the discussion. This backgrounder highlighted the need for industry and government to work together to create the right conditions for attracting the investment needed for a sustainable electricity future. CEA presented data indicating that demand growth continues (albeit at a slower rate than a few decades ago), that a significant percentage of capital stock will need to be replaced in the next 20 years, and that exports show no sign of declining. The combination of these factors means significant new generation capacity will need to be built over the next twenty years. As well, new transmission is needed to support competition and ensure reliability; this development, however, poses serious challenges given the difficulties around siting, regulatory hurdles, and the poor investment conditions for transmission. All of the above factors contribute to an environment where all in the electricity industry are taking a closer look at alternatives to conventional options.

For the purposes of the workshop, CEA and NRCan did not commit themselves to a single definition of alternative power, choosing instead to highlight the range of options other than conventional generation technologies that result in marked reduction in environmental impacts over customary usage. Barriers to any of the alternative technologies vary region-to-region, market-to-market. However, a general listing of these barriers includes: fuel availability, level of technology development, capital costs, market integration, public knowledge, lack of incentives, and jurisdictional issues. Part of the purpose of the workshop was to identify how these barriers might be overcome through cooperative action.

Ken Adams, Chair of the CEA Environmentally Preferable Power Task Group (and now Chair of CEA's Generation Council) and Vice-President of Power Supply at Manitoba Hydro, served as the Chair of the workshop. **Michael Cleland**, Senior VP Government Relations at CEA, and **Ric Cameron**, ADM Energy at NRCan, opened the event with introductory remarks.

Mr. Cleland thanked NRCan for its co-sponsorship of the event, commenting on how such cooperation sets the tone for addressing the issues going forward. He noted that electricity industry companies are driven by their obligation to provide reliable, secure, and environmentally sustainable power to Canadians. He addressed the distinction between renewables and alternatives, noting that the workshop title mentioned the latter, not the former. Mr. Cleland explained that the renewability of a fuel source, while a factor in the evaluation of a technology option, should not be the sole determining characteristic in the assessment of a technology choice. Environmental performance improvements to existing baselines – not wholesale changes to the technology mix - should, he suggested, be the measure for success.

Ric Cameron thanked CEA for putting the workshop together and noted the challenge facing Canada on GHG reductions. He underlined the importance of access to the grid for alternatives and stressed that emerging technology development will give industry more options. He reminded the audience that the Government of Canada presently offers the Wind Power Production Incentive (WPPI) and Government Power Purchase from green power sources program. He stressed the need to work with various government agencies – including Finance Canada – to achieve the right conditions to stimulate the application of more alternatives. Mr. Cameron noted that some jurisdictions had created renewable portfolio standards (RPS), but questioned whether such a mechanism was indeed applicable in Canada on a national scale.

PANEL 1, chaired by **Murray Paterson**, Business Development Manager of Green Energy at OPG, provided an opportunity to review the merits of and opportunities for alternatives in the marketplace from a variety of perspectives.

Hank Habicht, CEO of Capital E-Group, Global Environmental and Technology Foundation, provided a North American Investor's Perspective. He emphasized the critical role in US energy policy around alternatives played by the individual US states. He pointed out that, the California crisis and other regional market upsets aside, conventional generation prices are low. Therefore, alternatives have developed slowly. The key drivers in the US market are the greater mix of policy incentives, principally at the state level (one-third of states have an RPS), electricity reform in general, uncertainty about natural gas prices and supply, the size of the world market, and concern about global warming. He noted that the US National Energy Policy, amongst other things, promotes a hydrogen economy, support for alternatives, clean coal and sequestration, and existing low emission technologies like nuclear power and hydropower. The future needs the right mix of government-industry cooperation, and he argued for more Canada-US cooperation/harmonization.

David Burpee, Director of Electrical Energy at NRCAN, offered a Public Official's Perspective, entitled, "Federal Initiatives to Encourage Emerging Renewable Energy". Burpee noted that federal energy policy is based on letting the market decide. However, the federal government will intervene when markets don't capture externality costs. NRCAN sees alternatives as a major component of meeting Kyoto targets and noted that a range of initiatives are required to help reduce the cost of alternative energy sources, including: deployment through procurement, production and consumer incentives, and initiatives such as net metering. To date, the Federal Government has made a 20% federal commitment to purchase electricity from renewable sources and initiated a Market Incentive Program (MIP) that will underwrite marketing expenses of green power programs for residential and small business customers. David then discussed some specific emerging technologies. The federal government believes wind power is a high-quality resource with nearly 'unlimited' potential and few technical barriers to grid integration in short/medium term. Burpee highlighted the WPPI as a specific policy initiative. It is designed to encourage 1,000 MW of new capacity. Burpee also made reference to biomass – which he said has large emission reduction potential and may produce large GHG credits. Finally, he made reference to solar photovoltaics, which he described as a good-quality technology with nearly 'unlimited' potential, mainly because there are no technical limits to grid integration in the short/medium term, although the technology is currently only price-competitive in off-grid applications.

Melissa Felder, Senior Associate, Summerhill Group, offered a Global Marketplace Perspective, providing an overview of the complexities of green power, examining the context for green power in Canada and contrasting the development here with relevant international policy incentives, showing how these influence both pricing and market uptake. She indicated that

development has been impaired due to the discrepancy in costs of generation over the course of a plant for conventional versus “green-sources” electricity (i.e., externality costs not considered). Despite limited government incentives (i.e., WPPI) to overcome the discrepancy, she argued that they are not of a large enough in scale or scope (i.e., need to encourage more than wind) to significantly impact investment or market uptake. In Canada, non-large hydro renewables represent only about 2 % of the nation’s electricity generation despite the significant existing renewables potential. She noted that world growth in alternatives has been explosive - 200% in EU (especially Denmark and Germany) and 20% in US (California). However, cost remains the greater inhibitor of development: renewables cost 7-8 cents per kw/hr, despite incentives. She highlighted the fact that the US government is heavily involved in the promotion of renewables; with various congressional initiatives encouraging a national RPS, and a Production Tax Credit double that of the WPPI in Canada. State policies are focused on development changes through RPS and tax incentives in a growing number of U.S. states.

Andrew Kingston, President and CEO, DynaMotive Energy Systems, presented a Technology Proponent’s Perspective entitled, “Green Fuels to the World: DynaMotive Energy Systems”. Bio-oil is a burgeoning success mainly due to entrepreneurial partnerships that mitigate risk. DynaMotive is a leading developer of bio-oil conversion technology that produces no SO_x and low NO_x emissions when used to generate electricity and/or heat. Andrew explained that the technology is reliable, replicable, commercially scaleable and supported by patents. Key drivers to DynaMotive’s success are cost-competitiveness and reliability. In this respect, biomass possesses a number of advantages. It is a globally abundant, low cost, accessible, readily available, renewable, and GHG neutral resource. DynaMotive’s Bio Oil (pyrolysis) process increases energy density and efficiency, is storable, and its transport can be achieved using the existing fuel infrastructure. Andrew discussed DynaMotive’s *400TPD Project* which has potential to power a 20 MW combined cycle generating station.

Andrew Pape-Salmon, Pembina Institute, and **Mark Rudolph**, Rudolph & Associates and Chair of the Clean Air Renewable Energy (CARE) Coalition, presented an Industry-ENGO Perspective, entitled, “Enhancing Sustainable Economic Development with Low-Impact Renewable Electricity: Clean Air Renewable Energy Coalition (CARE)”. They focused on how international competitors are ahead of Canada in terms of alternatives policy, production, and export of technology and services. Despite recent changes, the following barriers exist in Canada: low electricity prices, little market recognition for environmental and social benefits, low consumer engagement and awareness, a financial (price) gap for retail and marketing, and finally, the fact that Canadian incentives are significantly lower than global competitors. CARE aims at furthering business-NGO partnerships to remove these barriers through identification of policy changes and recommending that the government establish both renewable energy targets and a national “certificate” trading system to equalize costs across Canada. CARE also recommends increasing the WPPI in order to compete with US levels (four times higher) to create a dynamic market for environmental benefits, thus keeping costs low and protecting investment. Finally, they recommended similar incentives to assist solar, hydropower, biomass, tidal, wave, or geothermal energies.

Questions concerned federal-state collaboration in the US as well as the possibility of expanding WPPI beyond 1000 MW. Hank Habicht responded to the first question, noting that Congress and the Federal Administration tended to take their cues from the state initiatives on alternatives. NRCan answered the second question, noting that they intended to increase and extend WPPI.

Doug Campbell, Business Development Manager of Green Energy at NS Power, chaired PANEL 2. The panel provided an opportunity to review the merits of and opportunities for alternatives in the marketplace from a variety of perspectives.

Michael Margolick, Senior Associate, GCSI-Natsource LLC, discussed the “Economic Fundamentals of Alternative Energy”. Alternatives need to be assessed in economic terms in order to compete with conventional sources, where natural gas is facing rapid depletion and air quality/climate change are key drivers. Michael discussed the development of hydrogen technology over the next 10 years and its implications for energy infrastructure and renewables. He noted that substantial investment in transmission connections is an essential piece of the alternatives puzzle, to ensure a sufficient grid for a diversifying portfolio. He suggested that Canadian incentives and programs are insufficient as the government’s tax-linked incentives produce side effects, including delayed technological changes, high transaction costs, and uncertain outcomes. Mr. Margolick advised that government should focus its efforts on buying down risk and encouraging industry initiatives.

Chet Chaffee, Vice-President of Scientific Certification Systems (SCS), presented the “Technical Fundamentals of Environmentally Preferred Power (EPP)”, with particular emphasis on life-cycle assessment. SCS provides a model for comprehensive environmental assessment of power generation sources and options for internal planning and management, policy analysis, and certification of environmentally preferable power options. SCS methodology is unique in that it is based on regional baselines, measuring – on a life-cycle basis – environmental performance as measured against what is already available on a power pool basis (e.g., PJM).

Andrew Pape-Salmon returned to speak on the “Environmental Fundamentals of Alternatives”, summarizing critical environmental issues facing Canada’s energy sector, including: Kyoto ratification, life-cycle assessment, and environmental certification. After reviewing life-cycle methodology, he discussed Canadian certification standards, advocating several layers of certification. First, “bright green”, providing the best overall environmental performance, suitable for green power marketing purposes, and bundling many environmental attributes. Secondly, “forest green” which demonstrates broad environmental benefits and is suitable for portfolio standards for renewable energy. Finally, “olive green” which demonstrates net reductions in GHGs and is suitable for meeting emission regulations. Andrew emphasized that consumers ought to know the different certification levels when making purchasing decisions.

Glen Estil, President of CANWEA, discussed the “Political Fundamentals of Clean Wind Power”, noting the decreasing cost of wind and the wind-friendly Kyoto Protocol. Technological advances have made wind generation more efficient, helping to drive wind into the electricity grid, leading to improved siting success (e.g., reduced noise concerns). He noted that wind can be coupled with storage provided at existing hydroelectric installations to maximize resources and reduce intermittency of supply. Provincial policies, above all, are needed, e.g. Renewable Portfolio Standards, requiring every retailer to purchase a certain percentage from green power sources. Provinces can also implement their own green power procurement, or match the Federal incentive with their own financial incentives. For example, Systems Benefits Charges are levied on power bills in many US states to support green power development. Wind development also depends on provincial policies concerning the purchase or lease of Crown land at a reasonable cost.

Theresa Howland, Product Manager, Green Power Marketing, ENMAX Corporation discussed the “Retail Fundamentals of Alternative Energy: Green Power Marketing”, noting the positive consumer response in Alberta. Ten utility programs currently exist in Canada, offering the service

to only about 5-1/2% of Canadian electricity customers, whereas in the US, 40% of customers have access to green power. She recommended aggressive marketing, including significant customer education and awareness building, to demonstrate the tangible benefits offered by green power. Additionally, she advocated common certification across Canada to assist consumers in comparing green power programs.

Questions focused on life-cycle assessment, specifically the valuation of significant costs. Speakers agreed that an inventory with further assessment of habitat impacts is needed, as nothing is available at this time to fully quantify these costs.

Luncheon Speaker **Steven Gilchrist**, MPP for Scarborough East and recently named Commissioner of Alternative Energy, spoke on the recommendations announced by the Ontario Alternative Fuels Committee in June 2002. His remarks concerned energy conservation, clean power, and alternative energy. He reviewed several initiatives the Government of Ontario has/hopes to undertake. He noted that the province would establish two Centres for Excellence – one for electricity and the other for alternative energy. Provincial policy will focus on partnerships with industry, especially the construction sector. One plan is to provide a tax credit for the first 100,000 homes to install solar technology. Additionally, Ontario will further green power marketing through identification and elimination of obstacles and drafting regulations to that purpose. Impediments to alternatives are tax barriers, including the federal GST collection. Mr. Gilchrist praised the Alternative Fuels Report saying that it combines the best elements of policy development in European and US jurisdictions.

PANEL 3 was chaired by **Larry Ward** of SaskPower and provided an opportunity to review existing policy, financial and other approaches to advancing alternative technologies.

Dr. **Ian Rowlands**, Professor from the Faculty of Environmental Studies at the University of Waterloo, spoke about “Electricity Certification Programs (ECPs)”, expanding on what had been presented in the morning. He explained that ECPs are similar to existing product eco-labeling programs and vary worldwide. Many programs have introduced more nuanced approaches, considering any or all of factors like water quality, water quantity, temperature and rate of flow, as well as impacts on fish, wildlife, and vegetation, and atmospheric emissions. Delivery vehicles also vary, whether government (Canada/Australia), government and business (UK), or a broad cross-section of stakeholders (US). Rowlands noted that certification of low-impact electricity began in Canada through the Environmental Choice (EcoLogo) Program in 1996 and new draft criteria are currently under consideration. Generally, certification organizations have been primary drivers for alternative energy sources, but there remain questions on the different certification programs available and there is an increasing (and necessary) focus on internationalization and harmonization.

Jim Scouras, Strategy Manager, Green and Alternative Energy Division at BC Hydro, spoke about “Direct Support by Utilities,” providing an overview of BC Hydro’s green energy objectives. BC Hydro is developing near-commercial technologies to enable and incubate new green power deployment and investment, including wind mapping, modeling and monitoring, community energy planning pilots with First Nations communities, and resource studies of green energy potential. BC currently has a competitive acquisition process and targets a minimum of 10% of new load growth from green power sources. BC Hydro’s 2002 Green Call process involves standard term contracts (Energy Purchase Agreements), mechanisms to ensure portfolio diversity, and competitive pricing. Jim explained that BC Hydro markets Smart Green Power Certificates as part of its goal to create market-driven demand to meet environmental goals and build a competitive edge. Green power certificates are issued on 100% made-in-BC electricity

generated from qualified green sources and purchased from facilities built and operated by independent power producers. He noted that BC Hydro's Triple Bottom line aims at a smaller environmental footprint, the reflection of community values, and promotion of trade growth.

William Tharp, Quantum Leap Company Limited, spoke about "A Capital Markets Approach to Advancing Alternative Technologies", offering an investment fund perspective. He suggested that growing demand for electricity and depletion in natural gas reserves equals a favourable market for alternatives; however, countering that is the low rate of return available for most alternatives. The focus of government therefore should be on innovation and minimization of risk. He highlighted the federal government's Sustainable Development Technology Canada (SDTC) Fund as an excellent example of public sector investment. SDTC manages \$100 million in funds for the development and demonstration of new technologies that are aimed at reducing greenhouse gas emissions and improving air quality, and operates as an arm's length, not-for-profit corporation.

Glenn MacDonell, Director of Energy, Industry Canada, spoke on "Government Support Initiatives to Advancing Alternative Energy Technologies in the Industry Sector". He discussed Technology Partnerships Canada (TPC), a technology investment fund that advances and supports government initiatives by investing strategically in research, development and innovation in order to encourage private sector investment, and as such, maintains and grows the technology base and technological capabilities of Canadian industry. TPC supports research, development and innovation in environmental technologies, enabling technologies (i.e. manufacturing and biotechnology), aerospace and defence. He also discussed Technology Road Maps (TRM) that focus technology development efforts by helping technology sectors identify, select, and develop technology options by assisting companies to pool resources and work with academia and government. He explained that TRMs are industry-led, multi-stakeholder, interactive processes that facilitate the setting of science and technology priorities and the integration of new technology with business. As a result, the maps identify markets and needs for future business growth over a 5 to 15 year timeframe. TRMs also identify gaps in market and technical knowledge, policies, regulations, outreach, etc. Glenn focused on examples from the fuel cell commercialization TRM and a photovoltaic barrier study.

Questions dealt with environmental assessment requirements, specifically for small hydro. Small hydro (i.e., 50 MW installation) is not subject to the BC *Environmental Act*, but subject to federal legislation, including the *Fisheries Act*, which can delay planned development. On wind projects, BC Hydro would prefer to have greater harmonization at federal-provincial levels to minimize cost and delay.

Ken Adams returned to chair PANEL 4, a Roundtable Discussion on the "Promotion of Alternative Technologies". The session built on the discussion earlier in the day and offered an opportunity to identify specific initiatives that could be taken to promote alternatives in Canada. Ken summarized the three issues CEA believes are fundamental: reliability, affordability, and environmental performance. Subsequently, **David Burpee** of NRCan reiterated the Federal Government position on Climate Change as an important driver to developing alternative energy but also stressed the need for expanded portfolio standards.

Two Canadian renewable developers with ambitious designs on capturing generation market share presented their companies. **Michael Margolick**, Vice-President Technology, Uniterre Resources Ltd. "Nai-Kun Wind Development Project" described the generation, transmission and environmental aspects of a planned, massive 900 MW offshore wind development in B.C. Offshore wind energy takes advantage of stronger and less turbulent winds, provides for

economies of scale and has potentially less visual effect than on-shore turbines. He noted that the European wind industry has already developed several generations of offshore turbines. The project is aimed at competing with gas turbines on a wholesale merchant basis rather than providing green energy to retail customers. **Ian MacLellan**, Founder and CEO of Kitchener-based ARISE Technologies, explained the opportunities available to solar generation in Canada. He discussed the advancement of solar technology and the high “value” typically given by consumers to solar (PV) generation.

Summary of Possible Follow-up Actions

Further to the workshop, CEA has reviewed the presentations and discussions, and offers the following summary of possible follow-up actions. It is proposed that CEA and NRCan meet to review these, to identify how best to proceed with them:

- (1) A multi-stakeholder event like this workshop should be held on an annual basis, to facilitate networking, information sharing, and the policy development process – leading towards developing more coordinated efforts for moving alternative energy technologies forward.
- (2) Efforts should be made to develop an agreed-upon definition of “alternative energy” by the government, as this will help focus policy development and funding support.
- (3) More cooperative project pilots should be undertaken by industry and government to help advance alternative energy technology development and implementation in a more coordinated fashion.
- (4) The investment community’s involvement in such discussions should be more actively solicited, to ensure that capital markets are better informed about the technologies, their implications, and the investment opportunities they afford.
- (5) A special effort should be undertaken to bring the provinces together to discuss various initiatives underway across the country, with an eye to identifying and sharing best available programme and policy options for promoting alternative energy technologies across Canada.
- (6) A broader engagement of federal departments is necessary to ensure the most comprehensive public policy process for alternative energy technologies, factoring in related initiatives around energy efficiency, and other policy initiatives.
- (7) On funding support of alternative energy technologies, efforts should be made to consolidate funding under a few initiatives (e.g., climate change) to simplify funding requests for alternative energy projects, and to ensure that different technologies are being equitably treated.
- (8) Cooperation between Canada and US officials on research, development, and application of alternative energy technologies, with an eye to a coordinated and harmonized North American approach is important.
- (9) The development of harmonized environmental certification programmes is important to ensure that the measurement of environmental performance, tracking and verification and customer expectations are uniform across markets.
- (10) Every effort should be made to simplify the regulatory framework around alternative energy initiatives – as part of a broader “smart regulation” framework for Canada.
- (11) Any programmes on alternative technologies should be linked in to the various discussions on the implications of net metering and time of day metering for alternative energy.
- (12) Enhanced mapping of alternative energy resource potential for Canada is required.
- (13) Centres of Excellence for alternative energy should be identified in Canada, in cooperation with industry, government, and academia – and jointly funded by industry and government.