The Integrated North American Electricity Market

Assuring an Adequate Supply of Electricity Through Cross-Border Cooperation and Trade

March 2005

Canadian Electricity Association

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Executive Summary

The North American electricity system, which interconnects Canadian and U.S. electricity markets, is among the most integrated and reliable in the world. It combines a diversity of fuel sources, extensive transmission interconnects and two-way trading that benefits both countries.

Looking to the future, growth in electricity demand in Canada and the U.S. will require increases in capacity in both countries. Both the U.S. and Canada project increases in the order of 25 percent in generation capacity by 2025 to satisfy increases in demand. In the U.S., recent efforts to meet this need have focused primarily on natural gas. However, a variety of factors have caused the price of natural gas to increase substantially. Moreover, Canada's ability to meet projected demand increases in the U.S. are questionable in light of projected increases in Canadian demand for natural gas, coupled with the fact that Canadian gas supplies will not be available indefinitely.

The more rational approach for meeting increased demand in the North American market is to take advantage of the diversity of fuel sources and generation supply. This can most effectively be done through on-going cooperation and trade between Canada and the U.S. The Canadian Electricity Association proposes the following areas of bi-national action to maintain adequate and diverse electricity supply in the North American market in the future:

- Greater dialogue on regional supply requirements.
- Mandatory reliability standards.
- Coordinated regulatory approaches to new cross-border transmission.
- A review of the role of emerging generation and transmission technologies.
- Opportunities to exchange experience and learning on demand-side measures.
- Coordinated strategies to manage GHG and other air pollutants.
- Continued emphasis on critical infrastructure protection.

The energy inter-dependence of Canada and the United States is a great advantage to both countries, in terms of reliability, economic development, and environmental performance. Closer co-operation and greater trade will only serve to heighten that advantage. The on-going dialogue around that closer cooperation is in the interest of all stakeholders. The Canadian Electricity Association recognizes this, and offers this paper to support that dialogue.

I. Long-Term Adequacy of Electricity Supply: A North American Concern

The bi-national electricity trading system that has evolved between Canada and the United States over more than a half century is, like the trading relationship in general, without compare. What began with small tie-lines and the development of boundary waters for hydroelectricity has evolved into extensive cooperative arrangements for managing transmission system reliability, major inter-ties across the Canada-U.S. border coast-to-coast, and significant trade volume, in both imports and exports. And since the 1980s, the combination of international agreements and regulatory actions has allowed for the creation of integrated North American electricity markets.

Within this bilateral trading system is a diversity of supply that reflects the differing fuel opportunities in our respective countries. In the United States, 51% of electricity generation needs are met by coal-fired generation facilities, 20% by nuclear generation, and 20% by natural gas, with hydroelectric capacity accounting for most of the remaining 9% of generation capacity. In contrast, 59% of Canadian electricity generation capacity is hydropower, 28% is conventional thermal power, and 13% is nuclear power.

The differences of these two supply systems have presented significant advantages to both the U.S. and Canada; when combined, these systems create efficiencies in supply management, stability in integrated systems, and greater security for the North American electricity market. For example, electricity generated from British Columbia hydroelectric facilities proved critical to maintaining adequate electricity supplies in California during the electricity crisis in that state a few years ago. The mid-western interconnections allow for significant efficiencies in resource management both north and south of the border, and cross-border electricity trade between Ontario and bordering states has been an important factor in the reliability of the electric grid around the Great Lakes.

Looking to the future, growth in electricity demand in Canada and the U.S. will require increases in capacity in our respective countries. Both the U.S. and Canada project increases of approximately 25 percent in generation capacity by 2025 to satisfy increases in demand. Recent efforts in the U.S. to meet demand increases have focused on a single fuel: natural gas. However, reliance on gas as the primary fuel source for future generation needs is not prudent. A variety of factors have caused the price of natural gas to increase substantially. Moreover, Canada's ability to meet projected demand increases in the U.S. are questionable in light of projected increases in Canadian demand for natural gas, coupled with the fact that Canadian gas supplies will shrink in the coming years. This is especially troubling, given the Energy Information Administration's projection that the increase in natural gas-fired generation facilities would require Canada to supply 23% of U.S. needs in the future from a current 17% of U.S. needs.

Instead, the more rational approach for meeting demand in the North American market is an approach that takes advantage of the diversity of fuel sources and generation supply. Rather than relying on a single fuel source, this approach would benefit from the strengths of the diverse integrated North American electricity market. Further, such an approach would promote a more secure North American electricity market, all the more important at this time given global geopolitical concerns in key energy supply regions. The availability and utilization of a range of supply options – different fuels, different technologies – is fundamental to a cost-effective, reliable, and secure system. Mirroring our seamless electricity market, generation options should reflect the range of fuel and generation technology choices that exist in the North American market.

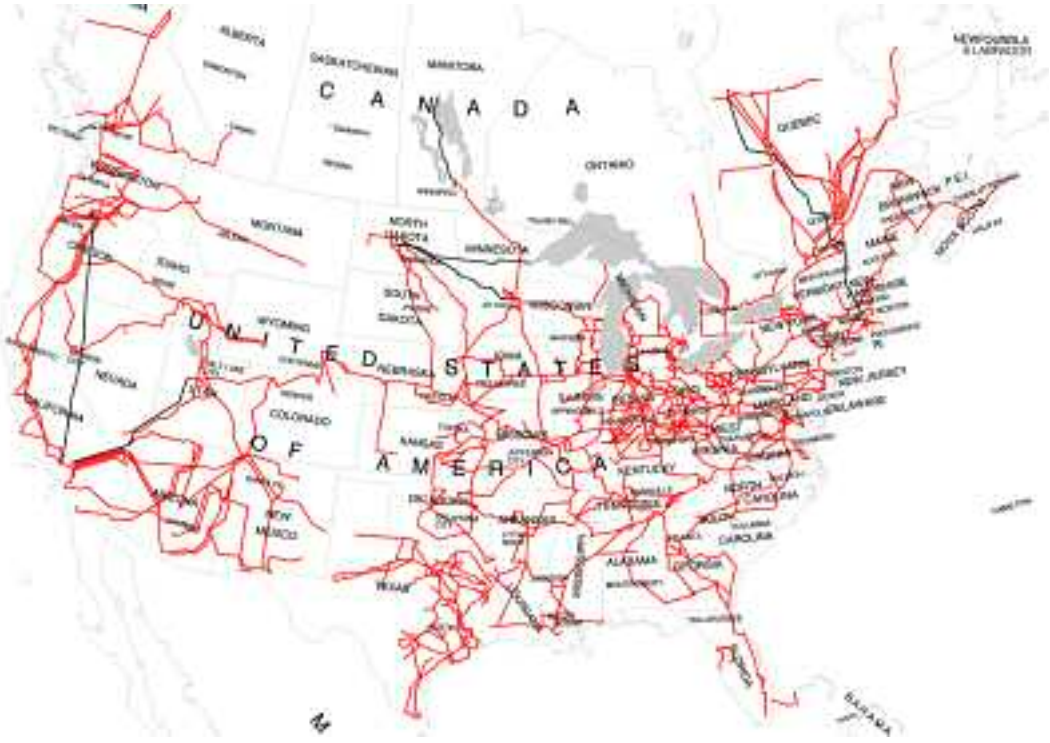
To realize this approach, there is a need to bring stakeholders together in our two countries to identify how best to capture the benefits from diverse supply options. North America has a wealth of options available to it, and needs to identify how best to ensure

that these are developed in an environmentally sound, economically prudent, security conscious manner. For its part, the Canadian Electricity Association ("CEA") is taking the initiative with this paper to propose measures for bi-national action to maintain adequate and diverse electricity supply in the North American market. CEA believes that the integrated North American electricity market is a testament to the extraordinarily cooperative working relationship between Canada and the U.S. The Free Trade agreement in NAFTA, and its bi-national precursor, the Canada-U.S. Free Trade Agreement, had as their forerunner a free trading relationship in electrical energy dating back decades. Electricity knows no borders, and managing it in our mutual interest is a common goal. Measures that build on this integration of international markets will help to secure a reliable supply of electricity in the future.

II. The Integrated U.S./Canadian Electricity Market

The diversity of the Canadian and U.S. electricity systems, the different balances of conventional and emerging technologies in our various regional generation mixes, and the differing market demands region by region over days, weeks, and seasons, have prompted a level of trade that benefits electricity consumers in every region across the continent. When linked across the international border, our diverse systems have created opportunities for efficiencies in regional systems management, reduced environmental impact, and improved reliability; these are vital achievements for all concerned.

North American Transmission Grid



Map copyright CEA. Lines shown are 345Kv and above. There are numerous interconnections between Canada and the U.S. under 345Kv that do not appear on this map.

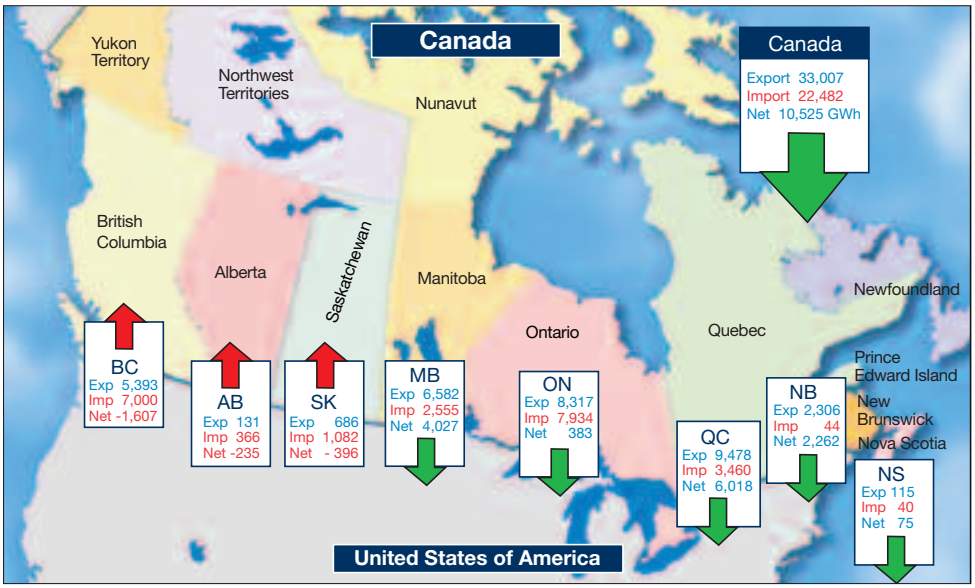
A. Details of the Integrated Market

The map of the North American Transmission Grid on page 4 offers a clear visual indicator of the extent of current integration. Electricity trade occurs at a range of points across the Canada-U.S. border, as shown below and on page 6, reflecting the largely north-south nature of the Canadian grid, as it is integrated with the more dense web of transmission infrastructure in the U.S.

Cross-border trade enables market participants to take advantage of diversity between the Canadian and U.S. electricity systems. The diversity and complementarity of our systems are first demonstrated by the different balances of various conventional and emerging technologies in our generation mixes. These differences primarily reflect availability of resources, as different geographic regions have access to different input resources. The pie charts on page 7 show the generation mixes for Canada and the U.S.

Electricity is now established as a key and growing part of the larger energy trade between the two countries, and it is increasingly two-way. Electricity trade between Canada and the U.S. stems primarily from two sources. First, generators in Canada are key suppliers to particular U.S. markets. In addition, generators in both countries take advantage of the trading relationship to optimize the performance of their respective asset portfolios, which contributes to lower electricity costs and

Exports and Imports between Canada and the United States, 2004

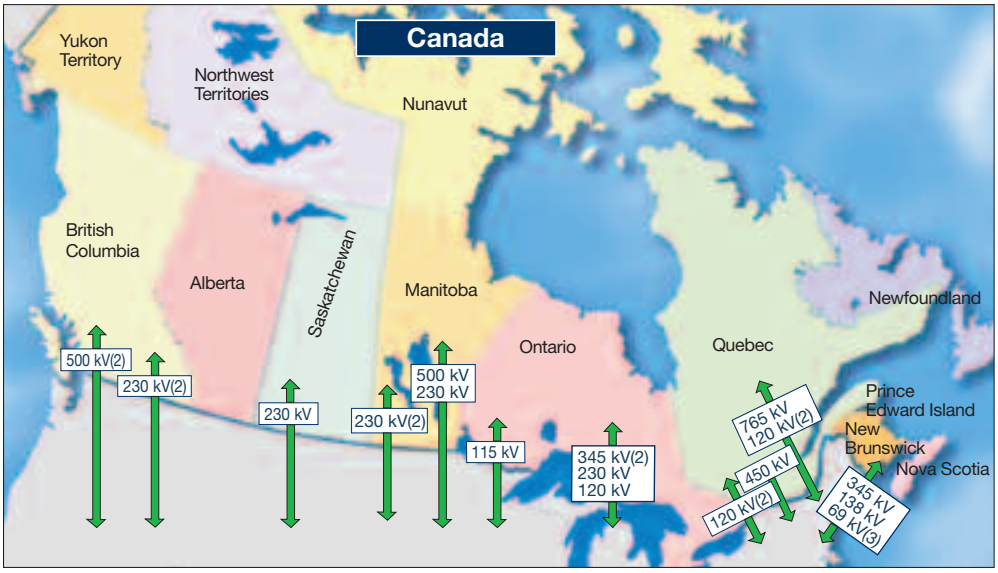


Source: NEB Electricity Exports and Imports, 2004.

higher overall system efficiency and reliability. The bar graph on page 7 demonstrates the extent of this two-way trading relationship.

The quantity of electricity exported from Canada has typically been 6 to 10 percent of production. At the same time, electricity imports to Canada have increased significantly. The fundamental point is that the market is a borderless one, and supply meets demand north to south or south to north as the market requires, to the advantage of consumers across the continent. Robust competitive wholesale markets in both the U.S. and Canada rely on integrated

Major Transmission Interconnections between Canada and the U.S.



Note: The numbers indicate the voltage of the power lines from each province to the states.
If there is more than one line with a given voltage, the number of lines is indicated in parentheses.

Source: NEB, Canadian Electricity Association and Natural Resources Canada.

U.S./Canadian markets. As the markets continue to open, the importance of cross-border trade will only increase.

Restructuring of the electricity industry remains an ongoing process in both Canada and the U.S. As with states in the U.S., provinces in Canada are pursuing restructuring agendas at varying paces. At present, approximately 50 percent of Canadian retail customers are in open markets (although regulated rates remain available to retail customers in both Ontario and Alberta). The map on page 8 provides the status of market restructuring in Canada.

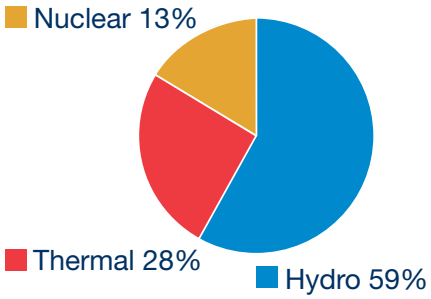
B. The Economic and Environmental Benefits of an Integrated Market

Cross-border electricity trade provides the opportunity to optimize the use of generating resources to the benefit of U.S. and Canadian market participants. When linked across borders, the diversity of our systems, our climates, and our demand profiles allow for efficient power flows north or south at various times depending on market circumstances. The resulting regional market efficiency gain reduces the overall need for generating facilities and results in lower generation costs to consumers. Moreover, electricity companies can derive environmental benefits through such efficiencies. For instance, a "must-run" fossil-fuel fired generator in the U.S. could sell off-peak power to a hydro generator in Canada, allowing the latter to "bank" energy (in the form of stored water) in its reservoirs. During periods of high demand, the hydro generator would release enough water to both meet its own needs and to assist in meeting the peak demand of its partner in this diversity exchange, thereby avoiding both emissions and higher costs from fossil peaking units. Such opportunities exist to a greater or lesser extent in each of the regional markets across the continent.

Efficiencies in regional systems management can also be achieved through participation in or coordination with regional transmission organizations ("RTOs"). In many cases, RTOs present an opportunity for the effective utilization of existing

Electricity Generation by Fuel Source in Canada and the United States, 2003

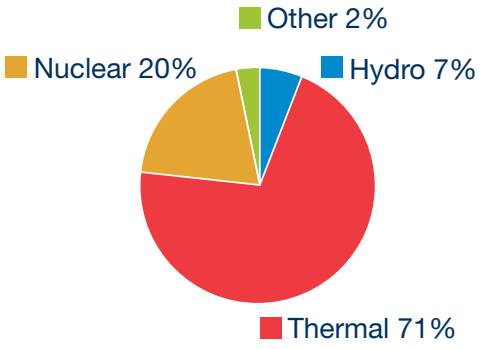
Canada
Net Electricity Generation, 2003



Total = 561 TWh

Source: Statistics Canada
Survey 2151

United States
Net Electricity Generation, 2003



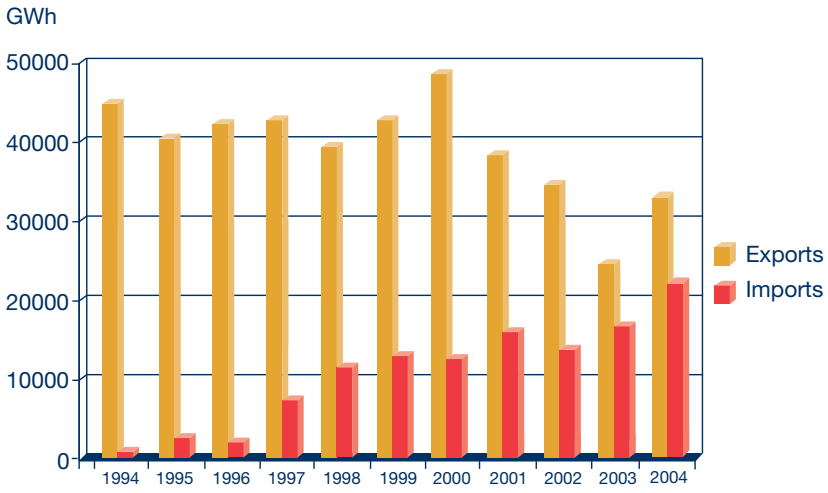
Total = 3848 TWh

Source: Energy Information Administration.
Electricity Power Annual.

transmission infrastructure. In fact, some Canadian utilities are actively exploring participation in bi-national RTOs as an approach for optimizing the management of their respective transmission systems.

The objectives of reliable, affordable, environmentally preferable power require that all technologies be available. In fact, increased integration enables the larger, combined U.S. and Canadian regional electricity markets to take full advantage of various emerging technologies like wind power, whose intermittent nature requires backup capacity, to meet our future energy needs on a larger scale.

Electricity Exports from Canada and Imports from the U.S., 1994-2004



Source: NEB Electricity Exports and Imports, Monthly Statistics, various years.

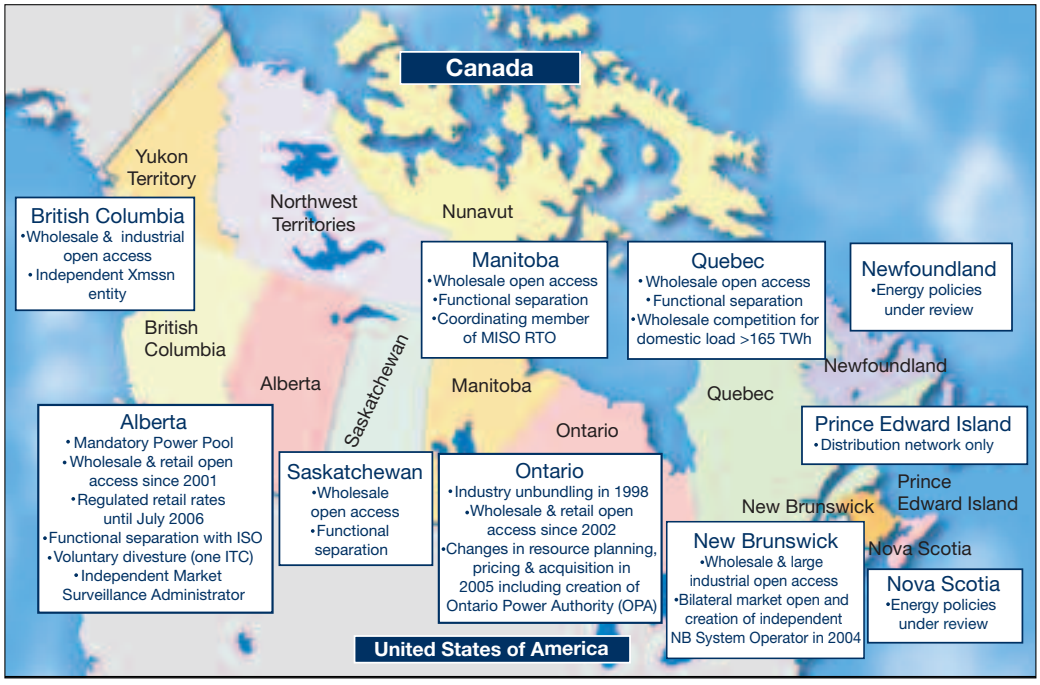
III. Assuring an Adequate Supply of Electricity in North American Markets – Areas for Cooperation

There is no better example of the integration of the electricity system in North America than the August 14, 2003 outage, during which an estimated 50 million people in the U.S. and Canada experienced an electric power blackout. Nevertheless, we saw a great resiliency of this integrated system; within 12 hours, over two thirds of power generation had been restored to service. Some may suggest that the blackout could have been significantly lessened in scope if there were a clear break between our systems, and the level of integration was reduced. Such statements betray a lack of appreciation of how integration prevents blackouts from occurring. And such statements ignore the fact that day to day the integrated electricity market assures a level of reliability and service that is extraordinary for electricity customers in both Canada and the U.S.

The interconnections across our border have significantly increased overall system reliability, cost effectiveness and operational efficiency and will continue to do so. Imports and exports balance system usage and provide reliability at the various transfer points along the U.S./Canada border. Canadian electricity plays an important role in serving peak demands in a number of U.S. regional markets along the border, and even helps to secure reliable service as far south as southern California. And such interconnections will prove critical to meeting increased electricity demand in both the U.S. and Canada.

Accordingly, we share the challenges of ensuring the future adequacy of electricity supply, and we need to address these challenges cooperatively. Such cooperative action is particularly important now, when markets on both sides of the border are facing uncertainties in the face of aging infrastructure, the need for new generation and transmission, growing emphasis on environmental and other regulatory objec-

Status of Market Restructuring in Canada, 2005



tives, natural gas price volatility, and other issues. In the following sections, CEA proposes seven measures that explore opportunities for bi-national cooperation to promote an adequate and reliable supply of electricity.

A. Greater Dialogue on Regional Supply Requirements

As explained above, the electricity markets in North America are not limited to a single country or a single state or province. Instead, such markets are regional and span the borders of states, provinces, and our respective countries. Accordingly, ongoing dialogue between industry and government players across the border between the two countries is necessary to promote a North American approach to assuring adequate electricity supply.

In recent years, regions have implemented, in varying degrees, planning processes to address future supply and infrastructure needs. These regional planning processes will increase in importance as regional transmission organizations ("RTOs") continue to evolve. Given the reality of international regional markets and the interconnected nature of the North American transmission system, the active role Canadian entities play in discussions on regional planning requirements, either within an RTO process or some other regional planning mechanism, is very valuable. For example, CEA believes the evolving RTOs can achieve even more effective regional and cross-border planning, as they assume regional generation and transmission planning responsibilities. Given the reality of international regional markets and the interconnected nature of the North American transmission system, the selected planning mechanism should consider planning issues from a bi-national perspective in order to identify constraints along the border, identify the necessary transmission facilities to address such constraints, and identify the most efficient and effective generation supply options.

Any dialogue on regional supply requirements must recognize the differences in jurisdictional authorities and processes. Moreover, within this process, there is always the need to recognize the clear differentiation between purely local needs and the solutions to them (which should not be part of the regional planning process), and those needs and/or solutions that have regional impact. CEA encourages a continued emphasis on dialogues on regional supply requirements to take advantage of the interconnected nature of our electricity markets and the great diversity of our respective generation supply options.

B. Mandatory Reliability Standards

The joint Canada/U.S. Task Force on the August 14, 2003 blackout issued a final report that concluded that the outage was caused, in large part, by the failure of certain parties to follow the North American Electric Reliability Council's ("NERC") voluntary reliability standards. CEA agrees the present system of voluntary reliability standards must change, particularly as electricity markets continue to evolve. However, because the transmission grid is international in scope, the focus must be on solutions that are international as well.

CEA supports the enactment of the reliability standards language contained in the U.S. energy bill. That language would allow for the creation of an Electric Reliability Organization ("ERO") that could operate on an international basis. The ERO model ensures a balance of interests that protects the organization from being unduly subject to any one stakeholder or government, while respecting the sovereign right of regulators in each country to assure themselves that the interests of their citizens are provided for through oversight and remand functions. And because only the ERO – as opposed to individual regulatory or legislative bodies – can develop reliability standards, the reliability system can be run effectively on an international basis.

The integration of the transmission system between Canada and the U.S. makes close cooperation between our countries a

necessity. At the same time, the market, regulatory and administrative systems are different in each country. These differences necessitate flexibility in any regime for the common administration of reliability standards, in order to ensure regional solutions. CEA remains supportive of reliability standards language in an energy law in the U.S. CEA recognizes that, until such time as reliability standards language is enacted in legislation, the Federal Energy Regulatory Commission may consider other options to address reliability. In either case, the underlying reality remains the same: the reliability of the bulk-power system is by its very nature an international concern, and cannot therefore be properly addressed without full engagement of and cooperation with Canada. Anything less could impede future cross-border trade and, more significantly, undermine the very reliability we all seek to guarantee.

C. Coordinated Regulatory Approaches to New Cross-Border Transmission

In its National Transmission Grid Study, the Department of Energy determined that the transmission system in the U.S. has become congested because growth in electricity demand and investment in new generation facilities has not been matched by investment in new transmission facilities. Similar disparities between generation and transmission investment have occurred in Canada. And NERC projects that transmission investment will continue to lag behind generation investment, resulting in still greater congestion on the North American transmission grid.

While the integrated U.S./Canadian electricity market enjoys the benefits of cross-border trade, constraints along the border and within large regional markets continue to inhibit further trading. Several examples exist of supply potentially available to constrained regions that cannot move because of transmission congestion. For example, the constraints in the Pacific Northwest coupled with the lack of direct inter-ties between Alberta and the U.S. limit the opportunities for cross-border trade between western Canada and the western U.S. Enhanced transmission capa-city between Manitoba and its bordering states would allow for increased exports from Manitoba, and constraints within the Northeast region constrain economic flows across the border. The proposed project by New Brunswick Power and its U.S. development partner, Bangor Hydro, to build a second high voltage transmission interconnection between Keswick, New Brunswick and Orrington, Maine is intended to address a transmission constraint between the Maritimes and New England.

A bi-national cooperative approach to encouraging the construction of beneficial new transmission capacity should help to ensure a reliable electricity system for Canadian and U.S. customers. One example of such cooperation is the participation of Canadian utilities in cross-border regional transmission organizations. What is important is that Canadian and U.S. entities have mutually crafted, and will continue to craft, arrangements that will facilitate such trading relationships, while respecting the NAFTA rules and jurisdictional sovereignty. In fact, a number of CEA members are currently working within their respective provinces and with their respective trading partners to establish processes that will enhance cross-border trade, and CEA members are committed to such continued cooperation to improve liquidity in bi-national markets.

Opportunities to ease transmission congestion also need to be identified. Last year, the U.S. Department of Energy issued a Notice of Inquiry regarding the designation of electric transmission bottlenecks, to which CEA provided comments. In those comments, CEA recommended that a process be convened to examine appropriate measures to address transmission bottlenecks on a bi-national basis. For example, this process could examine such issues as the allocation of the costs of cross-border facilities, determinations of how those facilities will be operated and by whom, and the reconciliation of differing regulatory policies. In fact, such an inquiry

may assist regulators in the development of policies to effectively remedy constraints on both sides of the border. And this inquiry may further allow for consideration of regional solutions that are also bi-national. However, CEA cautions that this cooperative effort to identify and address transmission bottlenecks must respect the sovereignty of each country.

Further, action needs to be taken to ensure adequate returns and reduce siting delays. One approach for encouraging the construction of transmission facilities across the border, as well as within states and provinces, is streamlining the process for siting transmission lines. Speeding up the process for transmission siting would allow for increased construction of beneficial transmission facilities within the North American transmission system.

Rates of return on capital invested in transmission facilities are too low, serving to discourage investment in such facilities. Instead, capital is invested in facilities that offer higher returns, such as generation facilities. FERC issued a proposed transmission policy statement that recognized the need for increased rates of return to encourage transmission investment. CEA believes that regulatory approaches that increase rates of return for transmission facilities would encourage greater investment in such facilities. Similarly, on the fiscal side, tax measures that would facilitate more investment in the development of new transmission infrastructure at key bottlenecks across the continental marketplace could be implemented. For example, improved capital cost allowance rates based on useful life would encourage greater transmission investment.

D. The Role of Emerging Generation and Transmission Technologies

Promoting the construction of new generation facilities and siting the transmission necessary to bring that new electricity to market are important to help ensure adequate electricity supply in the future. However, a number of factors will likely serve to inhibit strictly conventional solutions to long-term supply issues. For example, public opposition to the construction of new transmission lines and extensive regulatory processes for the approval of such lines may serve to discourage some needed investment in new transmission facilities. Moreover, concerns about air emissions and climate change will likely affect the generation supply choices in the future. Accordingly, alternative generation and transmission technologies may prove to be the more efficient response in certain circumstances.

Advancements have been made in transmission technologies both to reinforce the grid and to improve the management of the grid. Reinforcements may be more acceptable in regions where new construction is politically or logistically infeasible. Improvements to grid management, such as the utilization of real-time data, have allowed for the more efficient use of the existing transmission infrastructure. Nevertheless, in the absence of higher rates of return, there may not be sufficient incentives for such improvements to the transmission grid, or for the necessary research and development to pursue advanced transmission technologies. Opportunities for bi-national cooperation for both investment in advanced transmission technologies and transmission R&D – either through government programs, industry support, or government-industry partnerships – should be explored to take advantage of the bi-national interest in a reliable and efficient transmission system.

The electricity industry has seen substantial changes in the efficiency of conventional generation technologies, and research will continue to explore opportunities for improvement. Natural gas-fired generation has seen remarkable increases in efficiency, particularly when utilized as part of a cogeneration facility. In terms of coal-based generation, research in both the U.S. and Canada has focused on developing cleaner methods for burning coal to generate electricity, such as integrated gasification combined cycle technologies. Given the

plentiful – and readily accessible – coal reserves in both Canada and the U.S., the competitive advantages of this fuel should not be overlooked.

In addition to conventional technologies, emerging generation technologies will play an important role in meeting our long-term supply needs. Canada's electricity comes principally from hydroelectric facilities, while hydroelectric power serves as a critical resource in major portions of the U.S. Other renewable resources – particularly wind generation – are gaining in importance, both in recognition of their benefits in achieving fuel diversity and in improving air quality. However, these emerging sources tend to have higher direct costs than their conventional counterparts.

Given our common electricity market and our common air-shed, CEA supports bi-national cooperative research and development to improve the efficiency of our conventional generation technologies and to increase the cost-effectiveness of emerging generation technologies. Cooperative cross-border measures between our governments and between governments and industry could help to ensure an adequate and environmentally preferable electricity supply in the future.

E. Opportunities to Exchange Experience and Learning on Demand-Side Measures

Adequate generation and transmission capacity are critical to ensuring a reliable North American electricity market. Focusing solely on the supply side of the grid, however, misses opportunities for employing demand-side measures to address supply adequacy. Demand-side measures – particularly energy efficiency and distributed generation – can help to relieve existing transmission constraints along the border by reducing reliance on the transmission grid and reducing the need for the construction of new generation facilities. Demand-side measures have been implemented both in Canada and the U.S. in response to various policy directives, but are likely to increase in importance.

Measures to relieve transmission constraints can often occur in places other than where the constraint exists. For example, transmission constraints in the U.S. may be relieved through distributed generation or efficiency measures taken in Canada, and vice versa. Moreover, these same measures can help to avoid the need to build new generation facilities to satisfy increases in demand. Bi-national coordination in the planning and deployment of demand-side measures could thus prove an effective means of addressing transmission constraints on the international grid and addressing the need for more electricity supply.

F. Coordinated Strategies to Manage GHG and Other Air Pollutants

The electricity industry in both Canada and the U.S. is facing increasing pressure to reduce air emissions from fossil-fuel generating facilities. The major air pollutants generated from the combustion of fossil fuels are nitrogen oxides (NO_x), sulphur oxides (SO_x), mercury, and particulate matter. NO_x contributes to ground-level ozone, while both NO_x and SO_x are causes of acid rain. Particulate matter has been linked to lung damage. And the contamination of fish from mercury deposited in lakes and streams has proven toxic for those consuming the fish. There already exist significant regulatory and policy measures to address these issues on both sides of the border, and the requirements for emission reductions are expected to increase over time. However, uncertainty regarding how and when these additional requirements will take effect greatly impedes the industry's ability to plan for and execute efficient, cost-effective long-term solutions.

The electricity industry recognizes the merits of addressing the various air emission issues in an integrated fashion to achieve efficient solutions. The U.S. Congress is currently considering bills to require increased emissions reductions on a multi-pollutant

basis. The Bush Administration, through its proposed Clear Skies bill, is also proposing a multi-pollutant approach to air emissions reductions. The industry, however, also recognizes that these pollutants have cross-border impacts and in fact, air quality issues related to these emissions can be particularly acute in some of the heavily populated Canada/U.S. border regions. Accordingly, while a multi-pollutant approach for controlling these air emissions is important, it is equally important to find solutions that reflect the regional realities along the Canada/U.S. border.

Given the cross-border impacts of NO_x, SO_x, mercury and particulate matter, the management of these air emissions would benefit from coordinated approaches. Although requirements under international agreements such as the Canada/U.S. Clean Air Agreement attempt to address some of these issues, efforts in this area could be enhanced with other tools such as emission trading. Moreover, focusing on approaches that reflect the regional nature of the air-shed should result in optimal solutions to the air pollution problems. For example, building on existing efforts aimed at harmonizing long-term targets of key emissions on both sides of the border will facilitate effective reductions and promote a sustainable electricity sector and enhanced trade between the U.S. and Canada. There is a need for continued dialogue between officials on either side of the border, with industry participants in the discussions, so as to facilitate the most cost-effective and practical solutions to an issue of concern to all.

The climate change debate remains a continuing challenge for both the U.S. and Canada. While Canada has ratified the Kyoto Protocol, the U.S. has not. Nevertheless, there are opportunities for developing a coordinated approach to climate change between the NAFTA partners, which would allow for the development of an approach that recognizes the unique characteristics of North American energy production. As decision-makers begin to look at the post-Kyoto period, this becomes all the more important.

In addition to developing a common approach to emissions reductions, the NAFTA partners could work together on a coordinated approach to emissions trading. A North American GHG registry would encourage substantial reductions in GHG emissions in North America. First, established protocols both for reporting emissions and for reporting emissions reduction would encourage businesses in all of North America to engage in the trading of emissions reduction credits. Second, the existence of established protocols would encourage additional investments in greenhouse gas reduction measures. Finally, eligibility for a much broader range of projects for credits will encourage more businesses to participate in the registry. As with the great success with energy trading, GHG emissions trading between Canada and the U.S. offers significant benefits to both countries – building on already strong regional markets through new trading opportunities. And by providing businesses with the flexibility that trading provides, the NAFTA partners will help companies identify the most cost-effective options to reduce emissions.

G. Critical Infrastructure Protection

Since the terrorist attacks in the United States on September 11, 2001, the electricity industry has become better prepared for both physical and cyber attacks on the electricity infrastructure. However, the frequency of cyber attacks is on the increase. Such an increase is of particular concern given the electricity industry's growing dependence on e-commerce and electronic controls. Moreover, the potential for physical threats to the electric infrastructure remains a reality.

In January 2000, following the successful Y2K transition, CEA members formed the Critical Infrastructure Protection Working Group in order to coordinate activities, share best practices, and interface with the federal government. In its first year-and-a-half of activities, it had established an

effective information sharing Intranet site, implemented methods for coordinating activities with NERC and other partners, developed and implemented an Early Warning System for threats to electricity infrastructure, and worked closely with the federal government. The Early Warning System developed by the Working Group is a model being looked at by other sectors as a fast and efficient method of communicating information in times of high alert.

The integrated market enables Canadian and U.S. participants to effectively work together to safeguard the North American electric grid against physical and electronic cyber threats. The North American electric power industry is currently working through NERC to develop approaches for safeguarding the North American bulk electric power system. Such bi-national cooperation provides for an effective and cost-efficient approach to ensuring the protection of the North American electricity infrastructure and, accordingly, should be encouraged.

Conclusion

The integration between Canada and the United States will only increase as energy demand and trade continue to grow. This makes close cooperation between our countries a necessity. At the same time, the market, regulatory and administrative systems are different in each country. These differences will necessitate flexibility in any regime for the common administration of transmission, in order to ensure regional solutions. The reliability and adequacy of the bulk-power system is by its very nature an international concern, and cannot therefore be properly addressed without full engagement of and cooperation with Canada. Anything less could impede future cross-border trade and, more significantly, undermine the very reliability and adequacy we all seek to see guaranteed.