

U.S. - CANADA CLEAN ENERGY DIALOGUE ACTION PLAN II

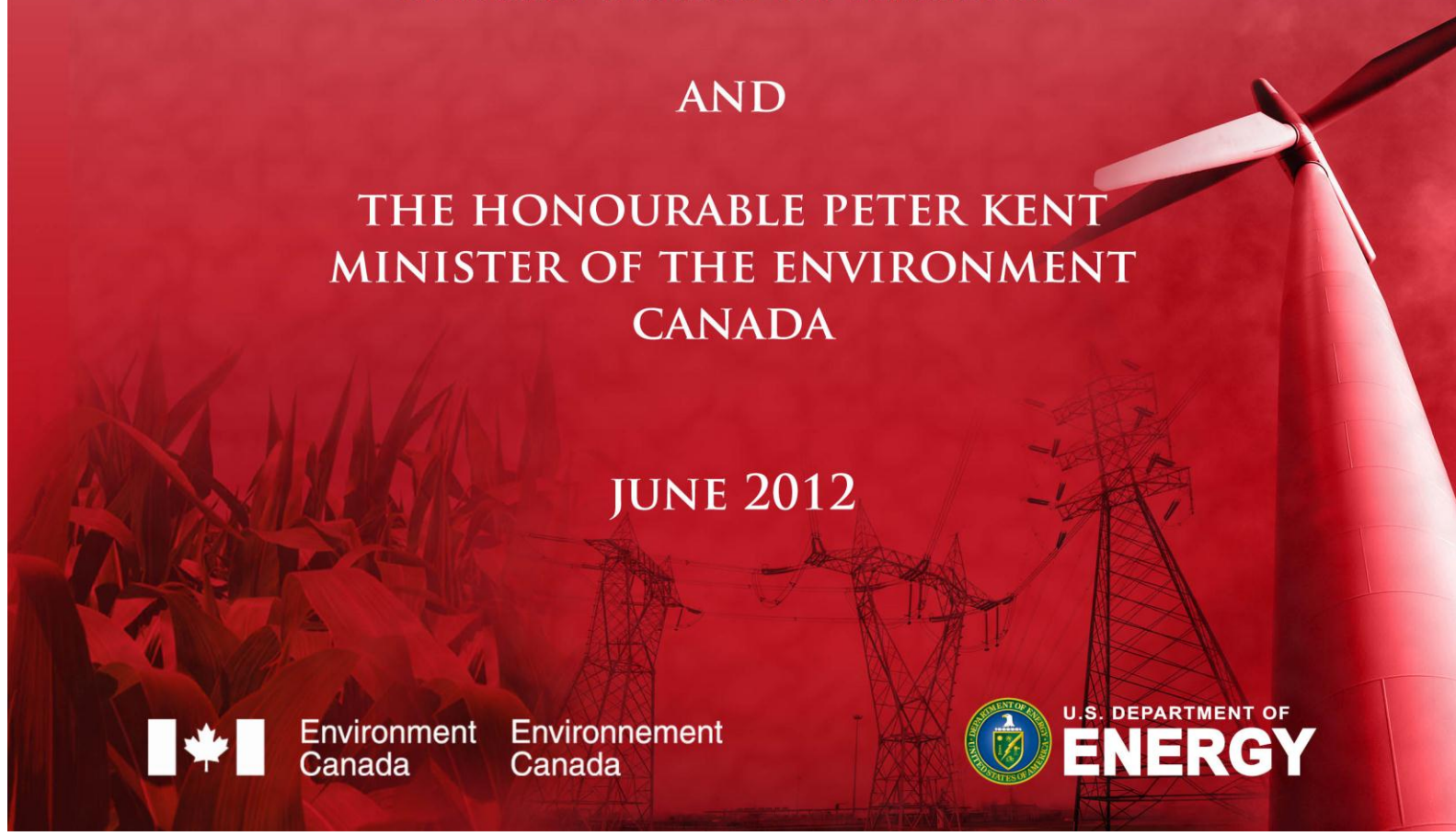


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Environment Canada Environnement Canada



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U.S.—Canada
Clean Energy Dialogue
Action Plan II

Transitioning to a Low-Carbon Economy

Canada and the United States have a strong bilateral energy relationship. Energy fuels our prosperity, secures our future, and challenges us to reduce its effects on global climate change. The U.S.-Canada Clean Energy Dialogue (CED) began in 2009 to strengthen bilateral collaboration on clean energy technologies and seek solutions for reducing greenhouse gas (GHG) emissions to accelerate the transition to a low-carbon economy. Today, our national responses to climate change are more coordinated. Our emission reduction targets are aligned. We are pursuing North American standards for vehicles. We continue to share a common vision of a low-carbon North American economy powered by clean energy.

Action Plan II describes initiatives that CED Working Groups plan to implement under Phase II of the CED to further progress toward a low-carbon economy that enhances energy security and revitalizes our economies through the creation of clean energy jobs.

Progress to Date

President Barack Obama and Prime Minister Stephen Harper launched the CED in February 2009. Since that time, the CED has provided an important mechanism for the United States and Canada to engage and align efforts on the development of clean energy technologies. A number of initiatives have helped move our two countries toward this goal by strengthening collaboration on innovative clean energy technologies.

The U.S. Department of Energy (DOE), Natural Resources Canada (NRCan), and Environment Canada are implementing the CED. They created three joint Working Groups to carry out its work and developed and implemented a CED Action Plan for Phase I. The September 2009 Action Plan identified collaboration in three focus areas: Carbon Capture and Storage (CCS), the Electricity Grid, and Clean Energy Research and Development (R&D). Progress reports on the 20 projects undertaken so far were provided in September 2009 and February 2011 to President Obama and Prime Minister Harper.

The **Carbon Capture and Storage (CCS) Working Group** undertook a number of initiatives to enable the rapid development and deployment of CCS in the United States and Canada including the following:

- DOE and Canadian entities spent \$5.2 million to expand work on the International Energy Agency GHG (IEAGHG) R&D Programme's Weyburn-Midale Carbon Dioxide Monitoring and Storage Project. These funds allowed the project's final phase to focus on best practices for the safe and permanent storage of carbon dioxide (CO₂) that is used in enhanced oil recovery (EOR).
- Work on a North American Carbon Storage Atlas under the North American Carbon Atlas Partnership began and was completed in April 2012. It resulted in a compatible mapping methodology, and in extensive data sharing on large sources of carbon emissions and potential storage sites in North America.
- The Working Group initiated efforts to advance collaborative research on next generation CCS technologies such as chemical looping and pressurized oxy-combustion.
- Knowledge-sharing was the focus of the Working Group's first Binational Conference held in May 2010. At the second bilateral meeting in November 2010, information, best practices and lessons learned were shared.
- The United States and Canada cooperated on regulatory issues, large-scale CCS projects and CCS demonstration projects.
- DOE and NRCan signed a Declaration of Intent (DOI) Concerning Cooperation on Energy Science and Technology on April 15, 2010, to advance bilateral collaboration in two key areas: bioenergy and CCS.

The **Electricity Grid Working Group** focused on facilitating the long-term transition to a modernized electricity grid. The Working Group held a number of significant bilateral events and completed foundation papers on key issues:

- The bilateral forum in February 2010 on Building the Power Workforce of Tomorrow focused on training and recruitment issues in the electricity sector.
- At the bilateral conference, Increasing Opportunities for Trade in Clean Electricity, in May 2010, stakeholders identified potential clean electricity resources and markets that could provide a foundation for increasing trade in clean energy.
- At the Smart Grid Policy Leadership Forum held in cooperation with the Ontario Independent Electricity System Operator and the University of Waterloo in

January 2011, government and industry leaders discussed key policy issues raised by the transition to a smart electric grid.

- NRCan established a Smart Grid Standards Task Force to provide Canadian input into standardization efforts of the U.S. National Institute of Standards and Technology.
- The Working Group completed foundation papers that examine policy and regulatory issues associated with energy storage, the smart grid and renewable portfolio standards. The issues included regulatory constraints, how the adoption of energy storage can assist in the integration of renewable energy projects, and how renewable power procurement policies can act as barriers in clean energy trade.

The **Clean Energy R&D Working Group** facilitated cross-border R&D collaboration by connecting Canadian and U.S. experts in priority areas, including future-generation biofuels, clean engines and vehicles, and energy efficiency. The Working Group undertook the following initiatives:

- Workshops that strengthened bilateral collaboration in light-weight vehicles, biofuels, algal biomass, and the measuring, reporting and verification of GHG emissions.
- Exchange of information on Canadian and U.S. R&D facilities and collaborative research on biomass pyrolysis.
- The U.S. Environmental Protection Agency and NRCan partnered to expand the ENERGY STAR® labelling program for equipment and appliances, thus helping consumers identify the most energy-efficient ENERGY STAR®-qualified products, and facilitating harmonization of the North American equipment market.
- DOE and NRCan, or their respective laboratories, signed several bilateral R&D agreements under which they collaborated on light-weight vehicles, algal biofuels, bioenergy and energy efficiency.
- Collaboration on a building energy benchmarking system to manage energy consumption and reduce GHG emissions from commercial and institutional buildings.

Priority Areas for Bilateral Collaboration under Phase II

Action Plan II initiates the next phase of the CED. In Phase II of the CED, the Working Groups are renewing their efforts to enhance bilateral collaboration on the development of clean energy technologies to reduce GHG emissions and increase energy security.

The Working Groups examined their initiatives to date and determined to continue their efforts to deepen bilateral collaboration in the three focus areas: CCS, the Electricity Grid, and Clean Energy R&D. In addition, a greater emphasis is to be placed on energy efficiency to take advantage of an expanded array of opportunities. Therefore, the Clean Energy R&D Working Group was expanded and renamed – the Clean Energy R&D and Energy Efficiency Working Group – to incorporate increased collaboration on energy efficiency. The three Working Groups decided to focus on the following priorities over the next two years.

Carbon Capture and Storage (CCS)

The Carbon Capture and Storage Working Group (CCSWG) decided to put in place framework conditions to further enable the rapid development and deployment of carbon capture and storage in Canada and the United States. Under Phase I of the CED, the Working Group established an Action Plan to facilitate collaboration on CCS as well as to contribute to the overall objectives of the dialogue.

Phase I confirmed that Canada and the United States have very similar objectives and challenges to overcome in advancing the demonstration of CCS before it can be more widely deployed as a commercially viable technology. The high costs and risks currently associated with the integration of CCS are being addressed through significant public-private investments in large-scale demonstration projects. R&D in less costly and more efficient next generation technologies is being pursued, policy and regulatory frameworks are evolving to provide more certainty and stronger incentives, and there is increased effort by industry proponents and governments to effectively engage and communicate with the public.

Even so, the barriers to advancing the demonstration of CCS need ongoing attention. This includes, for example, reducing CO₂ emissions from coal-fired power stations but also from other industrial sources such as natural gas processing, oil extraction and refining, fertilizer manufacturing, cement, iron and steel, and ethanol production.

For Phase II of the CED, the CCSWG decided to continue to focus on CCS initiatives, including the use of CO₂ as a valuable asset for EOR. This work is to build on the initiatives from Phase I to further progress on the development and deployment of CCS in the United States and Canada.

The activities identified in Phase I provide the initial building blocks to facilitate collaboration in CCS. Thus, within the framework of the Trilateral Energy Science and Technology Agreement (TESTA), the United States and Canada have identified the following priorities for Phase II:

1. Technical Collaboration on Research, Development and Demonstration

Canada and the United States continue to encourage and support collaborative research on the next generation of CCS technologies and to promote the development of breakthrough technologies that provide higher efficiency and relatively lower cost for CCS. Government laboratories, industry-led research programs, universities and other research organizations in both countries are pursuing a broad spectrum of R&D initiatives that address all aspects of the CCS chain of CO₂ capture, transport, utilization, and storage. An initial dialogue between researchers from DOE's National Energy Technology Laboratory and NRCan's Canmet Energy Technology Centre was held on April 30, 2012 in Pittsburgh to affirm where existing collaborations between researchers and new opportunities in the United States and Canada can be further enhanced throughout Phase II.

To advance development of clean electricity generation systems that integrate CO₂ capture, Phase II is to include exploring opportunities to enhance research collaboration on

- next generation post-combustion, oxy-combustion and gasification/pre-combustion-based capture systems
- syngas processing and the polygeneration of multiple products (including CO₂)
- advanced modelling tools for development and deployment of clean coal CCS technologies

Opportunities also are to be explored to enhance collaboration on building expertise to ensure the integrity of permanent CO₂ storage in geological formations. This work is intended to leverage existing Canada-U.S. collaboration, such as the IEAGHG Weyburn-Midale CO₂ Monitoring and Storage Project at a CO₂-Enhanced Oil Recovery project in southern Saskatchewan, with the projected completion of a best practices manual in mid-2012.

As well, a joint U.S.-Canada project is planned to study the effects of CO₂ storage on the Basal Cambrian Aquifer that straddles and encompasses much of the Canadian Prairie

provinces and U.S. Northern Plains states. Research on the impact of CO₂ impurities also is to be explored.

Continued efforts are planned on the development of the North American Carbon Storage Atlas (NACSA) that was initiated in Phase I. The NACSA was completed in April 2012 and formally launched on May 1, 2012. A key feature is an on-line interactive version of the NACSA for public use, with a process for ensuring that any updates and enhancements to the information are automatically integrated on an ongoing basis.

Project developers, policymakers and regulators decided to continue to meet to share experiences, best practices and lessons learned on approaches to measurement, monitoring and accounting at CO₂ storage sites, including the ongoing monitoring of injected CO₂. This process started in May 2012 with a meeting in Alabama to exchange information.

In terms of large-scale fully integrated CCS demonstration projects, governments and industry in both countries made significant progress in Phase I, increasing funding commitments and advancing a series of first-of-a-kind projects. As this first wave of projects continues to rollout during Phase II, the focus on knowledge-sharing is to continue as new experiences, challenges and lessons learned are realized throughout the projects' lifecycle. In Phase II, many large-scale demonstration projects face the critical stages of making final investment decisions and proceeding with construction. To start, a meeting in Western Canada in Fall of 2012 is planned, to bring together the proponents of demonstration projects from the United States and Canada to discuss and share their experiences and challenges in overcoming the barriers to deployment.

It also will be important in Phase II to discuss the co-benefits of polygeneration of multiple products with CCS (i.e. co-producing CO₂ with other value-added products such as hydrogen, urea, etc.), as well as value-added uses for captured CO₂ that can be combined with eventual permanent geological storage.

Adding value to the CCS chain is increasingly recognized as being important for helping to formulate a positive business case so that demonstration projects can advance. In particular, the injection of CO₂ for EOR offers a valuable revenue stream to strengthen the business case for CCS. Both countries already have extensive experience in the deployment and regulation of commercial CO₂-EOR and its accompanying pipeline infrastructure.

2. Dialogue on CCS Policies and Practices

Phase II of the CED should enable further sharing of experiences and best practices as jurisdictions on both sides of the border continue to put in place their policy and regulatory frameworks. This includes progress towards overarching GHG legislation and/or regulations to provide market-based incentives for companies to attract financing and enable investment in CCS projects. In an integrated North American energy market, it is important to ensure that overarching policy frameworks in each country that have an influence on CCS are at the very least informed by one another's policies.

There are ongoing efforts in both countries to provide project proponents and other affected stakeholders with more clarity and guidance on legal and regulatory issues specific to CCS. Particularly for CO₂ storage, under Phase II, the Working Group decided to encourage different jurisdictions in the United States and Canada to learn from each other on how issues are being addressed under both new CCS-related rule-making and application of existing sub-surface-related tenure and regulatory systems. This work is to include a focus on issues such as regulations for CO₂ monitoring, long-term liability for stored CO₂, compatible standards and practices, and combining or transitioning CO₂-EOR operations to permanent geological storage.

Under Phase II, the dialogue between Canada and the United States encompasses knowledge-sharing between policymakers and regulators, as well as between project proponents in how they have addressed, or how their large-scale projects have been impacted by, policy and regulatory issues. The meeting planned to take place in Western Canada in Fall of 2012 would provide an opportunity to share the early learning from demonstration projects.

3. Sharing of Best Practices on CCS Communications and Public Engagement

Public engagement and communications are crucial components in the development and approval process for CCS projects. Public engagement occurs at the local level for specific projects, as does an overall understanding and acceptance by the general public that CCS is a critical emissions abatement technology. Poor engagement strategies and a lack of understanding and acceptance of CCS could be detrimental to projects and to our respective commitments to significantly reduce GHG emissions. Both countries continue to work toward understanding and implementing the best methods and domestic strategies for engaging the public to ensure CCS is well understood as a crucial component in achieving our environmental goals.

This work includes knowledge-sharing specific to the experiences, lessons learned and best practices associated with the current first wave of demonstration projects in the United States and Canada on outreach work to consult and engage with the public. Several projects have gone through extensive public consultations and engagement since the launch of the CED, presenting opportunities for project developers to learn from this during Phase II.

The experiences from projects can then be used to inform overall domestic strategies for communicating and public engagement on CCS. Opportunities for enhancing existing best practices on public engagement, such as those established by the Regional Carbon Sequestration Partnerships, are to be explored.

Electricity Grid

North America's electricity sector is entering a period of rapid change characterized by substantial reinvestment in generation and transmission assets, a need to improve its environmental performance, the introduction of new technologies and the potential for electrification of other sectors of the economy, such as transportation.

The Electricity Grid Working Group (EGWG) aims to identify key opportunities and barriers associated with advancing an efficient and clean electricity grid within Canada and the United States and outline steps for bilateral collaboration and dialogue under Phase II of the CED. The steps include further joint projects and areas for policy and regulatory alignment.

Under Phase I of the CED, the EGWG facilitated the dialogue on a number of priority areas, including clean electricity trade, the smart grid and clean power technologies, power storage technologies, and capacity building in the electricity sector. For Phase II of the CED, the EGWG has identified the following priority themes:

1. Setting the Scene for Offshore Renewable Energy Technologies Deployment

As part of a commitment to promote the broader development and deployment of renewable energy, both countries are examining offshore renewable energy technology development potential. Some of this development is to occur in areas under federal land in both countries. Dialogue and exchange of information are needed on how regulatory frameworks for deployment of offshore renewable energy technologies and transmission associated with offshore generation can best facilitate this process and provide policymakers with solutions to challenges facing this sector.

In the United States and Canada, multiple federal departments and agencies are responsible for regulating and developing marine renewable energy. Clarity on the regulatory authority, administrative roles of various departments, and federal responsibilities in both countries should improve policymakers' understanding of marine renewable energy regulatory regimes in Canada and the United States.

While the North American marine renewable energy sector is in a nascent stage of development, several European countries have substantial offshore project experience. Countries such as Denmark, the United Kingdom and the Netherlands have established regulatory regimes governing offshore wind energy development, and in some cases, ocean renewable energy activities. The lessons learned from these European experiences and the regulatory regimes instituted to manage this evolving sector could prove invaluable in guiding regulatory regime management in North America.

To this end, the EGWG began a two-part study. The initial phase includes an overview of the international marine renewable energy experience, with an emphasis on regulatory regimes pertaining to offshore operations and rights allocation. This phase was completed in spring 2012, and provided a comprehensive review and analysis of the offshore renewable energy regulatory and permitting environments in Denmark, Germany, Ireland, the Netherlands, Portugal and the United Kingdom.

It is proposed that this initial phase of the study would be followed by a second phase that would provide an overview of U.S. and Canadian regulations and authorities related to operations and rights allocations. This work would integrate the potential relevance of lessons learned from the international experience document from first phase. This second phase would be initiated later in 2012 with a target completion date of spring 2013.

In addition, the EGWG may consider enhancing discussions among key policymakers and stakeholders to explore ways to address regulatory challenges facing the deployment of offshore renewable energy technologies.

2. Advancing Smart Grid Technologies

Introducing information and communications technologies to the electricity grid – making the transition to a so-called “smart grid” – is a potential game changer for the sector. This could achieve a number of objectives, including improving the integration of renewable resources such as wind, better engaging consumers in their own energy management, and enabling the electrification of the transport sector.

With increased smart grid activity across Canada and the United States, there is an increasing need to build awareness, share knowledge and progress, and collaborate on research and demonstration projects.

NRCan is investing significant resources in smart grid technologies demonstration through the Clean Energy Fund and the ecoENERGY Innovation Initiative announced in Budget 2011. DOE is making similar investments in the smart grid area. In order to improve understanding of lessons learned and best practices from these activities, mechanisms could be explored to improve information exchange between DOE and NRCan.

Through its Smart Grid Standards Task Force, Canada is working towards improving standards development activities and will release a Smart Grid Standards Roadmap in 2012.

Opportunities could be explored to:

- enhance the profile of this work with the goal of improving the representation of Canadian interests in the U.S. National Institute of Standards and Technology Interoperability Panel and international standardization activities
- exchange information about consumer awareness and receptivity to smart grid and time-of-use pricing by building on experiences in Ontario and the U.S. Smart Grid Consumer Collaborative

In the United States, the Federal Smart Grid Task Force, directed by DOE's Office of Electricity Delivery and Energy Reliability, includes experts from the Departments of Agriculture, Commerce, Defense, Homeland Security, and State, and from the Federal Energy Regulatory Commission, the Environmental Protection Agency, and the Federal Communications Commission. The mission is to ensure awareness, coordination and integration of the diverse federal activities related to smart grid technologies and practices. The Task Force implements administration policies articulated by the National Science and Technology Council Subcommittee on Smart Grid, while coordinating federal research; development and demonstration; international activities; and outreach and education efforts.

Currently, information on smart grid companies, products and demonstration projects is scattered and distributed on the Internet. In the United States, DOE funded the creation of the Smart Grid Information Clearinghouse (SGIC). Contents of the SGIC portal include demonstration projects, use cases, standards, legislation, policy and regulation, lessons learned, best practices and advanced topics dealing with R&D. The

SGIC database highlights the rapidly evolving opportunity to use electricity in an environmentally responsible way.

Canada has recently established a Canadian Smart Grid Repository (SGR), which is a Web-enabled, public-facing, industry-led database that lists government, utility and university smart grid related projects in Canada. By disseminating results of R&D, demonstration projects and other Canadian smart grid activities, the SGR will support the development of “smarter” electricity grids in Canada and their associated benefits (e.g., reduced GHG emissions, support electrical vehicle roll-out, improved grid reliability). Canada’s SGR will complement the SGIC hosted by DOE. The initial public launch of the SGR took place in spring 2012. Promotional activities will enhance the profile of the SGR among public, industry, stakeholder and academic audiences. Content will be added on an ongoing basis.

Canada and the United States intend to facilitate exchanges of information and lessons learned from investments in demonstration projects, smart grid standards development and adoption, and sharing of respective smart grid activities among key policymakers and stakeholders. This work is planned to be initiated in 2012, for completion in 2013.

3. Realizing the Potential of Power Storage Technologies

Electricity storage technologies have the potential to enable better integration into the electricity grid of a growing share of electricity from variable, intermittent renewable technologies and support increased clean electricity trade between the United States and Canada. Work to advance Canada-U.S. knowledge transfer on market design, regulatory approaches, and policies to promote uptake of energy storage technologies, including load management and demand response, should build on foundation work undertaken in the first phase of the CED. Specifically, as the next step, the EGWG is to engage key stakeholders and policymakers on ways to advance and realize the potential of power storage technologies. Options could be examined to share information and lessons learned from technology demonstrations in the area of energy storage that have been done under Canada’s Clean Energy Fund and under DOE’s energy storage programs.

As an initial step, the EGWG worked with Canadian provinces and territories under the umbrella of the Canadian Energy and Mines Ministers Conference to examine the role that energy storage can play in integrating renewable resources. A workshop was held in May 2012 that looked at the challenge of renewables integration from the standpoint of maintaining electric reliability. In this context, the EGWG incorporated U.S. perspectives on the use of energy storage into the workshop discussions.

4. Increasing Opportunities for Trade in Clean Electricity

The North American electricity market is deeply integrated across national borders. For example, electricity flows between Canadian provinces and interconnected U.S. jurisdictions exceed interprovincial power transfers. While these flows are a small percentage of overall generation and consumption, they are important for balancing loads and managing reliability at the margin in both countries.

The substantial integration between our two countries, both in physical terms, as well as in the management and oversight of the electricity system, means that there is common interest in understanding and addressing key policy and market trends, including increasing the supply of clean energy and associated transmission. The development of clean energy sources, including renewables, is a recognized priority of both countries.

Part of fostering the supply of clean energy is through the coordination of Canadian federal and U.S. state regulatory processes regarding international cross-border electricity projects and ensuring seamless power flows on the interconnected transmission grid. For example, the North American Synchrophasor Initiative could be used to better understand how to seamlessly integrate intermittent, variable sources of power into the electricity grid and how to operate existing and future transmission systems more reliably and efficiently.

The EGWG plans to review the findings from the Increasing Opportunities for Trade in Clean Electricity Conference held under the auspices of the CED in 2010 and, where appropriate, take follow-up action to address key points.

Clean Energy Research and Development and Energy Efficiency

Clean energy research and development (R&D) and energy efficiency are key pillars in the transition toward a prosperous and low-carbon economy. A number of energy efficiency measures can be adopted now to reduce energy consumption and its environmental impacts, whereas clean energy R&D focuses on the longer-term challenges associated with energy production and consumption.

The Clean Energy R&D and Energy Efficiency Working Group, in the second phase of the CED, aims to facilitate cross-border collaboration in priority areas, including: marine energy, advanced biofuels, transportation, buildings and communities, and energy efficiency.

In Phase I of the CED, the R&D Working Group focused on collaboration on future-generation biofuels, clean engines and vehicles, and energy efficiency. Initiatives in Phase II are planned to build on Phase I and place a greater emphasis on energy efficiency. The five priority themes and project initiatives outlined below have been identified for the second phase of the CED. Additional initiatives in areas of mutual interest are also to be explored.

1. Marine Energy

Both countries are actively engaged in this emerging area of clean electricity supply and are funding projects that advance promising technologies in various locations across North America. The following four projects present natural opportunities for information and knowledge-sharing, and address existing challenges to advance technology readiness:

- Joint investigation and development of more reliable underwater bearings assembly to help advance market acceptance. Sealed bearing assemblies that operate reliably in saline and turbulent underwater environments are a key enabling technology.
- The Working Group plans to conduct one or more workshops among government, industry, academic and regulatory stakeholders to develop a collaborative path forward on areas of common interest (barriers, standards, technical challenges, etc). The workshop should facilitate information exchange and knowledge-sharing on major marine energy program advances being realized by each country.
- Testing and information sharing of in-river stream turbine deployments, including data and knowledge related to technology performance and challenges.
- Environmental monitoring is to be undertaken to support and analyze performance of marine technologies already deployed within the Bay of Fundy.

2. Advanced Biofuels

Both countries are pursuing second and third generation biofuel development from a wide range of feed-stocks across multiple technology pathways. Biofuels are expected to play an important role in reducing GHG emissions from both on road and off-road vehicles. Information sharing and collaboratively undertaking technical investigations

can shorten development pathways, as well as lead to more effective investment of public R&D funding. The following four initiatives are planned:

- Conducting joint national biomass network workshops to determine shared interests and challenges in working toward one or more memorandum(s) of understanding (MOUs) to collaboratively resolve shared technical or market-related challenges.
- Investigating the pyrolysis of multiple feed-stocks and initial catalytic upgrading of resulting oils to help identify promising technology commercialization pathways.
- Testing with new fuels to help lower the cost and reduce the time taken to certify performance parameters of emerging biofuels.
- Information sharing on conversion potentials of available biomass to energy and inventorying federal initiatives related to biofuel sustainability and performance.

3. Advanced Transportation

Both countries and domestic auto manufacturers are investing heavily in developing alternative power trains (including for electric vehicles), more fuel efficient vehicle designs, and low-emission engines and fuels because low-emission and fuel-efficient vehicles are rapidly growing market segments. Through collaborative initiatives, favourable investment pathways can be narrowed and technology deployment barriers can be overcome, thereby aiding the industry in strengthening its product fleet while addressing various emission challenges. Planned collaborative projects include:

- Joint exploration of advanced light-weight magnesium alloy sheet metal fabrication methodologies. This initiative is to draw on the respective laboratory capabilities of each country in furthering the long-term objective of vehicle light-weighting.
- Conducting one or more workshops to address shared and emerging priorities related to the Transportation Technologies and Fuels Forum (covering topics such as biofuels, electric and natural gas vehicles).
- Facilitating discussions between key Canadian federal departments and provincial governments, DOE and U.S. national labs regarding options to harmonize data gathering related to electric vehicles and charging infrastructure for North America.

- Supporting the deployment of natural gas use in the transportation sector by working jointly to identify key areas for targeted research and development efforts related to natural gas vehicles and its associated infrastructure. This work should enhance the ongoing competitiveness of natural gas technologies by reducing barriers to market entry.

4. Advanced Buildings and Communities

The clean energy agenda includes the efficient end-use, effective integration of clean distributed generation into existing energy networks and far greater deployment of clean energy supplies. In this regard, advanced buildings and communities figure centrally in accelerating both smarter (and more efficient) loads, as well as the cost-effective deployment and integration of low-carbon and distributed generation sources into electricity networks. A key initiative to help advance these interests is:

- Cooperative modelling of renewable energy deployment and power system interactions. The modeling should facilitate policy analysis, option development and well-informed decision-making on the setting of suitable renewable energy resources and targets for reliable intermittent source integration into existing power systems.

5. Energy Efficiency

With rising energy demand, Canada and the United States are actively pursuing policy efforts to improve energy efficiency across all sectors of the economy. Energy efficiency is one of the most cost-effective ways to promote clean energy, address climate change, and support economic growth. Alignment on enhanced regulatory and programming tools should help overcome technical impediments and can help facilitate technology breakthroughs. Joint collaboration is planned on the following initiatives:

- Joint work to strengthen ENERGY STAR® labelling for equipment and appliances, furthering efforts undertaken during the first phase of the CED.
- Adaptation of the U.S. Portfolio Manager Building Benchmarking Tool for the Canadian market, to enable Canada and the United States to comparatively benchmark the energy use in commercial/institutional buildings and help encourage building improvements.
- Activities to accelerate the adoption of the new ISO 50001 Standard for Energy Management Systems in industry, including pilot ISO 50001 certification of an international company operating in both countries.

Next Steps

The initiatives described in this CED Action Plan II are to be implemented over the next two years with periodic reports on progress as these initiatives move forward.

Through the CED, the United States and Canada have an important opportunity to accelerate our collective progress toward a clean energy future. We intend to continue working together to advance our common goals of strengthening collaboration on clean energy technologies, addressing climate change, creating economic growth, and increasing energy security for the benefit of both nations. Our countries share the closest energy relationship in the world and have highly integrated economies. Clean energy is a crucial underpinning to our economies and to our environmental well-being.

Looking ahead, our joint efforts under Phase II of the CED should further enable the rapid development and deployment of CCS; advance the long-term transition to a modernized electricity grid; and facilitate cross-border R&D and energy efficiency collaboration by connecting Canadian and U.S. experts in these priority areas.

The CED continues to find and create synergies between Canada and the United States as both countries pursue common clean energy objectives within and between our integrated economies. We are committed to working through the CED to contribute to the transition to a low-carbon economy while enhancing energy security and revitalizing the economy through the creation of clean energy jobs.