



**SUMMARY OF THE CONFERENCE ON
CONTINENTAL ENERGY MARKETS AND
GREENHOUSE GAS EMISSIONS: THE
IMPLICATIONS?
20-21 FEBRUARY 2002**

The conference on Continental Energy Markets and Greenhouse Gas Emissions was held from 20-21 February 2002 in Ottawa, Ontario, Canada. The meeting was organized by the International Institute for Sustainable Development (IISD) and the Canadian Energy Research Institute (CERI), and was sponsored by Alcan, Environment Canada, Hydro One, Natural Resources Canada, Ontario Power Generation, Petro-Canada, Shell Canada, Suncor Energy, and TransCanada. Over one hundred and thirty participants from Canada, the US and Mexico attended, representing government agencies, academic and research institutions, business and industry, and international and non-governmental organizations (NGOs).

The conference presented participants with an opportunity to examine strategies and approaches to meet North America's current and future energy needs, including the option of a continental energy strategy. In considering the continent's energy needs, participants met in Plenary to hear speeches and to engage in discussions on the following issues: the US energy policy; roles of Parties with different commitments under the Kyoto Protocol and the implications for the North American Free Trade Agreement (NAFTA); innovative approaches to meeting energy needs; and implications of energy issues for development in the continent's northern regions.

Discussions and conclusions from this meeting are expected to contribute to the dialogue on policies and approaches to address the energy challenges facing North America.

Note: A complete copy of the conference proceedings, including audio files and PowerPoint presentations, is available from the conference organizers. For more information, please contact: Claudia Velasquez, CERI; tel: +1-403-220-2380; e-mail: cvelasquez@ceri.ca

BACKGROUND TO THE CONFERENCE

On the initiative of the Bush Administration, governments in North America have expressed an active interest in participating in the debate on the development of a continental energy strategy. This debate takes place in the context of the US withdrawal from the Kyoto Protocol to the UN Framework Convention on Climate Change (UNFCCC), as well as the Bush administration's development of an energy policy and a new climate change strategy. These developments have highlighted the linkages between discussions on continental

energy markets and greenhouse gas emissions, as well as underlining clear differences between the US, Mexico and Canada regarding implementation of the Kyoto Protocol.

With this background, the conference was convened with the aim of exploring options related to the development of continental energy markets, focusing in particular on the implications of these options for meeting climate change commitments. Some of the questions guiding discussions throughout the conference include:

- Can the U.S. agenda on energy requirements be addressed in a manner consistent with climate protection through regional/continental climate change initiatives and/or a regional sustainable energy systems approach?
- Are there other options to address growing demands for energy services?
- What are the economic, environmental and social impacts of such decisions?
- Given the growing U.S. demands for Mexican and Canadian oil and gas resources, should we think about developing a North American regional GHG target and measures that allow the burden of addressing that target to be shared equitably?
- Does it make sense to begin talking about a "coordinated policies and measures" approach in the North American context?
- How, if at all, could a regional emissions market scheme be integrated into the Kyoto emissions regime?

REPORT OF THE CONFERENCE

The conference on Continental Energy Markets and Greenhouse Gas Emissions opened on Wednesday morning, 20 February 2002. Philip Prince, President and CEO of CERI, welcomed participants. Noting that CERI has been undertaking research on energy policies for over 27 years, he said there are no easy answers. While he did not expect that this meeting would identify every solution, he said it would examine some key questions and options.

In his introductory remarks, David Runnalls, IISD's President and CEO, said this conference would present a diverse range of perspectives and thoughts on continental energy markets and greenhouse gas issues. He noted that the meeting had been postponed due to the events of 11 September 2001, but that it was now even more timely given the new climate change policy announcement by the Bush administration, as well as recent disagreements in Canada among senior political figures on ratifying the Kyoto Protocol.

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CONFERENCE OBJECTIVE: MEETING NORTH AMERICA'S CURRENT AND FUTURE ENERGY NEEDS

IISD's Climate Change Director John Drexhage outlined the objectives of the conference. Noting the links between the growing demand for energy and the need to respond to climate change, he said one major theme of the conference would be the issue of a continental energy strategy. This would include identifying how growing energy demands can be met, and what the environmental implications might be. Other key questions to be considered would include: how to address climate change in the context of a continental energy strategy; what scenarios exist for energy use over the next decades; what the implications are for Canada, the US and Mexico, each of which has taken on different obligations under the UNFCCC and/or Kyoto Protocol; and whether it is possible to develop a continental climate change regime in the context of the Kyoto Protocol. He explained that the conference would also seek to examine some possible solutions to North America's energy needs, including emissions trading, the Clean Development Mechanism, Joint Implementation, credits or exemptions for clean energy exports, renewable energy, geological storage, and fuel cells.

SESSION ONE: U.S. ENERGY POLICY - POTENTIAL EXPANSION ON THE SUPPLY SIDE

On Wednesday morning, participants met in two Plenary sessions on US energy policy, focusing in the first session on potential expansion on the supply side, and in the second on alternatives to the supply side approach. The first session was moderated by Philip Prince, who introduced the three speakers and facilitated the subsequent question-and-answer period. Delegates were also briefed on US energy policy by a US Government representative.

POTENTIAL EXPANSION ON THE SUPPLY SIDE: Neil Camarta, Senior Vice President of Oil Sands at Shell Canada, outlined two possible energy scenarios for the next 50 years, one where oil scarcity eventually drives biofuel expansion, the other a consumer-driven shift toward fuel cell growth. He explained that both scenarios would lead to a reduction in carbon intensity. He also highlighted the considerable potential for oil sands development in North America and described Shell's Athabasca Oil Sands Project, which is currently under construction. He said Shell hopes to reduce greenhouse gas emissions by displacing more greenhouse gas intensive energy from the North Sea, the Middle East, and Venezuela. Camarta also highlighted Shell's aim to improve transparency and stakeholder engagement.

Ken Adams, Vice President of Power Supply at Manitoba Hydro, described Canada's hydro potential in the North American energy market. He noted that Canada's net electricity exports to the US averaged 28 Terawatt hours per year during the past decade, and that the majority of these exports were generated at hydro facilities. He highlighted the significant greenhouse gas reductions that can be achieved by substituting Canadian hydro electricity for US coal, and noted that hydro also complements intermittent energy sources such as wind and solar. He concluded that although there may be insufficient hydro capacity to meet all of North America's energy requirements, it can still help to meet energy demand in the US and contribute to reductions in greenhouse gas emissions.

Helen Howes, Vice President of Sustainable Development at Ontario Power Generation, outlined measures taken since 1998 to deregulate Ontario's electricity market, which will be opened to competition in May 2002, thereby obliging the company to reduce its market share. She reviewed the current state of the Ontario energy market, noting modest growth in demand, with nuclear, fossil fuels and hydro all providing significant shares of the energy supply. Future challenges for Ontario Power Generation include remaining competitive in the new deregulated environment and successfully participating in the US market.

QUESTION-AND-ANSWER PERIOD: Following these presentations, speakers responded to a number of questions submitted by conference participants. Ken Adams replied to a question on environmental problems related to hydro by cautioning against making generalizations and noting that each hydro proposal should be judged on its own merits. He favored rigorous environmental impact assessments so that informed decisions can be taken on what impacts are acceptable.

Replying to a query about how Ontario Power Generation might use the Kyoto mechanisms, Helen Howes said the company is looking at buying credits that have longevity, and noted that the company is involved in pilot Joint Implementation projects. She said the company may not be an "early player" in the Clean Development Mechanism, particularly because of the mechanism's up-front costs. However, she stressed the company's interest in taking advantage of the entire range of mechanisms available under the Protocol.

In response to questions and comments on the competitive environment for Canadian industry should it ratify the Kyoto Protocol, Ken Adams said Shell was interested in what the exact rules will be and where the costs will fall. Helen Howes said the "devil is in the detail," while noting that her company is nevertheless proceeding with its greenhouse gas reduction strategies.

BRIEFING ON US ENERGY POLICY: Participants at the conference were also briefed on the US National Energy Policy and its implementation by Larisa Dobriansky, Senior Policy Advisor at the US Department of Energy. She explained that the Policy was prompted by a growing imbalance between energy supply and demand in the US, and that it recognizes that secure and sustainable energy that is reliable and affordable is essential for human prosperity. Dobriansky highlighted the importance of taking an integrated approach, and underscored the need for a balanced and diverse portfolio of energy sources to ensure energy security and for increasingly modernized energy infrastructure and regulations. She emphasized the importance of maintaining energy trading partnerships with Canada, and stated that the new US climate change strategy demonstrates its commitment to the objectives of the UNFCCC.

In response to a question on impediments to improved energy efficiency, Dobriansky noted some regulatory obstacles, and said that industry stakeholders had expressed concerns about the US EPA's New Source Review Program (a permit program that regulates emissions released to the air from new and modified stationary sources).

SESSION TWO: U.S. ENERGY POLICY - ALTERNATIVES TO THE SUPPLY SIDE APPROACH

This session, which focused on alternatives to the supply side approach in US policy, was held late Wednesday morning and moderated by Richard Ian Cameron, Assistant Deputy Minister of the Energy Sector at Natural Resources Canada.

ALTERNATIVES TO THE SUPPLY SIDE APPROACH: Vicki Arroyo Cochran, Director of Policy Analysis at the Pew Center on Global Climate Change, noted that despite the de-linking of GDP growth and energy use, US emissions are still 14.5% higher now than in 1990. She stated that even with the new US strategy on climate change, US greenhouse gas emissions will continue to increase over the next decade at a rate only slightly lower than that predicted under a business-as-usual scenario. She expressed concern that the plan does not call for a mandatory tracking and reporting system, but approved of its support for baseline protection for firms that have already reduced their emissions.

Gerry Scott, Climate Change Campaign Director at the David Suzuki Foundation, said US President Bush has "turned his back on the climate." Scott underscored the need to look at alternatives to the supply side approach and address energy demand. He noted that although there is a strong case for renewable energy and energy efficiency technologies, market imperfections and institutional biases are

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preventing faster development of these technologies. He highlighted the need to factor-in external costs in energy pricing and to shift subsidies away from polluting energies to cleaner alternatives. He concluded by urging Canada to join Mexico in ratifying the Kyoto Protocol.

James Mackenzie, Senior Associate at the World Resources Institute's Climate, Energy and Pollution program, discussed US energy use patterns. Noting that fossil fuel consumption continues to increase, he said the Bush administration's focus on expanding domestic energy production and on fossil fuels is "doomed to failure" as a long-term solution, and carries risks in terms of climate change, the environment, and national security. Mackenzie further warned that, on current trends, US emissions could quadruple by 2075. While acknowledging that no easy solutions exist, he highlighted the need for improved energy efficiency and the accelerated introduction of renewable energy technologies.

QUESTION-AND-ANSWER PERIOD: Responding to questions and comments on what could realistically be achieved in terms of reducing greenhouse gas emissions, Vicki Arroyo Cochran highlighted changes in consumer demand as a key factor contributing to increased energy demand. Gerry Scott said the general perception that a major change would involve "pain and cost" should be challenged given the gains that could be expected. He observed that 16,000 Canadians die each year due to illnesses resulting from air pollution, and said increasing energy efficiency should be seen in a positive light.

Replying to a question on whether large hydro and nuclear power should play a role in decarbonizing the economy, Scott said they should not, although there may be a role for smaller hydro schemes. Arroyo Cochran said that although all options should be considered, a number of unresolved issues, such as waste disposal concerns, cast doubts over nuclear energy as an option.

SESSION THREE: THE ROLES OF PARTIES WITH DIFFERENT COMMITMENTS UNDER THE KYOTO PROTOCOL AND IMPLICATIONS FOR NAFTA

This session, which examined the roles of parties with different commitments under the Kyoto Protocol and the implications this may have for NAFTA, was held on Wednesday afternoon. Presentations were given on the international climate change negotiations, Mexico's energy and climate change policies, and on industry and NGO perspectives. This was followed by a question-and-answer period. The session was moderated by Janine Ferretti, Executive Director of the North American Commission for Environmental Cooperation, who drew participants' attention to last year's announcement in Quebec City that the countries of NAFTA would intensify their work on continental energy trading. Noting the recent divergence among NAFTA members' approaches on climate change, she invited speakers to comment on the path forward.

INTERNATIONAL NEGOTIATIONS: Paul Fauteux, Director General of the Climate Change Bureau in Canada's Environment Department, presented a government perspective on climate change negotiations, focusing on Canada's cleaner energy exports, the Kyoto mechanisms, and the second commitment period. On cleaner energy exports, he stressed the importance of this issue to Canada, but acknowledged that progress was likely to be slow, especially in light of opposition or indifference among other Parties.

On the mechanisms, he highlighted the need to ensure that whatever approach the US takes to trading, this approach must be compatible with the Protocol. He discussed eligibility for trading in North America, stating that if Canada ratified and there was entry into force, it could be both a buyer and seller, while the US could only buy, and Mexico could only sell. On second commitment period targets, he said developing countries, or at least major emitters, should take on commitments. This would mean greater compatibility in the North American context, particularly if the US rejoined the Protocol.

John Dillon, Vice President of Policy and Legal Counsel with the Canadian Council of Chief Executives, presented a Canadian industry perspective on the Kyoto Protocol negotiations. He highlighted a number of concerns, including whether Canada will be able to bridge the estimated 30% gap between its current emissions situation and obligations for the first commitment period, and what impact the Protocol might have on trade and competitiveness, particularly in light of the US withdrawal. He stressed that many details have yet to be determined or clarified before a clear assessment can be made on how effectively the private sector will be able to use the Kyoto mechanisms, and on the viability of rules governing carbon sequestration.

Thomas Jacob, Senior Advisor for Global Affairs at DuPont, stressed the need for global emissions reductions while simultaneously strengthening the global economy. In this regard, he highlighted DuPont's greenhouse gas emissions reductions of over 60% since 1990. He stated that, although the targets and timetable of the Kyoto Protocol may be overly aggressive, DuPont approves of the Protocol's market-based mechanisms and basic architecture. In addition, Jacob drew attention to concerns among industries based in the EU, Canada, and Japan regarding an unconstrained US industry, and noted that the EU is exploring options for "border adjustment" to level the playing field, which may become a complicated issue under the World Trade Organization (WTO).

MEXICAN ENERGY AND CLIMATE CHANGE POLICIES IN A NORTH AMERICAN CONTEXT:

Mariano Bauer, Project Manager of Research at the Mexican Petroleum Institute, underscored that Mexican *per capita* energy consumption and GDP levels are far below those of Canada and the US. He noted that although Mexico's total and *per capita* greenhouse gas emissions are relatively low, the country has implemented a climate change program that promotes energy efficiency, fuel substitution, development of alternative energy sources, forest conservation and reforestation, and climate change research. He concluded that a fully integrated North American energy market would require physical connections for electricity and natural gas, as well as constitutional reform.

NGO AND INDUSTRY PERSPECTIVES ON ENERGY AND CLIMATE CHANGE POLICIES:

Presenting an NGO perspective on Canada's energy and climate change policies, Robert Hornung, Policy Director at the Pembina Institute, argued that there is a clear contradiction between Canada's projected energy development and its climate change commitments. He suggested that Canada's Kyoto Protocol commitments appear to be inconsistent with its ongoing policy of exporting increasing amounts of oil and gas to the US. In the short-term, he advocated ratification of the Kyoto Protocol, and supported debate on how the costs of meeting greenhouse gas commitments should be distributed, and how they can be minimized. While noting some scope for cooperation with the US on specific issues, he said Canada needs to focus on actively incorporating climate change considerations into its own energy policies, and supported concrete steps to make energy efficiency and investment in renewable energy key components of its policies.

Gordon Lambert, Vice President of Sustainable Development at Suncor Energy, presented an industry perspective on Canada's energy and climate change policies. He highlighted the need to move beyond the notion that the environment, economy and social welfare are competing interests, and said climate change policy should be considered in an integrated and long-term manner that reflects national, continental, and global aspirations. Lambert admitted that this will require greater creativity, and proposed using profits generated from fossil fuels to make investments in alternative renewable energies. He highlighted the need for a common vision that would create alignment among diverse interests and provide new business opportunities, improved competitiveness, enhanced environmental quality, and positive social impacts.

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QUESTION-AND-ANSWER PERIOD: Replying to a question on whether securing an acceptable outcome on cleaner energy exports is a precondition for Canada's ratification of the Protocol, Paul Fauteux said the exports issue is unlikely to be resolved this year. However, he added that the prospects for ultimate success on this issue will be one factor influencing the decision on whether to ratify this year.

In answer to a question on how far the Bush administration's climate plan differs from business-as-usual, Tom Jacob indicated that the plan is similar to the business-as-usual scenarios developed by the Intergovernmental Panel on Climate Change (IPCC). However, he added that the plan shifts the political debate away from whether or not to have a target to how useful this target is. Commenting on a further question about the Bush administration's climate plan, Paul Fauteux noted that the plan is not overly-specific, and that it marks only the beginning of a process that is likely to be substantially altered by Congress.

In response to a query on whether the Kyoto Protocol detracts from a focus on innovation, Fauteux said it did not, adding that it was not a question of choosing between the Protocol and technological development, as the Protocol would harness the power of the market to catalyze such innovation. He stressed that the Protocol was just a "baby step" in terms of what is needed to address climate change in the longer term, and would mark only a modest departure from business-as-usual. Thomas Jacob supported the framing of a longer-term strategy, and said the Protocol should only be seen as a first step in a very long process.

Responding to a question about whether energy efficiency is likely to deliver "promised goods" in the future when it has failed to do so in the past, Robert Hornung underscored that the barriers to energy efficiency are not technical but political and therefore can be removed. On whether environmental externalities should be reflected in the price of goods and services, Hornung agreed, stating that there needs to be a price signal. When asked about Suncor's position on whether Canada should ratify the Kyoto Protocol, Gordon Lambert stated that the company will support the government's decision.

OVERVIEW OF DAY ONE OF THE CONFERENCE

Late afternoon Wednesday, Sue Kirby, Associate Assistant Deputy Minister for the Energy Sector at Natural Resources Canada, provided an overview of the major themes that emerged from the first day of the conference. On US energy policy, she drew attention to comments expressed by presenters and participants that: the North American energy market faces unique challenges because of countries' differing status under the Kyoto Protocol; creative solutions and inclusive dialogue are essential; major changes in energy supply will take place over time, so it is necessary to look at a range of technologies and fuels; and the new US climate change strategy reopens dialogue on climate change, but should focus more on the demand side, the uptake of renewables, and consumer involvement.

Reflecting on the session addressing the roles of Parties with different commitments under the Kyoto Protocol and implications for NAFTA, Kirby highlighted various emerging themes, including that:

- climate change poses a high risk for both the economy and the environment;
- there is need for a systems approach and a long-term vision and framework;
- the US, as a non-Party to the Protocol, will have a competitive advantage over its trading partners, and is less likely to encourage carbon reducing technologies and innovations;
- key decisions regarding allocation of responsibility and costs need to be resolved, particularly when the producer and consumer are based in different countries; and
- it may make more sense for Canada and the US to pursue partnerships in specific areas, rather than cooperate on a broad North American climate policy framework.

SESSION FOUR: INNOVATIVE APPROACHES

The session on innovative approaches to meeting energy needs took place on Thursday morning, 21 February, and was moderated by Norine Smith, Assistant Deputy Minister for Policy and Communications at Environment Canada. The session included presentations on: opportunities through the Clean Development Mechanism and Joint Implementation; BP's experience in greenhouse gas reduction; cleaner energy embodied in Canadian aluminum exports; continental emissions trading; credits/exemptions for clean energy exports; the Clean Air and Renewable Energy Coalition; wind power; capture, use and storage of carbon dioxide; costs for capture and sequestration of carbon dioxide in western Canadian geological media; fuel cell opportunities; and the Canadian Transportation Fuel Cell Alliance.

OPPORTUNITIES THROUGH THE CLEAN DEVELOPMENT MECHANISM AND JOINT IMPLEMENTATION: Sushma Gera, Deputy Director of the CDM and JI Office at the Canadian Department of Foreign Affairs and International Trade, described the benefits and opportunities provided by the Kyoto Protocol's market-based mechanisms, the CDM and JI. She highlighted that the CDM, *inter alia*: facilitates low cost emission reductions; encourages private sector involvement; stimulates technology transfer and capacity building; provides socio-economic benefits and improves energy efficiency, infrastructure and air quality for host countries; and provides companies with investment opportunities, access to new markets and an opportunity to demonstrate environmental leadership and meet voluntary greenhouse gas targets.

BP'S EXPERIENCES IN GREENHOUSE GAS REDUCTION: John Hawkins, Vice President of Health, Safety and Environment for BP Canada Energy Company, outlined the company's experience with an internal emissions trading system, in terms of which emissions limits are allocated to each of the company's business units. He said the system had encouraged efficient, low-cost methods to achieve emissions reductions, such as reducing the practice of flaring, and highlighted extensive information sharing as a critical step in achieving further energy efficiency. Stating that the "now is time to take action on climate change," he supported learning by doing, incentives rather than punitive action, and the extensive use of market-based approaches.

CLEANER ENERGY EMBODIED IN CANADIAN ALUMINUM EXPORTS: Hugh Porteous, Director of Research and Corporate Relations at Alcan Inc., drew attention to the Canadian aluminum industry's success in significantly reducing the energy intensity involved in aluminum production during the past decade. Noting "fierce" price competition in the industry, he said Canadian companies should not be penalized for meeting higher environmental standards, and expressed concern about investment leakage, particularly following the US decision to withdraw from the Kyoto Protocol. He argued that Canada should obtain recognition or credit for its cleaner energy exports, opposed a cap and trade system, and proposed a baseline and credit trading system, which he said would be less likely to contravene WTO rules. He highlighted the Aluminum Framework Agreement with Quebec as an example of an effective agreement with industry.

CONTINENTAL EMISSIONS TRADING: Greg Block, Director of Programs at the North American Commission for Environmental Cooperation, discussed regional emissions trading regimes and their harmonization. He said the design of a regional trading regime should be guided by economic efficiency and environmental integrity, and noted that Mexico has infrastructure issues that need to be addressed before engaging in trading. On harmonization, he emphasized the importance of compatibility between regimes to avoid competitiveness issues, and highlighted a list of necessary design features, including macro design, coverage, and mandatory versus voluntary participation.

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CREDITS/EXEMPTIONS FOR CLEAN ENERGY EXPORTS:

Rick Hyndman, Senior Policy Advisor on Climate Change with the Canadian Association of Petroleum Producers, underscored that Canada's production of oil and gas for export to the US has contributed to growing greenhouse gas emissions in Canada. He noted that the Kyoto Protocol greenhouse gas accounting system attributes upstream emissions to the exporter. Hyndman argued that since Canada's natural gas exports to the US reduce coal consumption, Canada should have its greenhouse gas inventory adjusted either through a credit for clean energy exports or through exemption of upstream emissions.

Matthew Bramley, Climate Change Director at the Pembina Institute, examined Canada's call for credits for clean energy exports that may result in greenhouse gas emission reductions in the US. He said this issue should not delay Canada's ratification of the Kyoto Protocol, as further efforts to renegotiate its targets for the first commitment period would not be practical, and would harm Canada's international standing. However, he said this was a significant issue for the second commitment period. He identified several ways to address the problem, including granting credits to producers and exempting emissions, but recommended that the most effective approach might be for countries to factor energy export considerations into their negotiating positions.

CLEAN AIR AND RENEWABLE ENERGY COALITION:

Marlie Burt, Director of Taxation at Suncor Energy, described the Clean Air and Renewable Energy Coalition and its initiatives. She stated that Canada's renewable energy production is less developed than its international competitors even though Canada has some of the best resources in the world for wind and small-scale hydro, and said that the Coalition has recommended that the government adopt policies to help the renewables industry to develop. She highlighted some of the challenges for renewables in Canada, including problems with market access, limited consumer choice, higher costs, marginal economics and market risks.

WIND: David Boileau, President of Harmony Wind Energy, discussed harnessing wind power in Ontario. He explained that wind power is the leading source of new renewable energy due to significant technical advances, its reliability, advances in siting, reductions in turbine costs, and its contribution to energy security. However, he added that Canadian wind power development lags far behind other countries. He described the activities of the Ontario Wind Power Task Force which aims to, *inter alia*, identify ways to attract private investment, develop more accurate data on winds in Ontario, and provide the Government of Ontario with constructive recommendations, such as on renewable portfolio standards and production tax credits.

CAPTURE, USE AND STORAGE OF CARBON DIOXIDE:

Graham Campbell, Director-General at Natural Resources Canada's Office of Energy Research and Development, reviewed the research and development work being conducted on carbon dioxide capture, use and storage. He noted that 12 relevant projects are underway in Canada aimed at advancing relevant technologies and reducing their costs, including a project on oxygen-fired combustion with carbon dioxide recycling, and a study to assess the potential to store carbon dioxide in underground geological beds and abandoned fossil fuel reservoirs. He concluded by suggesting that, while this ongoing work should not be seen as a "silver bullet" solution, it does offer the possibility to break the link between increased energy from fossil fuels and carbon dioxide emissions.

COSTS FOR CAPTURE AND SEQUESTRATION OF CARBON DIOXIDE IN WESTERN CANADIAN GEOLOGICAL MEDIA:

Larry Fisher, Senior Research Director at CERI, briefed participants on a recently-completed CERI study on the costs and opportunities for the capture and geological sequestration of carbon dioxide. The study developed an inventory of 200 sources of carbon dioxide in western Canada, and estimated the costs for capture, transportation and storage of carbon dioxide in disused oil and gas reservoirs. Fisher highlighted the considerable potential of this approach.

FUEL CELL OPPORTUNITIES: Kevin Harris, Business Development Manager at Hydrogenics Corporation, explained that fuel cells have high efficiency and reliability, require less maintenance and produce virtually zero emissions. He acknowledged that there are some complicated issues to resolve, including hydrogen availability, infrastructure, and high costs, but noted that the costs are coming down. He indicated that the industry is still in the early stages of development, and that driving forces for fuel cell development would include energy market deregulation, growing expectations for distributed power generation, discontinuity between energy supply and demand, and environmental concerns.

THE CANADIAN TRANSPORTATION FUEL CELL ALLIANCE: Rodney Semotiuk, Transportation Energy Advisor at Natural Resources Canada, discussed Natural Resources Canada's fuel cell program, which funds Canadian companies and universities to look at, *inter alia*, hydrogen production, storage and fuelling safety, and fuel cell system integration and enabling technologies. He said the program aims to demonstrate greenhouse gas reduction potential, evaluate fuelling routes for fuel cell vehicles, and provide support for fuelling infrastructure, including standards, codes, training and safety. Semotiuk also outlined the new Canadian Transportation Fuel Cell Alliance initiative and addressed common misconceptions about hydrogen safety.

QUESTION-AND-ANSWER PERIOD: In response to a question on internal corporate emissions caps, John Hawkins said there is an expectation within BP that business units will comply with the emissions limits set by the company. Hugh Porteous said Alcan's greenhouse gas reduction strategy requires every plant to identify and quantify options for reduction, and that management incentives are tied to meeting emissions targets.

When asked what Canada can do to put more "teeth" into the renewable energy industry, Marlie Burt suggested augmenting existing production incentive credits and underscored the importance of dealing with consumer demand.

SESSION FIVE: NORTHERN DEVELOPMENT

This session, which focused on issues of specific concern to the development of the northern region of the continent, was held on Thursday afternoon and moderated by IISD's Climate Change Director, John Drexhage. In introducing the session, he juxtaposed concerns over climate change impacts in the north with controversial issues such as exploration and drilling in Alaska, as well as pipeline transmission and oil and gas development in northern Canada.

GEOLOGICAL PERSPECTIVE – MACKENZIE DELTA GAS: Giles Morrell, Senior Petroleum Geologist with Indian and Northern Affairs Canada, spoke on the development of natural gas resources in the Mackenzie Delta. Highlighting reports that the Beaufort Sea and Mackenzie Delta could generate "prolific quantities" of natural gas and oil, he drew attention to significant recent interest in investment to develop these resources. He noted that the North presents some challenges to investors, with high entry costs and environmental concerns. However, he said such issues could be addressed by taking a balanced approach, and predicted that the development of a commercially-viable pipeline would mark an important step on the road to development of the area's gas resources during the coming decades.

ENVIRONMENTAL PERSPECTIVE: Randell Pokiak, Inuvialuit Settlement Region, provided an environmental perspective of northern oil and gas development. He explained that in the 1970s and 1980s, the Inuvialuit people had no official control over activities on their land, and that the Inuvialuit Settlement Region suffered major social, economic and environmental impacts from oil and gas activities. He described the Inuvialuit Final Agreement, a land claim treaty signed between the Inuvialuit people and the government, and explained that owning land means that the Inuvialuit people now have some control over their destiny and that industry must now address their demands. He

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added that climate change is affecting the lives of the Inuvialuit people, because they can no longer predict the exact timing of the seasons or animal migrations.

QUESTION-AND-ANSWER PERIOD: In response to a question on the impact of climate change on the exploitation of gas resources in the Mackenzie Delta, Giles Morrell said its effects may not be immediately obvious, although it could have a variety of impacts, such as on construction schedules for a gas pipeline. Replying to a question on the viability of an over-the-top route for a pipeline through the Beaufort Sea, Giles said this shorter route was an attractive possibility, although the presence of ice and ice pressure ridges would present some technological challenges. He highlighted the need to identify innovative, cost-effective solutions.

KEYNOTE LUNCHTIME ADDRESSES

In addition to the Plenary sessions outlined above, participants also heard lunchtime addresses during the conference from two of Canada's Ministers.

MINISTER OF NATURAL RESOURCES: On Wednesday, Herb Dhaliwal, Canadian Minister of Natural Resources, emphasized the need to strengthen continental energy markets with improved regulatory compatibility, predictability and consistency. He noted that Canada intends to expand energy trade with the US and Mexico, but underscored that Canada's environmental and social standards would not be compromised. Minister Dhaliwal stated that improving energy efficiency is the best way to reconcile Canada's economic and environmental objectives, and highlighted the need to accelerate the uptake of renewable energy technologies, fuel cells, and carbon dioxide capture and storage technologies. Regarding the US Administration's new climate change strategy, Minister Dhaliwal expressed concern about the lack of clear greenhouse gas emissions targets; called for faster improvements in energy efficiency and a more rapid uptake of cleaner energy options; and stated that the long-term interests of the US and all nations would best be served by US participation in the Kyoto Protocol. In response to a question on the likelihood of Canada ratifying the Kyoto Protocol this year, Minister Dhaliwal emphasized Canada's continued support for the Protocol, but was unable at this stage to confirm a date for ratification.

MINISTER OF THE ENVIRONMENT: The keynote address on Thursday lunchtime was presented by David Anderson, Canada's Minister of the Environment. On ratifying the Protocol, he quoted Prime Minister Chretien's statement last year that the successful negotiations in Bonn "open the door for Canada's ratification" in 2002. However, Anderson noted that although Canada has the clear aim of ratifying, such a step would be provisional on the completion of meaningful consultations with provinces, territories, stakeholders and other Canadians, and would also require a clear implementation plan in which no region would bear an unreasonable burden. On reaching the Kyoto targets, he said Canada is "probably one-third of the way there" in terms of programs and plans agreed to so far. Further measures likely to be adopted include domestic emissions trading, targeted measures, and the Protocol mechanisms. Taking issue with the assumption that the impacts of meeting Kyoto targets are always negative, he highlighted examples of corporate greenhouse gas initiatives that have resulted in significant cost savings.

Minister Anderson welcomed the Bush administration's new climate change strategy and hoped it would mark a first step towards re-engagement with the international community on climate change, while noting that it represented only a small shift away from business-as-usual. He closed his speech by highlighting clean energy exports as a major issue for Canada. In response to a participant's question on whether a positive outcome on this would be a prerequisite for ratification, Anderson said it was not being linked to that, although if progress was made then clearly it would make the decision on ratification easier.

CLOSING KEYNOTE ADDRESS: MANAGING ENVIRONMENTAL AND ECONOMIC RISK OF CLIMATE CHANGE

On Thursday afternoon, Lorne Taylor, Minister of Environment for the Government of Alberta, presented the conference's closing keynote address. While acknowledging that action on climate change is necessary, he stressed that ratifying the Kyoto Protocol could have "disastrous" consequences for Alberta's economy. He said Canada must understand the risks before committing to an international agreement, and underscored that it should gain credit for its clean energy exports to the US. Minister Taylor emphasized that all Canadians must share the cost of reducing emissions equally, and that no jurisdiction or sector should bear an unfair burden. He encouraged the Canadian Government to work with the US, commit funding for purchasing international greenhouse gas emissions credits, and develop a national climate change plan that is acceptable to all provinces.

In response to a question concerning the degree of consensus between the provinces, Minister Taylor replied that only Quebec and Manitoba seem to favor ratification of the Kyoto Protocol.

CLOSE OF THE CONFERENCE

The conference closed on Thursday afternoon, 21 February, with final remarks from the co-organizers. CERI President and CEO Philip Prince thanked participants for their attendance. David Runnalls, President and CEO of IISD, highlighted the "impressive collaboration" with CERI in organizing this event, and noted the excellent timing of the meeting. Thanking participants for their active input, he closed the meeting shortly after 3:45 pm.

THINGS TO LOOK FOR

EARTH TECHNOLOGIES FORUM: This conference and exhibition on global climate change and ozone protection technologies and policies will be held from 25-27 March 2002 in Washington, DC. Participants will discuss current technologies and efforts to bring them into the marketplace. For more information contact: tel: +1-703-807-4052; e-mail: earthforum@alcalde-fay.com; Internet: <http://www.earthforum.com>

PROGRAMME ON CLIMATE CHANGE - SCIENCE, IMPACTS AND POLICY RESPONSES: This event will take place from 15-19 April 2002 at Imperial College, London, UK. The five-day modular programme aims to bring a diversity of professionals together to help them understand the underlying science and the business impact of climate change and responses. For more information contact: Ulrika Wernmark; tel: +44-20-7594-6886; fax: +44-20-7594-6883; e-mail: u.wernmark@ic.ac.uk; Internet: <http://www.ad.ic.ac.uk/cpd/climate.htm>

WORKSHOP ON CLEAN ENERGY EXPORTS: This UNFCCC-related workshop is being held in early May in Whistler, British Columbia, Canada. For more information contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.de; Internet: <http://www.unfccc.de>

16TH SESSION OF THE UNFCCC SUBSIDIARY BODIES: SB-16 will take place in Bonn, Germany, from 3-14 June 2002. For more information contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.de; Internet: <http://www.unfccc.de>

EIGHTH CONFERENCE OF THE PARTIES TO THE UNFCCC: COP-8 is provisionally planned to take place from 23 October - 1 November 2002 in New Delhi, India. For more information contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; Internet: <http://www.unfccc.int/>