

Canadian Electricity and the  
**economy**

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**Developing a North American ●  
Energy Perspective**

**A Proposal for Action on Electricity**

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Canadian Electricity Association

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Canadian Electricity Association  
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## **I. Canadian Electricity and North American Electricity Market**

In the year since the Canadian Electricity Association (CEA) released its first paper on the North American Electricity market, a number of important events have affected the outlook of the North American electricity industry.

Of greatest significance, were the series of terrorist attacks on the United States on September 11, 2001. Among other things, the attacks highlighted the vulnerability of an open society's infrastructure to terrorist violence. They also highlighted just how closely integrated infrastructure between Canada and the U.S. really is. Since the 11th the whole security issue, including how it affects energy, has been a priority concern for the U.S. and Canada and will no doubt remain so.

Second, following on the heels of last year's electricity crisis in California, the downturn in the North American economy and the collapse of Enron have shaken not only the public's confidence in the restructuring process but that of investors as well. While these events have not stopped the process of fundamental change under way across much of the North American electricity industry, they have highlighted the need for governments to work cooperatively on integrating the many policy initiatives bearing on electricity. A more integrated Canada/U.S. electricity market contributes positively to the ongoing transformation process – both for consumers and producers. CEA believes that over the past year the necessary dialogue to ensure such an integrated approach has been initiated, but it needs to be accelerated.

Third, the past year has witnessed major events affecting the climate change issue. While Bonn and Marrakech cemented the deal with rules as good as Canada could have hoped for, the Kyoto target to reduce national greenhouse gas (GHG) emissions by 6 percent below 1990 levels by 2008-12 remains a daunting challenge for Canada.

With just six years until the beginning of the first commitment period, Canada is still on a path that exceeds the target by more than 25 percent. The withdrawal of the United States from the protocol and a U.S. domestic plan which is much less aggressive than Kyoto means that, should Canada attempt to implement Kyoto, we would place ourselves at a cost disadvantage relative to our major trading partner. The electricity industry cannot ignore the climate change issue, but this dilemma raises a serious question. What is the best way to resolve this issue? The CEA believes that a continental approach to climate change with realistic targets to reduce GHG over a long-term period should be considered by industry and governments as an effective means of addressing this problem.

All of these issues have confronted us in a year when the Bush Administration launched its energy strategy: a strategy that focused on security of supply. Security, environment and market restructuring are all deeply affected by supply issues. Within Canada, there is no crisis in supply at present, but without careful attention to future energy needs and measures to attract investment we could experience a domestic supply shortage, similar to those experienced in U.S. markets. Without due attention to future demand, through adequate investment in new generation and transmission both Canada and the U.S. risk long-term security of supply problems. While many of the issues should be addressed domestically we must also work in the context of a North American energy strategy.

The electricity industry needs to work together with national governments to ensure that the most cooperative framework possible is in place so that whatever issues arise, they can be addressed through a North American partnership. The high standard of living we have come to expect in Canada and the U.S. depends on secure, reliable, affordable electricity. Through an effective partnership we can help to ensure that security and economic advantage for both our nations.



CEA, as the national forum and voice of the electricity business in Canada, is committed to making the partnership successful. The corporate utility member companies of CEA – accounting for over 90 percent of Canada's installed generating capacity, all of the high voltage transmission, and most of the nation's distribution systems – have a long history of meeting the needs of Canadians for secure, reliable and affordable electricity. They are determined that their

future will continue to include many customers beyond our national border.

CEA has prepared this paper to provide a Canadian industry overview and Canadian industry perspectives on what more could be done to improve the functioning of electricity markets in a North American context and thereby strengthen the partnership in place. Its intended audience is decision-makers and policy advisors in both countries.



## II. The Canada/U.S. Electricity Relationship

Building on our respective domestic desires to meet electricity requirements, a Canada-U.S. electricity relationship has evolved over the last half century. What began with small tie-lines and the development of boundary waters for hydroelectricity, has evolved into complex cooperative arrangements for managing transmission system reliability, major interties across the Canada-U.S. border coast to coast, growing exports and imports, and increasing crossborder asset ownership.

Access to a plentiful supply of reliable and reasonably priced electric energy has traditionally been seen as a strategic competitive advantage in the North American marketplace vis-à-vis other parts of the world. Consumers in North America have come to expect a very high level of reliability, security of supply, and environmental performance for electricity.

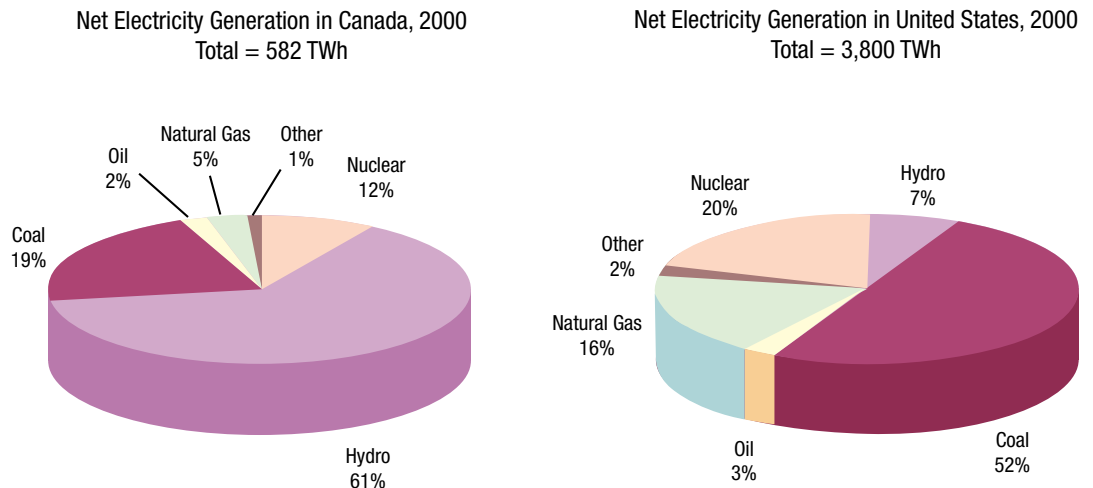
Canada and the U.S. have very diverse electrical systems. In both countries, the

division of powers between federal and provincial/state governments means that no one jurisdiction has full authority over electricity, but in Canada, provincial jurisdiction is stronger than state jurisdiction in the U.S.. The strength of state or provincial authority has given rise to different approaches to electricity markets in both countries, with varying mixes of public and private entities and a wide diversity of approaches to deregulation.

The diversity of our systems is also demonstrated by the different balances of the various conventional and emerging technologies in our generation mixes. These differences primarily reflect availability of resources, as different geographic regions have access to different fuels. When linked across borders, these diverse generation systems create opportunities for efficiencies in regional systems management, reduced environmental impact and improvements to reliability.

The pie charts below show the generation mixes for Canada and the U.S.

### Electricity Generation by Fuel Type in Canada and the U.S., 2000



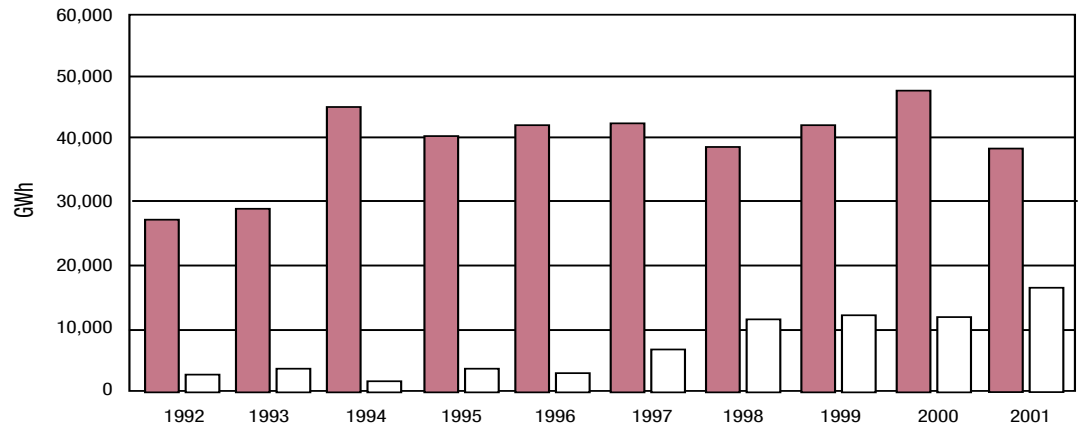
Source: 1) Energy Statistics Handbook, 57-601 UPB, July 2001, Statistics Canada, 2001 2) Quarterly Report on Energy Supply & Demand in Canada, 57-003 XPB, 2000 4th Quarter, Statistics Canada, 2001 3) Electric Power Annual 2000, Vol. 1, U.S. Department of Energy, 2001



Both Canada and the U.S. have benefited from the efficiencies of increased integration. Electricity is now established as a key and growing part of the larger energy relationship between the two countries –

and as the chart below demonstrates, the relationship is increasingly one of strong two way trading, not just north to south transfers.

### Electricity Exports from Canada and Imports from U.S., 1992-2001

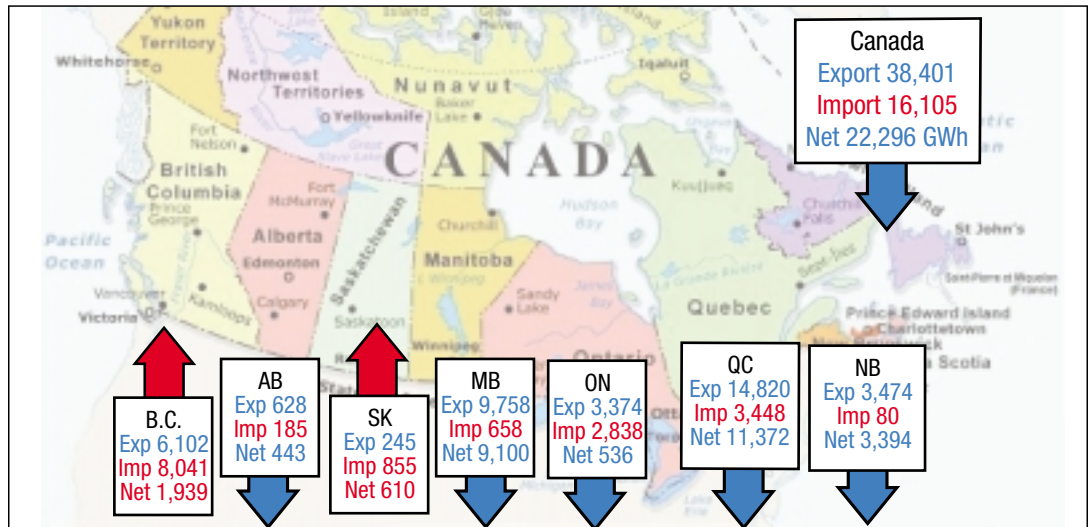


Source: Electricity Exports and Imports 1980 to 1999, National Energy Board, 2001

Imports and exports balance system usage and provide reliability at the various transfer points. While Canada is overall a net exporter, at various border points it is also a net importer – a situation that changes year to

year reflecting changing market conditions north and south of the border. The fact these changes occur year over year also demonstrates the importance of regional systems' integration in the market.

### Volume of Net Exports/Imports, 2001



Source: Electricity Exports and Imports January 2001 to December 2001, National Energy Board, 2001

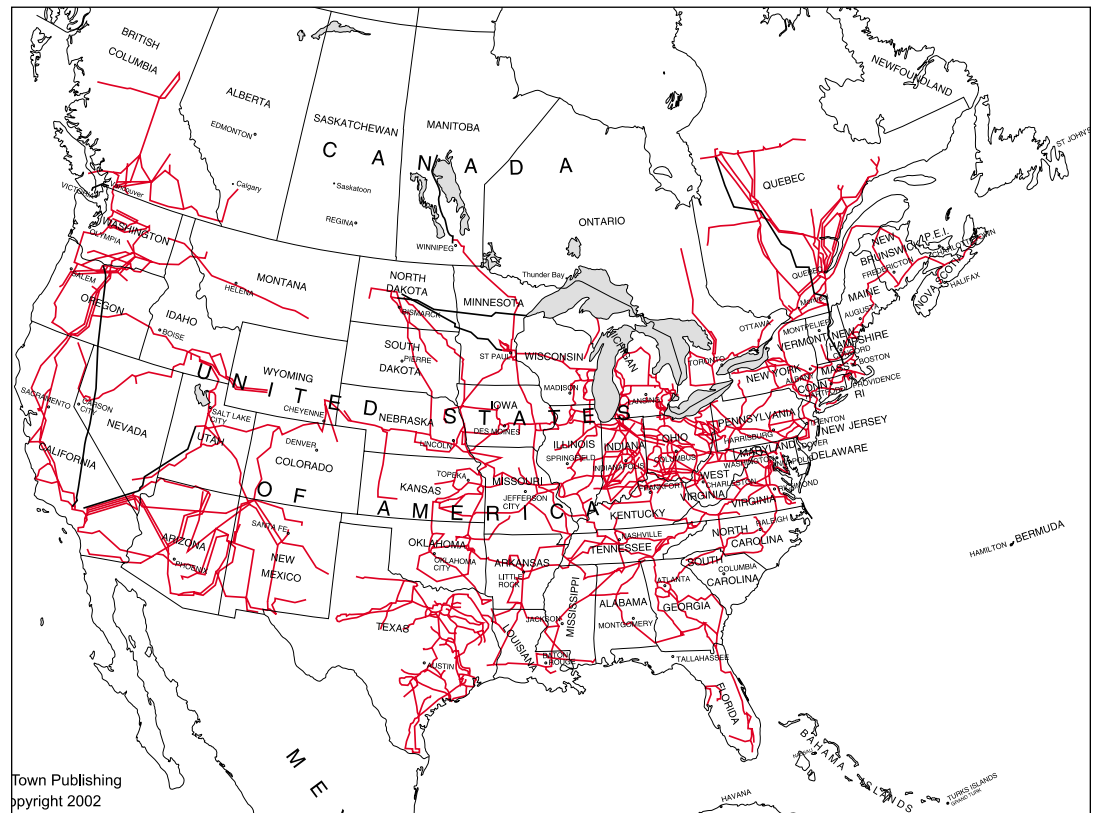


The various regional markets are not static, but highly integrated and active trading zones. The national border does not hinder the trade per se, as the commodity – electrons – is oblivious to borders. However, regulatory regimes have a serious impact on markets in so far as investment and planning decisions are made in good part on the basis of the legal certainty afforded by the respective jurisdictions.

The map of the North American Transmission Grid, seen below, offers a clear visual indicator of how the regional markets, described above, function. Electricity trade occurs at a range of points across the Canada-U.S. border, reflecting the largely north-south nature of the Canadian grid, as

it is integrated with the more complicated web of transmission infrastructure in the U.S. Opportunities to increase that north-south regional integration are increasingly in the news, at or near virtually every major existing interconnect. In short the North American grid has great potential to become more integrated, not less so, to the advantage of consumers and industry interested in long-term reliable power supply. In order to maintain current levels of reliability and improve access to various markets across the both sides of the border, governments and industry must work together to build on the existing policy and regulatory framework to ensure such beneficial integration.

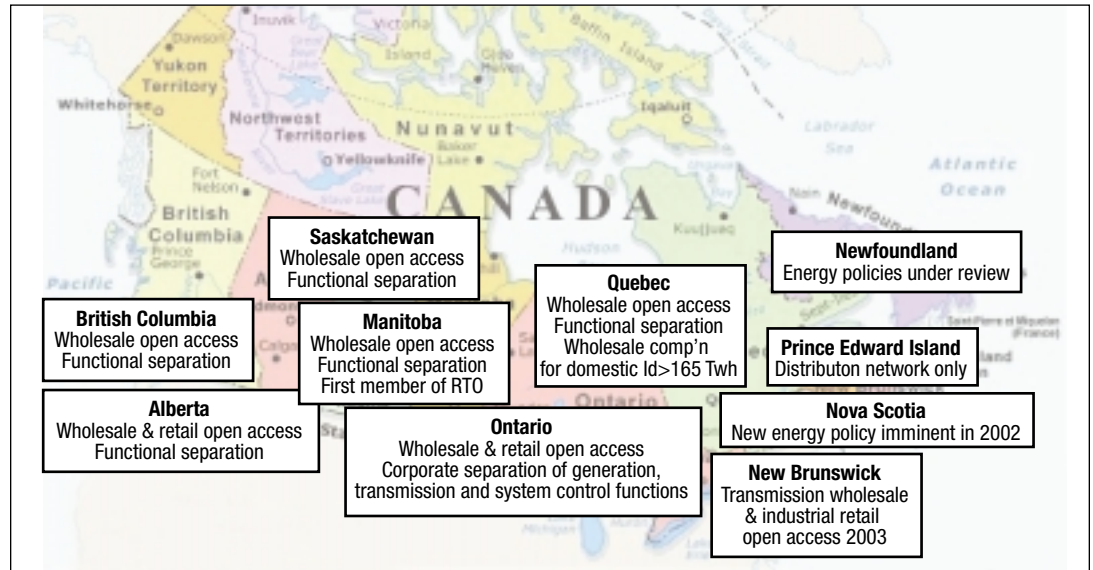
### North American Transmission Grid



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.



## Status of Market Restructuring across Canada



Restructuring of the electricity industry remains an ongoing process in both Canada and U.S.. As with states in the U.S., some provinces in Canada are pursuing a restructuring agenda much more aggressively than others. Alberta has opened up its retail markets and Ontario is scheduled to follow

suit in the spring of this year. By that time approximately 50% of Canadian retail customers will be in completely open markets. Other provinces continue to assess what changes – if any – are appropriate to ensure that the electricity needs of their residents can best be met.



### III. Key Themes for Advancing the Relationship

CEA believes it is in the interest of energy consumers in both Canada and the U.S. to expand on the existing electricity relationship between our two countries.

An expanded relationship can lead to greater overall system efficiency, steadily improving the industry's environmental performance, enhanced security of supply and system reliability, and improved operation of the market. In order to maximize the benefits of this expanded relationship there is a need for a focused dialogue among industry stakeholders and officials of governments in both Canada and the U.S.

CEA believes that such a dialogue should be built with the recognition that regulatory frameworks are increasingly influenced by what is happening in other jurisdictions. Regulators therefore need to monitor carefully what is occurring in other markets. With this recognition as background, we believe the dialogue should be anchored by four themes:

- **Increasing trade:** In 2001, two-way trade involved transfers of approximately 53,000 GWh of electricity – equivalent to half the demand in New York State – with Canadian supply reaching markets in 20 states in 2001.

- **Encouraging investment:** An investment relationship has evolved with increasing numbers of Canadian and U.S. companies investing across our mutual border, and beyond it into Mexico.
- **Protecting the environment:** An increasing number of environmental issues are of mutual concern, and increasingly of continental scope
- **Supporting technology advancement:** New technologies which address both supply and demand and the environmental issues attached to both are of growing interest to electricity companies and governments across the continent.

In the following, CEA provides specific ideas of what can be done in each of these areas. Each of the ideas will in turn need to be further developed in order to specify policy initiatives. Some of these initiatives will be cross-border or even continental in nature. Others will be matters primarily of domestic policy. In all cases such development work needs to be part of the government and industry stakeholder dialogue aimed at maintaining continued access to secure, reliable and affordable electricity for all consumers in North America.



## **IV. A North American Energy Perspective**

### **A. Increasing Trade**

#### **A Policy Proposition**

CEA member companies believe that increased trade in both directions has significant positive potential for both Canadians and Americans. In order to maximize these benefits, there is a need to attend to two broad sets of issues: reinforcing the trade rules and ensuring adequate infrastructure.

NAFTA provides a solid framework that can and should be built upon to achieve the objective of increased trade. The NAFTA rules framework, if fully respected, limits barriers to trade. But for the electricity sector, currently undergoing a period of significant change, that framework needs to be the foundation of a dialogue among NAFTA parties to ensure that trade concerns can be anticipated and dealt with before they become real barriers to enhanced cooperation. The current Renewable Portfolio Standard (RPS) debate in the U.S. Congress highlights the need for industry and government to work together to ensure that domestic policies comply with the NAFTA framework. Should the U.S. adopt a federal RPS programme – depending on the criteria used to define renewables – it could close off a portion of the U.S. market to Canadian power suppliers. Industry and government must work together to keep the market open and accessible and to avoid potentially destructive trade disputes.

The electricity industry is in a period of restructuring, moving in the direction of competitive markets and a much higher degree of inter-regional integration. The regulatory and competition policy rules that will govern this new world are still unknown in many cases. How those rules are designed and how they work within each country and within individual jurisdictions within countries could easily frustrate the objective of increasing trade whether through inadvertence or design.

As the industry and its regulatory frameworks evolve at national, provincial and state levels, Canada and the U.S. need to work together to maximize the trade enhancing effects and minimize barriers to trade.

At the same time, it will be important to strengthen the physical infrastructure – the transmission system – that permits electricity to flow. Several examples exist of supply potentially available to constrained regions that cannot move because of transmission congestion. Opportunities to ease this congestion need to be identified and actions taken to ensure adequate returns and reduce siting delays.

#### **Specific Initiatives for Both Governments**

##### **A Current Priority**

The debate around reliability in the United States has been particularly active over the last six months, both in Congress and at the FERC. Canadian Electricity Association member companies remain committed to the development of a new North American reliability system under a self-regulating reliability organization that respects jurisdictional responsibilities, while promoting an ongoing integration of the bulk transmission system. The opportunity to advance such an initiative is at present before legislators in the U.S. – and clearly in the interests of consumers on both sides of our common border. Governments in both countries have recognized the merits of this approach and need to encourage its realization.

##### **Other Opportunities**

- Build on the established Canada-U.S. Energy Consultative Mechanism and, as appropriate, North American Energy Working Group under NAFTA to create a monitoring mechanism and a regular forum where potential trade irritants can be discussed and resolved before they become trade disputes.



- Endorse the principle and commit to ensure that legislative initiatives related to industry restructuring, reliability enhancement, or improvement of environmental performance, are made consistent with NAFTA and do not create trade barriers – inadvertently or otherwise.
- Examine possibilities to develop regulatory and tax frameworks that can facilitate the development of new transmission infrastructure at key bottlenecks across the continental marketplace.

## B. Encouraging Investment

### A Policy Proposition

Canadian and U.S. Governments share the objective of ensuring a sustainable supply/demand balance in electricity. While managing demand growth through energy efficiency and conservation are important measures, they alone will not address supply needs.

New and replacement supply, and the means to transmit that supply, are essential and need to be brought on over the next few years throughout North America. In most markets in Canada the situation is not as extreme as it has been in some U.S. markets but there are markets facing supply and transmission constraints. By way of example, taking into account domestic load growth, exports, demand side management and efficiency, and plant retirement, the new and replacement supply requirement for Canada by 2020 is 205 Twh – over one-third of current production.

Increased investment in the electricity sector is critical and must not be confined to newer technologies and fuel sources. While investment in this area is important and should be supported, without significant investment in conventional technology and fuels North America will face a serious supply shortage.

Governments need to ensure that appropriate investment conditions are in place. For the most part, the rules governing invest-

ment conditions are matters of domestic policy but there is a mutual interest in ensuring investment is facilitated on both sides of the border, to alleviate near-term supply problems and, more particularly, to assist in the ongoing integration of the markets.

One important condition affecting investment is the increased coordination among transmission suppliers through regional transmission organizations (RTOs). Players across North America are actively involved in the RTO debate trying to achieve the most effective utilization of existing transmission infrastructure. Canadian entities do not have a single view on RTOs, but a variety of perspectives reflecting different market conditions, ownership structures, and other conditions in their regional markets. What they do share is a determination to have U.S. regulators appreciate that the objectives of Order 2000 are domestic objectives, not international ones. Canadian entities active in U.S. markets are negotiating a range of bilateral arrangements to ensure continued effective coordination across the border in a post-Order 2000 era.

However, some of the most important determinants of investment conditions are the product of policy and regulatory frameworks set by governments. Regulated rates of return are generally inadequate to attract investment in transmission infrastructure. Tax provisions are often dated, given the rapidly changing character of the industry. Siting processes increase both risk and lead times to degrees that make many investments untenable.

Both countries should act to reduce regulatory delay and uncertainty and take steps that will improve rates of return on electricity investments.

### Specific Initiatives for Both Governments

#### A Current Priority

In an era when new supply is required across North America, after a period of over



a decade of remarkably little construction, there is a need to look closely at environmental approval and related environmental regulatory processes with an eye to reducing both timelines and uncertainty while still upholding environmental standards. There are a variety of legislative proposals tied to energy and environment before national legislators in both Canada and the U.S. – from re-licensing to species at risk initiatives. The opportunity for governments to identify efficiencies in one another's regimes, or new efficiencies that could be applied in both, is upon us and should be seized.

#### Other Opportunities

- Examine tax structures to ensure tax regimes facilitate investment in an increasingly competitive industry on both sides of the border.
- Encourage regulatory cooperation for streamlined approval of cross-border transmission facilities, to help address transmission bottlenecks across the continent.
- Modernize regulatory systems to ensure regulated returns are consistent with the need to attract capital.
- Pursue long-term integrated approaches to air emissions management that provide for increased investor certainty.

### C. Protecting the Environment

#### A Policy Proposition

Curtailing demand growth and encouraging emerging low-impact technologies are important steps in meeting our future electricity needs while having minimal impact on the environment. However, they will not be sufficient to meet the new supply requirements referred to above. Therefore they must be part of a larger strategy in order to solve long-term supply issues, as well as address environmental concerns. That larger strategy must continue to focus on developing conventional technology projects

that are necessary for our energy security, and it must do so in a manner that recognizes the changing electricity market, where generation, transmission and distribution, and retail decisions are often made independent of one another.

CEA believes that the focus of environmental policy needs to be fourfold:

- continued efforts to improve efficiency;
- encouragement of emerging technologies with demonstrated environmental benefits;
- a constant emphasis on improving the environmental performance of conventional technologies; and
- concerted effort to address the issue of environmental preferability of various supply options in a more systematic and measurable manner

Advancing an environmental policy is a necessary part of a long-term energy plan. However, there are some limitations that should be recognized:

- Even with improved energy efficiency measures, significant demand growth is inevitable;
- Production, transport and consumption of energy in all its forms have significant environmental consequences, and while there are many promising new technology opportunities, no technology is without environmental impacts;
- No one technology is universally applicable across a national marketplace – fuel availability, geography, and a host of other factors affect the generation technology chosen in any one place; the objectives of reliable, affordable, low environmental impact electricity require that all technologies be available; and
- The existing capital stock will make up the bulk of capacity for many years to come and can be the locus for many



cost-effective environmental improvements. The reality is that many of our environmental concerns are continental – responding to them therefore requires coordination between governments across the continent.

### **Specific Initiatives for Both Governments**

#### A Current Priority

Initiatives aimed at identifying environmentally preferable power products are before governments in both countries at this time. There is a need to develop a sound continental framework for such efforts, that recognizes market conditions, fuel availability, and the various other realities of the current North American market. Such an effort would have more significant long term benefits than many of the current initiatives that, in the interest of quick results, can distort markets by arbitrarily picking winners and losers.

#### Other Opportunities

- Promote cooperation in energy efficiency measures including standards, consumer information (such as environmental disclosure) and sharing best practices.
- Promote coordinated approaches amongst NAFTA countries on greenhouse gas emissions.
- Promote cross-border cooperation on a regional basis to address other environmental challenges such as reducing other air emissions.

### **D. Supporting Technology Advancement**

#### A Policy Proposition

An essential component of the strategy to achieve competitively priced, secure, reliable, and low environmental impact power is investment in technology development –

both new technologies and improvements to existing technologies. The convergence of private interest in an increasingly competitive market, with public interest in environmental improvement and enhanced availability and diversity of supply, provides a basis for public-private collaboration in this area. The convergence of economic and environmental benefits across the Canada-U.S. border provides a basis for bi-national collaboration.

Canada and the U.S. should work together and with their respective electricity industries to develop promising areas for collaboration and to encourage increased private sector investment in new power technology.

### **Specific Initiatives for both Governments**

#### A Current Priority

Efforts to develop new technology and make improvements to existing technologies, are the subject of very active discussions in both Canada and the United States. The success of these efforts turns on effective public-private cooperation. The time is ripe for governments in the two countries to join forces in more cooperative efforts aimed at:

- investing in emerging low-impact generation technologies;
- investing in demand-side technologies;
- developing and demonstrating new clean coal technologies.

#### Other Opportunities

- Promote a bi-national dialogue to identify priority areas for technology investment covering all aspects of generation, transmission, distribution and customer technologies.
- Review and reduce where appropriate tax and regulatory barriers to investment in technology development.



## V. Conclusion: Building a Strong Energy Future

Canada and the U.S. must continue to work together to build a strong energy future for North America. The prosperity of our respective economies rests on a secure supply of energy. In the past, we have taken for granted the abundant supply of energy readily available in North America. While we are not facing significant shortages, we cannot remain complacent or we will risk losing the security we have come to expect. A shared vision for the future will help to ensure appropriate policy initiatives are taken on both sides of the border to maintain that security.

A North American energy perspective creates an opportunity to bring our shared energy objectives into focus:

- The economic benefits that flow from developing our energy resources and technological expertise;
- The environmental benefits that flow from effective stewardship; and
- The social and economic benefits that

flow from the availability of affordable, secure and reliable energy.

As the interdependence of the North American energy markets has grown, so too have the benefits to consumers and producers in both Canada and the U.S.. Further integration through increased trade; cross-border investment; a continental dialogue on environment policies and cooperation on technology will help promote our mutual objectives. Neither country can avoid the fact that energy is increasingly a continental concern.

The intention of this paper is to highlight some of the measures that can be taken by governments and industry alike to encourage a strong energy future for North America. Most of these measures build on the existing policy framework already in place in Canada and the U.S..

CEA member companies are committed to working with officials in Canada and the U.S. and with other stakeholders to improve and expand on the framework outlined here, and build an even more secure and environmentally sound energy future for both our countries.

