



***CLEAN GROWTH 2.0
HOW CANADA CAN BE
A LEADER IN ENERGY AND
ENVIRONMENTAL INNOVATION***

***POLICY PAPER
TASK FORCE ON ENERGY, THE ENVIRONMENT
AND CLIMATE CHANGE
CANADIAN COUNCIL OF CHIEF EXECUTIVES***

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EXECUTIVE SUMMARY

As the worst of the global financial crisis begins to recede, attention is turning to Canada's triple challenge of shaping a more sustainable way of life, building a more competitive economy and ensuring adequate public finances that are essential to the quality of life that Canadians enjoy. Canada is blessed with a wealth of natural resources, which have and will continue to power a great deal of Canada's future prosperity. We have the second largest reserves of oil in the world, are number two in global uranium output, represent the number three natural gas producer in the world and are sitting on coal reserves sufficient for 100 years at current production rates. As well, various parts of the country offer significant potential in new sources of hydroelectricity as well as biofuels, wind and tidal power.

Canada gains tremendous advantage from its position as the largest foreign supplier of energy to the United States, which is increasingly focused on energy security. There also are significant potential markets elsewhere in the world, particularly in the emerging economies such as China, which recently surpassed the United States as the world's largest energy consumer. It is clear that global energy use, and the resulting greenhouse gas emissions, will continue to grow for some time as developing countries are eager to improve their standard of living and to supply modern energy services to those citizens who lack any access currently.

With the decline of conventional oil production in the Western Sedimentary Basin, the oilsands represent a huge proportion of Canada's oil reserves and a strategic asset of considerable importance to the entire country. It is estimated that over the next 20 years, oilsands development will contribute \$123 billion of revenue to various levels of governments, the largest share of which goes to the federal



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government. Energy and resource development benefits not only the region where those resources are located. The resultant demand for construction and materials, for engineering, technical and financial services, as well as the government revenues raised through taxes and royalties, enhances prosperity for all Canadians. In that sense, energy is a lynchpin to our economic progress, as well as a daily fact of life for every Canadian.

But it is by no means a foregone conclusion that Canada's energy resources can and will be developed in a timely and cost-effective manner that maximizes our economic potential. Much of our traditional stock of fossil fuels is increasingly in more remote locations, and can be difficult and costly to extract and process. Renewables and alternative fuels hold considerable promise but are at the higher end of the cost curve and for the most part lack the required infrastructure to deliver significant quantities of energy to markets at a competitive cost.

We believe Canada can be an energy and resource powerhouse while also developing the technologies and systems that lead to successful businesses and higher paying jobs in this country, as well as contributing to environmental improvement around the globe. But we have to be on our game, with government, industry and key stakeholders pulling in the same direction and with smart policy that ensures Canada can successfully compete with other locations around the world for the significant investment needed.

Canadian industry is ready and willing to do its part, but companies need a road map that provides clarity and predictability, anchored in a sound economic competitiveness framework, so they are able to contribute innovative and lasting solutions.



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This paper outlines five priority recommendations:

1. National energy strategy: The country needs a coherent national energy framework that makes the most of our opportunities to develop clean energy solutions and position Canada for leadership internationally. The Prime Minister should convene a meeting of First Ministers that would provide direction to begin preparation of a national energy strategy. It should go without saying that this is not something developed by the federal government in isolation, but in partnership with the provinces and territories and building on each region's strengths and opportunities.

2. Bilateral accord with the United States: The federal government must signal its serious intention to develop an energy and environmental accord, engage the United States at the highest level and convince them it is in both our countries' interests. As with the FTA and NAFTA, this will require a very senior Canadian negotiator and a dedicated team with broad policy experience in trade negotiations, finance, energy and environmental policy. Canada's objective should be to secure greater cross-border collaboration on energy, climate change policy, harmonized standards and development of key clean energy technologies. In the case of GHG regulation for emissions-intensive and trade-exposed sectors, the goal should be comparable regulatory cost impact so as to avoid any legitimate rationale for US border charges.

3. National approach to climate policy and carbon pricing: We must get past the current patchwork of federal and provincial action plans and commit to a coherent national approach to climate policy. Canada need not wait for the Americans to move in key areas of policy, and the federal government already has moved ahead with the regulatory scheme for GHG emissions from the electricity sector due to differing



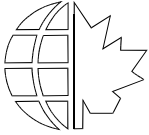
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circumstances in the mix of electricity generation in each country. On the other hand, harmonized Canada-US regulatory standards are the best approach for passenger vehicles, light and heavy trucks and for other goods where production is highly integrated on a North American basis.

For the upstream oil and gas sector, the approach should be built on the Alberta model of emissions pricing and the federal government should work with relevant provinces to develop a national regulatory model that makes continual progress on emissions management while maintaining the international competitiveness of the upstream sector. For other emissions-intensive and trade-exposed sectors, the apparent inability of the United States to enact a federal climate policy means that further regulation should await sufficient clarity on US policy so as not to put manufacturing industries still in fragile recovery mode at a distinct competitive disadvantage.

Carbon pricing policy should be developed with the following principles in mind:

- It should be broadly applied across the economy and to consumer end-use;
- It will have to start at relatively low levels so as to give time for adjustment and to avoid unnecessary impacts on competitiveness;
- Revenue raised should be deployed to fund reductions in other taxes and support the development of new technologies;
- Revenue distribution should be designed to avoid an undue cost burden on any particular region or sector;
- Carbon pricing should not merely penalize high carbon industries but ensure the incentive for companies and individuals to adopt cleaner technologies, products and services and to encourage shifts



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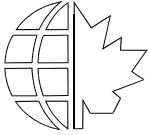
in consumption from high energy-intensive goods to lower intensity goods and services.

4. *Coherent technology and innovation strategy:* Realizing energy and environmental goals both here in Canada and abroad will require the development and widespread adoption of new generations of technology. The federal, provincial and territorial governments should engage critical business sectors on a national technology enhancement policy. Enhanced policy coordination can assist Canadian businesses in securing a larger share of the burgeoning global market in clean energy technologies.

Canadian firms need to increase their commitment and the share of revenues devoted to energy R&D, and enhance collaboration with universities doing leading-edge research. There is also a role for strategic public sector investments, especially to help with demonstration and commercialization of promising technologies. A portion of funds raised through carbon pricing schemes should be devoted to the development of technology.

5. *Meaningful engagement of Canadians:* We need to move the national discussion beyond debates about the environmental impact of specific energy choices to a balanced and informed discussion of Canada's energy future and the role individual Canadians must play. All forms of energy will be required to meet current and future needs, all have some environmental impact and costs are sure to increase. Canadians need to be thoughtfully engaged and contribute to an informed debate about the best means to ensure economic opportunity in all regions of the country, high quality jobs and affordable energy.

It starts with a national commitment from governments and industry to improve Canadian literacy on energy and environment, to bring them



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into the debate on Canada's national energy strategy and provide better information on the costs and benefits of energy choices. Above all, we need renewed effort on building an energy conservation ethic in the country, so that businesses of all sizes and millions of individual Canadians are focused on maximizing energy efficiency and making smarter choices about day-to-day energy use.

For Canada to be a leader in energy and environmental innovation also requires several other key elements:

Make a responsible global contribution: Canada needs to improve its own environmental performance, so that we can credibly champion an innovative, long-term and effective global approach to the challenge of climate change. The Copenhagen Accord is an important building block since it brings in all major emitting countries in a way that meets their needs and aspirations. Global energy demand is likely to continue growing to satisfy the legitimate desire for higher living standards, particularly in emerging economies. Thus meaningful progress will not be possible without an overall framework that encourages and enables the ongoing creation and dissemination of new generations of low-carbon technology across the globe. Canada should work constructively with the United States and other like-minded nations to fashion a sustainable and effective long-term approach, in part through demonstrating that it is possible to combine superior economic and environmental performance.

Create a positive climate for investment in energy, infrastructure and advanced technologies: The broader economic policy framework is critical to ensuring Canadian industry's capacity to respond and innovate. Through smart fiscal, tax and other policies governments can help ensure that companies stay healthy and profitable and thus both encourage and enable increased investment in new technologies. The



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government should also clarify the rules with respect to investment in resource assets and companies by foreign state-owned enterprises, as well as policies that can stimulate greater domestic processing and upgrading of energy and other natural resources and strengthen the Canadian base for related industries, such as petrochemicals, energy services and financing.

Ensure Effective and Efficient Regulatory Regimes: Businesses do not object to efficient regulatory oversight. But they want to get on with the job of investing in advanced energy solutions, and so need assurance that regulations will be cost-effective, that regulatory processes will be clear, fair and efficient, that multiple levels of governments will cooperate in “one-window” assessment processes and that decisions are reached in a timely manner.

Galvanize a stronger commitment from Canadian industry: Canadian businesses already have done a great deal to make their operations and products more energy efficient, to develop new technologies that reduce emissions and costs and to create more sustainable business models. However, we can and must do more. Individual company commitments and sector goals, as well as benchmarking against competitors in other countries, can be powerful motivators to change.

Strengthen the Canada “Brand”: The global market for cleaner energy is huge and Canada has the opportunity to be a valued and competitive supplier of such energy, together with advanced technologies and related services. At the same time, we have to be on our game, as the competition to capture a share of this burgeoning market is fierce. As well, we need to do more to get the facts out on the Canada “story”, both our vast array of energy resources and our responsible approach to environmental management.



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Modernize Energy Infrastructure: Much of the infrastructure that carries our current energy supply is aging and in need of significant refurbishment or replacement. Additional capacity also will be needed if we are to realize the opportunity to supply cleaner energy to existing and new markets. Electricity transmission improvements, including more interconnection between regions and smart electricity grids within regions, are needed, as are efforts to establish the refueling infrastructure necessary for alternative transportation fuels.

Foster Unique Canadian Talents: Canada also has tremendous assets in terms of scientific and human talent and financial and entrepreneurial skills. We need to fully mobilize those assets so that we can be a leader in the development of next generation technologies that will provide cleaner energy and environmentally preferable products and services that can be put to use both here and abroad. Among other things, this will require a significant investment in education and training by both the public and private sectors.

We believe Canada should maximize the potential of our resource, technical, financial and human assets to position us as an energy and environmental powerhouse. Many of the elements are already in place, but it calls for a compelling vision and far-sighted leaders, particularly in the business community, to make the case. It must be built on cooperation amongst all levels of government, a sound strategy with complementary elements that are national, continental and global in scope, and with the engagement and support of Canadians. Ensuring that economic, energy and environmental objectives can be made mutually reinforcing will be a preoccupation of major nations around the world, both developed and developing, and Canada is well-positioned to make a substantive and sustainable contribution to this global challenge.



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I. INTRODUCTION

As the worst of the economic downturn recedes, Canada is poised to be one of the best performing economies in the developed world. Economic growth is returning, job recovery has been strong, public finances, while still worrisome, are in better shape than most OECD countries, and commodity prices are moving higher.

An important component of that more positive picture relates to the fact that Canada is blessed with a wealth of natural resources, which have been and will continue to be a source of economic strength. Energy and resource development benefits not only the region where those resources are located. The resultant demand for construction and materials, for engineering, technical and financial services, as well as the government revenues raised through taxes and royalties, enhances prosperity for all Canadians. In that sense, energy is a lynchpin to our economic progress, as well as a daily fact of life for every Canadian. And it is a critical component to Canada's triple challenge of shaping a more sustainable way of life, building a more competitive economy and ensuring adequate public finances that are essential to the quality of life that Canadians enjoy.

Canada's endowment of natural resources can be a tremendous source of comparative advantage, particularly as our major trading partner, the United States, becomes increasingly preoccupied with the issue of energy security as its reliance on imported energy grows. We cannot take this enormous potential for granted however, and to derive maximum benefit we need a long-term approach to energy development and energy use. We need to greatly increase the efficiency of energy development, production and delivery as well as the fuel efficiency at the point of consumption. We must further develop alternative sources of energy and discover and deploy new



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technologies that will allow an increased standard of living with lower energy consumption and less environmental impact.

It is important that we view energy in the larger global context, particularly as we think about the long-term challenge of addressing climate change. That global context includes the fact that the world will need more energy supply to meet growing demand, a demand that is fueled by overall global population increases, the growth of emerging economies and the needs of literally billions of people to rise out of poverty and have access to the enhanced standard of living that affordable and reliable energy can help bring about. While aggregate energy consumption likely will increase, technology and the wise use of energy can bring about reduced per capita consumption worldwide.

Canada's vast natural resources represent enormous potential for future economic prosperity as the world seeks access to cleaner and more sustainable forms of energy. But it also speaks to the special responsibility we have to be wise stewards of this endowment. Energy development and use have environmental consequences, most particularly related to the threat of significant climatic change, but also with respect to air pollutants, land use, access to clean water, as well as the potential for disruption of fragile ecosystems. Canada can and should be a model to the world on how to pursue responsible resource development and further economic growth while reducing the country's environmental footprint.

As a country we have not always pursued energy development and environmental stewardship as mutually reinforcing objectives. Smart policy that integrates energy and environment has many benefits -- including increased economic opportunities for all parts of Canada, cleaner air and improved public health, lessening the energy intensity of our economy, reducing our exposure to energy price volatility and



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the economic disruption that can result, as well as addressing the threat of climate change. If we first can get energy policy right, enhanced economic prospects, fewer regional tensions and significant and long-term environmental improvements will follow.

This paper makes the case for an innovative, effective and long-term approach to harnessing Canada's energy and environmental potential. It places Canada's energy resources in a global perspective, outlines the key issues and policy priorities that can make this vision a reality, including the need for alignment with our most important trading partner, and challenges government at all levels, businesses of all sizes and Canadians generally to get engaged in supporting a positive vision for Canada's future.

II. EMBRACING A NATIONAL VISION

Canadians' identity of themselves is closely linked to their natural environment. Our tremendous land mass, touching on three oceans, our treasure of mountains, forests, wilderness, lakes and rivers, and the rich array of wildlife that inhabit them, have long been a symbol of national pride as we greet visitors from other countries. And indeed, governments at all levels, with significant contributions from the private sector, aboriginal peoples and national and local conservation groups, are making impressive strides in expanding Canada's system of parks and protected spaces, establishing marine conservation areas, strengthening protection of critical ecosystems and habitat for wildlife preservation, and enriching the country's stock of biological resources.

In addition to that rich natural heritage, Canadians have long accepted that a strong economy and a healthy environment can and should go hand-in-hand. We believe it is equally clear that energy is an important component of that positive vision. In the Council's 2007 policy paper



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Clean Growth: Building a Canadian Environmental Superpower, we made the case that Canada has all the necessary tools to be a significant global player in the move toward cleaner energy. These include:

- Generous endowments of virtually every form of energy;
- An electricity generation capacity that is already amongst the least carbon-intensive in the world, with an ability to increase that advantage through as yet untapped potential in hydro and renewables;
- A commitment to continuously improve the energy efficiency and reduce the environmental footprint of Canada's oil and gas and other energy-intensive industries;
- Large stocks of uranium and advanced nuclear capabilities that can contribute to low emissions nuclear power;
- Leading research and development related to new and cleaner vehicles and fuels.

In the *Clean Growth* paper we stated:

“Canada has the resource base, the scientific and human talent and the financial and entrepreneurial skills to be a leader in the development of next generation technologies that will provide cleaner energy and environmentally preferable products and services that can be put to use both here and abroad. Energy is our strength and clean energy has the potential to be our greatest competitive advantage. If we make the most of this strength, Canada can become an energy and environmental superpower.”

That vision is even more relevant and empowering today, and we believe it can be very appealing to Canadians. It must be clearly articulated, forcefully advocated and backed by government policy and business action that will make the most of our opportunities and



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contribute positively to Canada's emerging status as a world power in energy development. Such a strategy will not be straightforward nor cost-free, and will require some hard choices. Nonetheless, it offers enormous potential upside for Canadian businesses, workers and consumers. We think the case for such strategy is compelling and the timing is now. And it is a win-win-win, for Canada's economy, the environment and Canadian society.

III. ENERGY IN A GLOBAL DIMENSION

Of course, energy is not only important to Canada. It is the lifeblood of every economy and society around the world, and the engine that will allow billions of people in lesser developed countries to rise out of poverty. It has been estimated that one and a half billion people around the world do not have access to modern energy services.

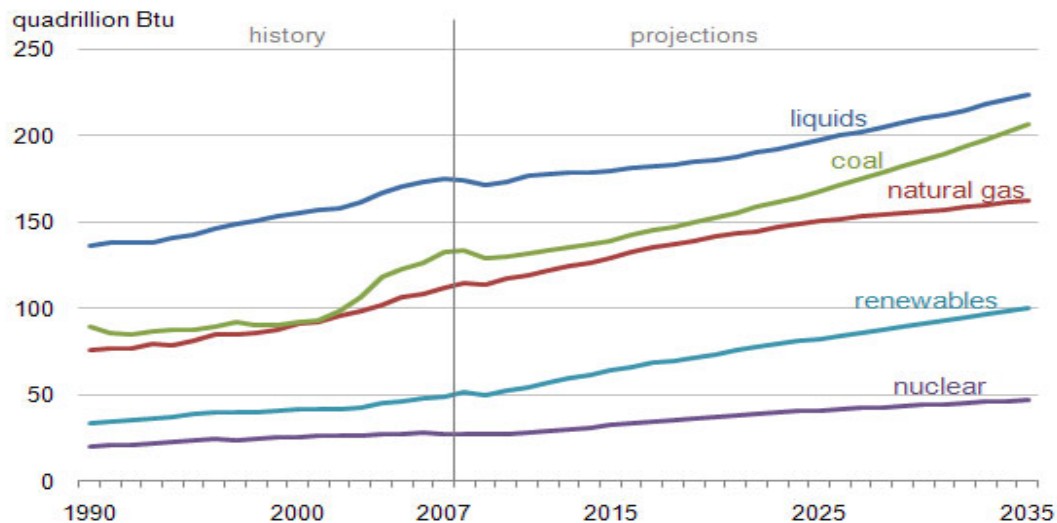
The International Energy Agency (IEA) has forecast that even with current policy in many countries to increase energy efficiency, global primary energy demand will grow 40 percent between 2007 and 2030. As the global population continues to grow and more citizens in developing countries seek access to even a small measure of the lifestyle that we in the Western world have come to know, energy of all forms will be absolutely essential. Fossil fuels will remain dominant in the equation, representing more than three-quarters of the growth in energy demand. And the vast majority of this increase will come from developing countries, primarily, China, India and the Middle East.¹

In fact, the IEA has recently estimated that China has now surpassed the United States as the largest user of energy in the world. China's energy use has doubled in the past ten years.² Moreover, China's sale of passenger cars has grown from 326,000 in 1995 to 8.7 million last year, making it now the largest automobile market in the world.³



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Figure 1: World marketed energy use by fuel type



"Liquids" includes petroleum-derived fuels, ethanol, biodiesel and coal-to-liquids.

Source: US Energy Information Administration, *International Energy Outlook 2010*.

It must be acknowledged that China has made tremendous strides in recent years in developing renewable energy. Recent estimates indicate that it spent \$34 billion on clean energy projects in 2009.⁴ Undoubtedly the Chinese leadership recognizes that the rapid growth of fossil energy use poses many challenges, including increasing reliance on foreign suppliers and the threat to population health from greater use of coal-based electricity. China has pledged to reduce the carbon intensity of its economy by 40 to 45 percent (GHG emissions per unit of GDP) from 2005 levels by 2020. When considered in light of the expected growth of its economy over that period however, there is little reason to believe that China will be able to dramatically change its energy or GHG emissions profile in the near term.

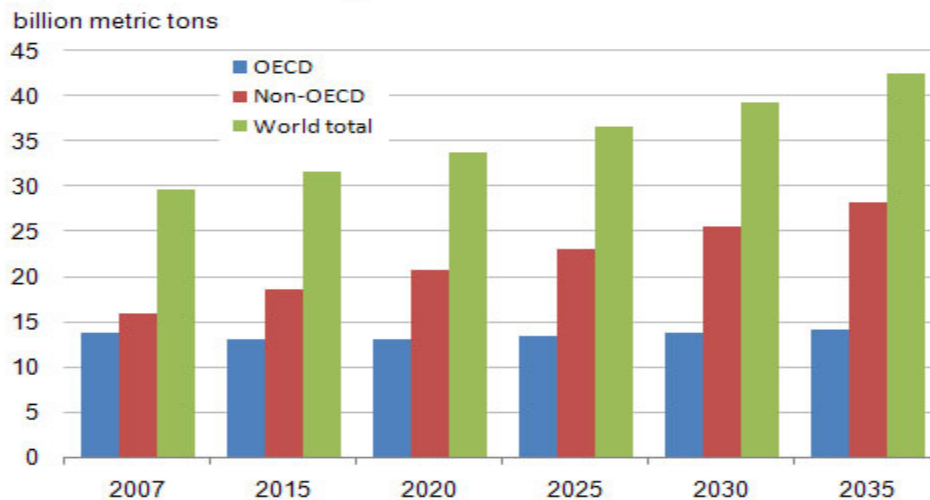


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The IEA also projects that some \$26 trillion in cumulative spending will be needed to meet this growing energy demand. Energy investment around the globe has declined sharply in the last two years as a result of the financial and economic crisis, and ramping up needed investment will be difficult with most governments running large deficits, reduced cash flow in the private sector and tighter credit. More than half of that energy investment is needed in developing countries, both to modernize infrastructure and to provide access to energy where none had existed before.

As illustrated in Figure 2, this increase in global energy use, still fueled mainly by fossil energy, will have significant implications for global emissions of greenhouse gases.

Figure 2: World energy-related carbon dioxide emissions



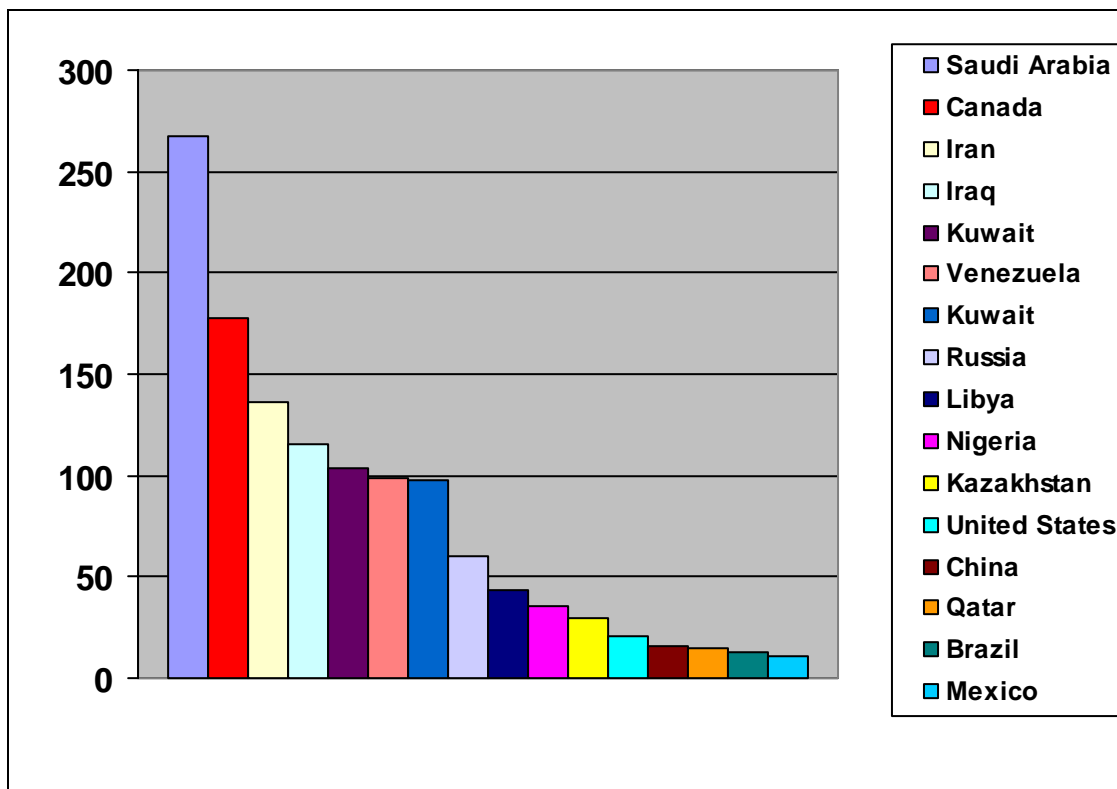
Source: US Energy Information Administration, *International Energy Outlook 2010*



IV. CANADA'S ENERGY RESOURCES

Canada is blessed with a multitude of energy resources, which have long contributed to our prosperity. Canada's oil reserves are second only to those of Saudi Arabia, and we are now the largest source of oil imports into the United States. Major projects currently are underway to increase oilsands production and move that product to attractive markets south of the border.

Figure 3: Global Oil Reserves by Country
(Billions of barrels)



Source: US Energy Information Administration, 2009 estimates



Figure 4: Top 10 Crude Oil Suppliers to the United States

Country	Imports (million barrels annually)
1. Canada	709.1
2. Mexico	398.5
3. Saudi Arabia	357.9
4. Venezuela	347.3
5. Nigeria	283.1
6. Iraq	163.9
7. Angola	163.1
8. Brazil	107.8
9. Algeria	102.6
10. Russia	84.1

Source: US Energy Information Administration, 2009 statistics

Canada possesses significant natural gas assets, including shale gas in Alberta, north-eastern British Columbia and Quebec, as well as extensive conventional gas potential in the west, north and in Atlantic Canada. We are the world's third largest natural gas producer, approximately half of which is exported to the United States. Natural gas is a significant factor in the US's transition away from more emissions-intensive coal as a source of electricity generation as well as a growing source of feedstock for the North American petrochemical industry. While shale gas is being developed in large volumes in the United States, Canadian gas producers will continue to enjoy efficient access to key US markets in the Midwest and West Coast regions.

Until last year, we led the world in uranium production, and even in second place Canada contributes 23 percent of global production.⁵ We are the second largest supplier of metallurgical coal, nearly all of which



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is exported to various countries around the world. Canada possesses more than 6 billion tonnes of coal that could be economically recoverable using existing technologies (100 years of supply at today's recovery rates), but government estimates suggest there is as much as 190 billion tonnes of coal-in-place of potential future interest.⁶

We are among the world leaders in hydro power as a percentage of our overall electricity production (nearly 60 percent), although hydroelectric capacity is spread unevenly across the country. Investment in wind and solar energy is expanding rapidly, albeit from a relatively small base. According to a recent survey, Canada ranked 9th in the world in terms of its attractiveness as a place for renewable energy investment.⁷ And in the Bay of Fundy we have one of the world's foremost opportunities for tidal power development.

Figure 5: Electricity Generation in Canada

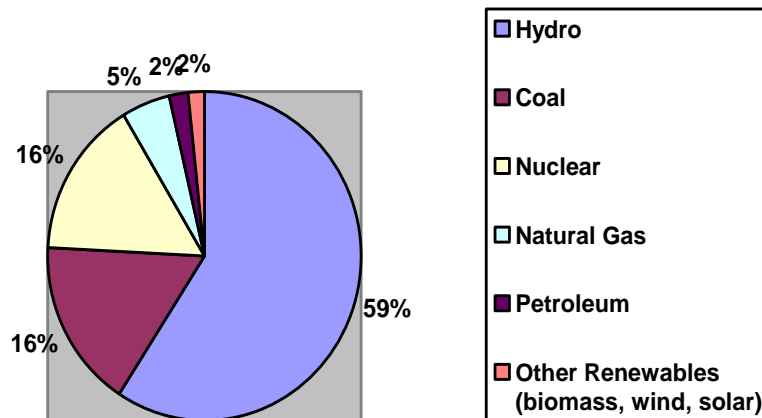
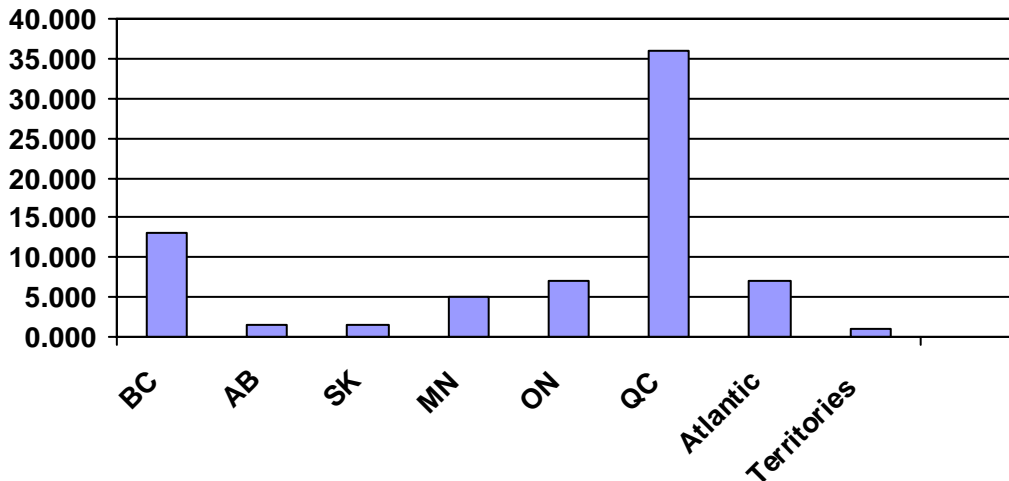




Figure 6: Installed Hydroelectric Capacity by Provinces
(2006, in megawatts)



Electricity trade with the United States is small in comparison to oil and gas but nonetheless significant. In 2006, we exported 41 billion kilowatt hours (Kwh) of electricity south of the border, while importing 23 billion Kwh, a positive trade balance of \$1.3 billion. ⁸

Canadian companies are on the leading edge in development of biofuels. Canadian forestry firms have been in the forefront of development of new fuels from wood waste and spent pulping liquor. Canada produced over 2 billion litres of ethanol in 2009 and we have the agricultural space to expand ethanol production from a variety of crops and plant material. Canada is also home to a number of firms doing leading edge research looking at cellulosic ethanol, adapting other plant material such as switch grass and agricultural residues to make ethanol, as well as making biodiesel from algae.



Canada’s Oilsands Resource

When discussing Canada’s energy potential, talk quickly turns to the oilsands. With the decline of conventional oil production in the Western Sedimentary Basin, the oilsands represent a huge proportion of Canada’s oil reserves and a strategic asset of considerable importance to the entire country. Figures 7, 8 and 9 illustrate the expected economic contribution of oilsands development over the next 20 years, in terms of national GDP, employment and government revenues. The Canadian Energy Research Institute estimates that total revenues to various levels of governments will be \$123 billion over that period, composed of corporate tax, personal income tax, royalties, sales and property taxes, as a result of investment and development in the oilsands.

Figure 7: Oilsands GDP Impact Distribution
(\$ billions)

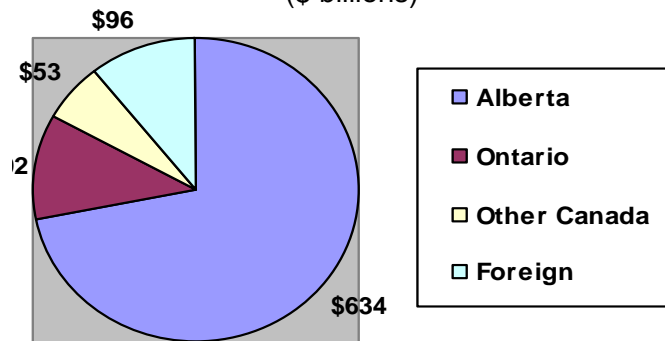




Figure 8: Oilsands Employment Impact Distribution

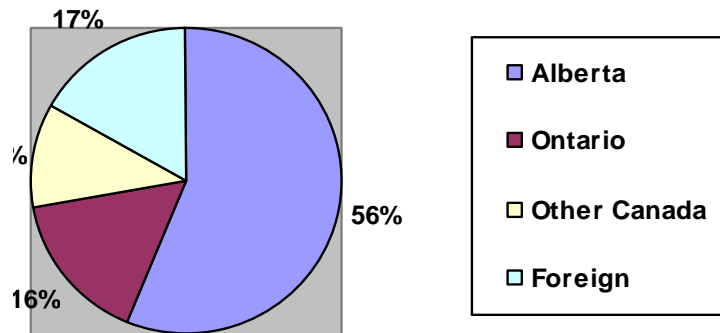
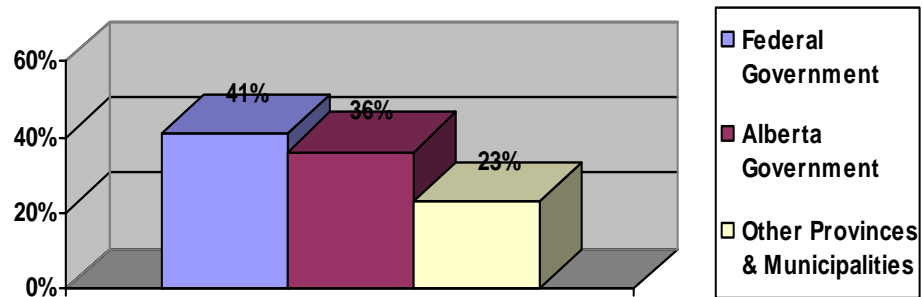


Figure 9: Government Revenue Distribution from Oilsands



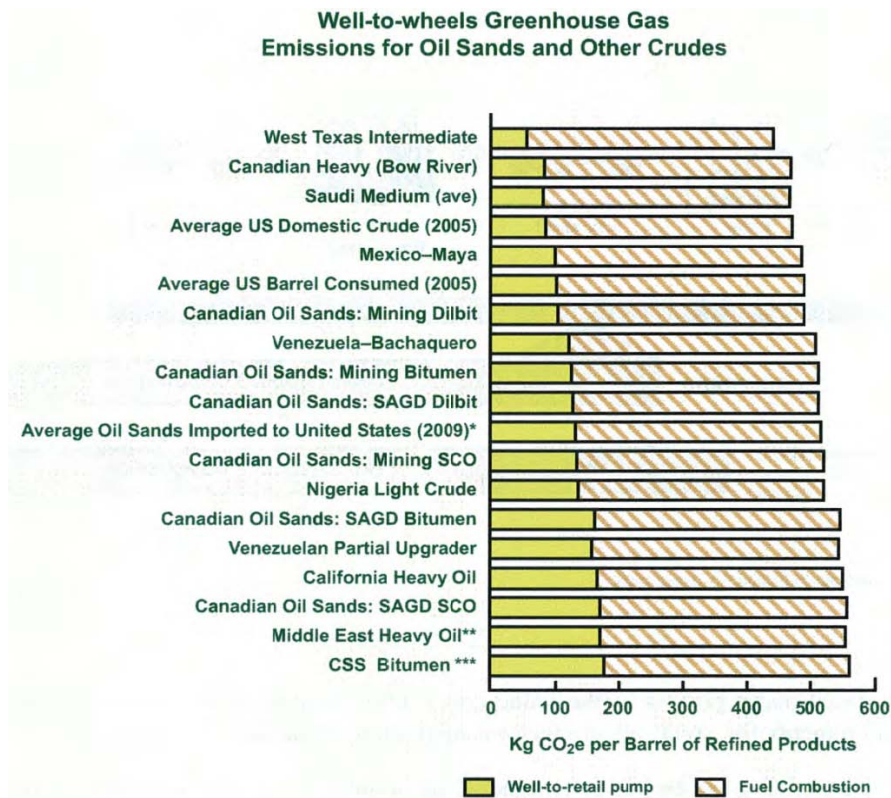
Source: Canadian Energy Research Institute

With the likelihood that gasoline and diesel will continue to be the dominant fuel sources for vehicles for some time to come, the oilsands will be an increasingly important energy source for the United States. Judged on a life-cycle basis, the GHG profile of oilsands-derived gasoline is comparable to other sources of the fuel, both US domestic and imported, that are currently being or could be used in that country.



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Figure 10: Life Cycle GHG Emissions of Various Crude Oils



Source: Cambridge Energy Research Associates, *Oil Sands, Greenhouse Gases, and US Oil Supply: Getting the Numbers Right*, September, 2010

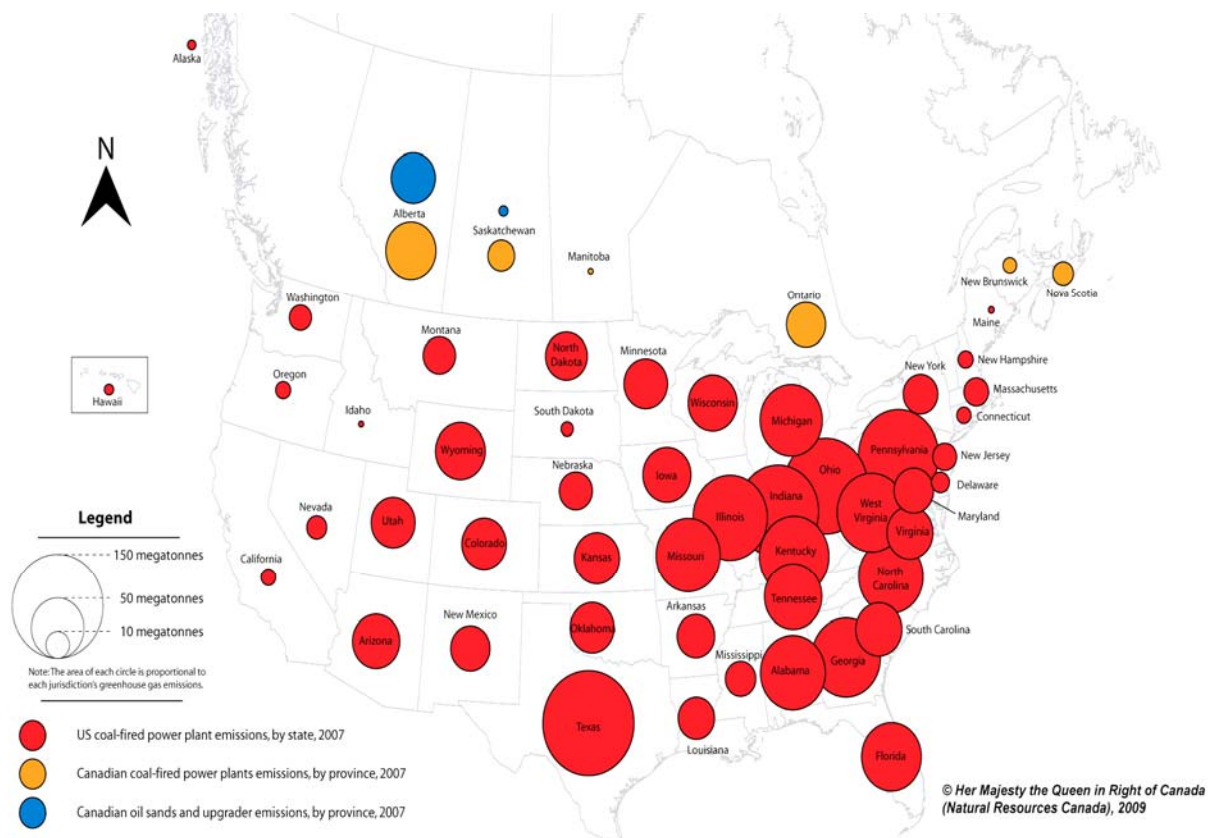
It is important to note that GHG emissions from the oilsands represent 5 percent of Canada’ total GHG emissions and one-tenth of one percent of total global emissions. GHG emissions per barrel of oilsands production have been reduced by 39 percent through the application of advanced technologies and process optimization. As oilsands development expands aggregate emissions will grow and the industry has acknowledged that more must be done to stem the growth through new technologies such as capture and storage of carbon dioxide. As



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well, industry is working to address other environmental issues through enhanced land reclamation, water recycling and shrinking the size of tailing ponds.⁹ Finally, it is important to keep in mind the scale of GHG emissions from oilsands operations in relation to the largest source of such emissions on the continent, namely coal-fired electricity generation in the United States. This is amply illustrated below.¹⁰

Figure 11: Greenhouse Gas Emissions from Coal-fired Power Plants and Oil Sands Operations, 2007





V. MAKING A RESPONSIBLE GLOBAL CONTRIBUTION

Canada sits in the rather unique position of being a stable democracy with a market-driven energy policy in a world where the vast majority of energy resources are either in politically risky regions or under state control. Accordingly, we have an important role to play as a secure energy supplier, not just to the United States but increasingly to other parts of the world where access to reliable energy will foster much-needed development.

With respect to the preeminent global challenge of reducing the risk of climate change, the Council has argued for some time that Canada should be urging the international community to adopt a long-term approach that ensures all major emitting countries make a responsible contribution. Given the likely growth in global energy demand and resulting GHG emissions illustrated in section III above, any other approach simply will not be effective. Satisfying the legitimate desire for higher living standards, particularly in emerging economies, will not be possible without an overall framework that encourages and enables the ongoing creation and dissemination of new generations of low-carbon technology across the globe.

The CCCE was encouraged by the negotiation of the Copenhagen Accord at the 2009 international climate summit. It was critical to get the United States on board, since they had never ratified the Kyoto Protocol and Canada faced Kyoto obligations that did not apply south of the border. Equally important, the Accord allows the major emerging economies to define strategies and actions that are manageable in their circumstances in the near term, while setting the precedent for more ambitious targets in the future as their economic prosperity and their technological capabilities allow.



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As Figure 12 illustrates, some 20 countries account for more than 80 percent of global GHG emissions and it is essential that they each do their part. Our federal government should continue to work with like-minded nations -- the US, Japan, and Australia in particular -- to pursue a strategy of positive engagement of the major emerging economies. As well, in addition to the formal United Nations negotiations a number of other multilateral fora -- the G20, Major Economies Forum, Asia-Pacific Partnership -- can help bring convergence around a global strategy as well as promote innovative and practical solutions.

Figure 12: Countries with Highest Energy-related GHG Emissions
(with rank and percentage of world total)

1. China	21.5%	11. Saudi Arabia	1.5%
2. United States	19.2%	12. Italy	1.5%
3. Russia	5.7%	13. South Africa	1.5%
4. India	4.9%	14. Mexico	1.4%
5. Japan	4.0%	15. Australia	1.4%
6. Germany	2.7%	16. Indonesia	1.4%
7. Canada	1.9%	17. Brazil	1.4%
8. United Kingdom	1.9%	18. France	1.4%
9. South Korea	1.8%	19. Spain	1.2%
10. Iran	1.7%	20. Ukraine	1.1%

Source: US Energy Information Administration

Canada can and should do more to reduce our GHG and other emissions associated with energy production and consumption, but the calculation of our contribution to the global effort should take account of our role as a critical energy supplier. In particular, exports of clean electricity (75 percent of electricity production in Canada is already carbon-free, with the goal of increasing that proportion) and natural gas will serve to replace more emissions-intensive sources in the United



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States. Similarly, global GHG benefits will be achieved when consumers and industries in other countries use Canadian products made from low carbon energy (e.g. aluminum, steel, wood products, etc.) and there should be some recognition of this fact. And finally, Canada can contribute to other energy-intensive nations examples of innovative policy approaches and technologies that demonstrate how to achieve superior economic and environmental performance.

Canada needs to improve its own environmental performance, so that we can credibly champion this inclusive global approach. As noted in section VIII, a sound North American approach can be a model internationally for regional cooperation among nations.

We need to encourage greater international effort in climate science and adaptation. Canada can contribute to improving our understanding of the impacts of a changing climate and in particular in the development of strategies to deal with vulnerable regions such as the Arctic and coastal communities.

VI. BUILDING AN ENERGY CONSERVATION ETHIC

The focus of energy and environmental policy has too often been on questions of energy supply, whereas it is really in the demand equation where the greatest potential for positive change exists. There are understandable reasons why Canadians are high per capita users of energy, but there are many ways in which we are wasteful in our energy use. The reality is that 80 percent of the GHG emissions from fossil fuels, and a considerable portion of other environmental stressors associated with energy, come from end-use, and only 20 percent from energy production and transmission. The best answer to rising energy costs and environmental impacts associated with energy use is to work effectively to reduce the country's energy consumption. The most



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energy efficient countries will have a great comparative advantage in a world of expensive energy.

The overall imperative, therefore, is for much more focus on the sustainable end-use of energy. The first line of attack should be energy conservation, since a unit of energy not consumed is far more effective than efforts to mitigate the impact of energy consumption down the line. Few Canadians appreciate just how much energy is wasted throughout the production, transmission systems and end-use, even with today's modern technologies. For example, whether produced by burning coal or natural gas, more energy is lost in today's thermal electricity systems than is made available to consumers in the form of useable electricity. This is exacerbated by line losses in transmission and inefficiencies in appliances, lighting or other end-use applications in homes, offices and factories. The case is not much better for vehicles and modern internal combustion engines, where far more energy is lost, mostly in the form of waste heat, than is used to provide motive power.

Author Peter Tertzakian has called this the Asymmetry Principle of Energy Consumption: "a unit of energy saved at the consumer level cascades into multiple units of energy saved at the source" and is illustrated in Figures 13 and 14.¹¹ This is a powerful argument for reducing the amount of energy consumed in the first place.



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Figure 13: Asymmetry Diagram for Natural Gas to Light

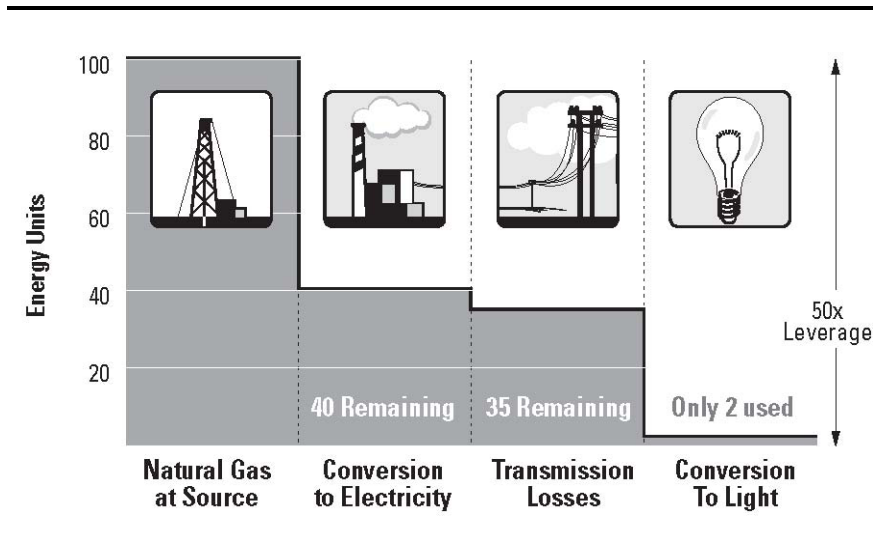
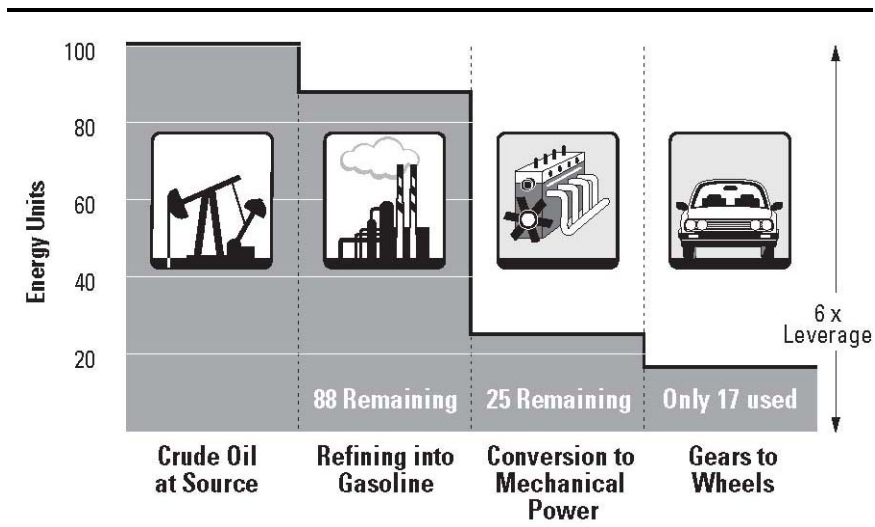


Figure 14: Asymmetry Diagram for Oil to Wheels

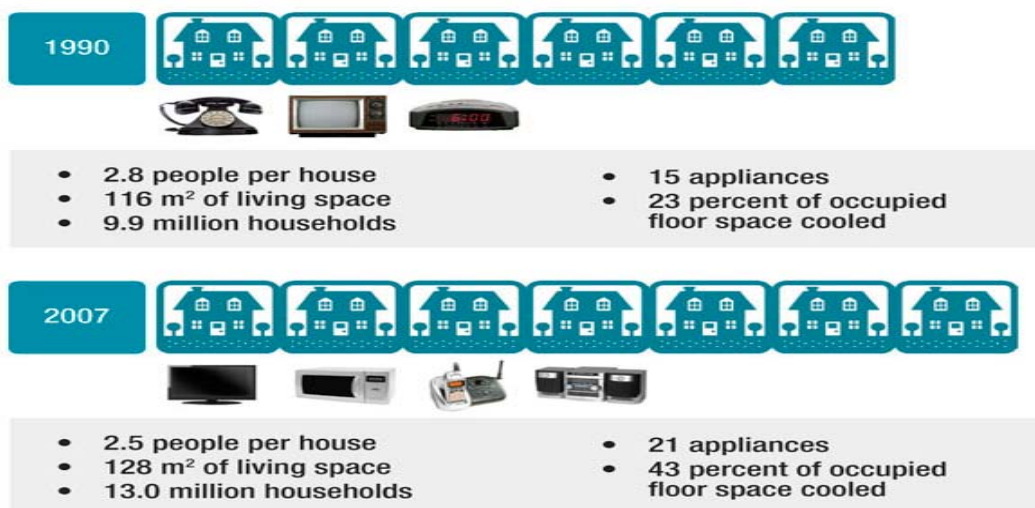




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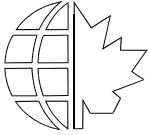
Even with growing awareness of climate change and other environmental issues, the Canadian experience in recent years has not been particularly encouraging. Nation-wide, residential energy use increased 13 percent between 1990 and 2007.¹² This reflects in part a growing population and a larger number of households. While the efficiency of heating equipment and new buildings improved over this time, the reality is that, as shown below, this was outpaced by the larger number of dwellings, the increase in the average size of living space and the fact that Canadians are using more appliances and air conditioning.

Figure 15: Residential energy indicators, 1990 and 2007



Source: Natural Resources Canada, *Energy Efficiency Trends in Canada, 1990-2007*

Transportation is another significant user of energy and accounts for 27 percent of Canada's GHG emissions. Overall emissions from this sector increased 36 percent between 1990 and 2008.¹³ A part of this increase



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results from expansion of freight modes of transport over this period, but a significant portion of transportation energy use (54 percent) is accounted for by automobiles and light-duty trucks. Between 1990 and 2007, the number of registered passenger vehicles in Canada increased from 14.1 million to 16.7 million and overall passenger-kilometres travelled grew by 42 percent.¹⁴ Recent analysis suggests that Canadians bought 16 million automobiles over the past decade, but less than 100,000 of them were hybrid vehicles.¹⁵

Harmonized North American vehicle emissions standards are an important step in addressing the growth in transportation sector emissions. Among other things, a larger market, as opposed to one fragmented by differing standards, will enable the introduction of lower-cost solutions for customers. As recently finalized by the federal government, new GHG emissions standards for cars and light-duty trucks will take effect for the 2011 model year and will become more stringent each year through 2016. As a result of these new harmonized regulations, it is projected that the average GHG emission performance of new vehicles for the 2016 model year will be 25 percent lower than that of vehicles sold in Canada in 2008. In addition, General Motors, Ford and Chrysler have pledged that as much as 50 percent of the vehicles they produce in the United States in 2012 will be flex-fuel.

Together with coming regulation of heavy-duty vehicles, and the commitment to further align North American vehicle regulations in 2017 and beyond, these are significant steps in stemming the pattern of GHG emissions in the transportation sector. Nonetheless, it will take time to turn over the stock of vehicles so that a much larger proportion is of the fuel-efficient variety. Automakers around the world are spending billions on the next generation of vehicles -- hybrids, all-electric vehicles, hydrogen fuel cells, and flex-fuel vehicles that can run on up to 85 percent ethanol. As well, an energy bill introduced in the



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last session of the US Senate would give a boost to natural gas vehicles in North America, at least the potential for fleet conversion to natural gas. But all of these alternative fuels raise questions about the cost and length of time needed to get an adequate re-fueling infrastructure in place, not to mention whether the vehicles will quickly gain public acceptance.

As much as these new vehicles and alternative fuels will help in the medium to longer-term, the short-term priority has to be to get more people out of their cars and using public transit, car-pooling, cycling and walking. Over the longer term, this has to be addressed by significant changes to urban form -- density and land use in particular. In addition to the GHG reductions, there will be multiple benefits -- reduced urban smog, less traffic congestion and more livable communities. A recent study by the Pembina Institute illustrates this challenge. While there has been progress made by some of Canada's largest cities through encouraging higher density housing and more use of public transit, these gains have been offset by population shifts to suburban areas surrounding the urban core where there are longer commuting distances and higher reliance on the automobile.¹⁶ Another study, undertaken by QUEST (Quality Urban Energy Systems of Tomorrow), also points to the potential for reduced energy use and GHG emissions, while enhancing economic growth, through advanced application of integrated community energy solutions.¹⁷



Policies working at cross-purposes

- **Too often governments have chosen to shield citizens from the impact of higher energy prices, especially electricity prices. That makes sense for those on limited incomes, who spend a disproportionately larger share of their disposable income on energy. But by making the price cushion available to all, they have blunted the incentive for those with moderate and higher incomes to take needed efficiency measures.**
- **Too many municipal governments have not taken a comprehensive approach to urban planning, so that more urban sprawl is encouraged rather than inner city densification that can reduce commute times, re-vitalize downtown cores, as well as addressing environmental issues.**

In thinking about a comprehensive program to enroll businesses of all sizes, building owners and individual Canadians in advanced thinking about energy conservation and the importance of energy efficiency, some priority areas include:

- Study successful European models of district heating (combined heat and power) and how they might be adopted in larger Canadian communities;
- Re-examine and re-tool existing government programs aimed at maximizing energy efficiency in industry, commercial and residential sectors;
- Develop improved building codes nationally to improve the overall energy efficiency of new housing and commercial buildings, to incent leading-edge design (passive solar systems, green roofs, etc.) and consider how programs such as LEED



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(Leadership in Energy and Environmental Design) can become the standard in new building design;

- Encourage local governments to build sustainable energy use into community planning -- zoning, urban and transportation design, public transit, sprawl vs. densification, etc.
- Consider how governments and business can work together to support Canadians in their choice of environmentally preferable goods and services;
- Look to significantly increase Canadians' energy literacy.

The reality is that governments at all levels have been preaching energy efficiency to Canadians in various ways since the first oil price shocks of the 1970s, with limited success. So clearly a new model is needed. We do not pretend to have all the answers to this conundrum, but it seems clear that price will work in a way that public exhortation and appeals to the greater good have not. As we saw during the rapid run-up in gasoline prices in 2007, consumers will respond and that further illustrates the importance of coherent carbon pricing policies.

VII. A COHERENT NATIONAL APPROACH

For many years, the CCCE and other business leaders have urged the federal, provincial and territorial governments to work more closely together on a coherent and effective national strategy to address climate change. Unfortunately, recent events are moving the country farther away from a single unified approach to climate policy, with several provinces seemingly engaged in one-upmanship rather than attempting to build a true national consensus. Business leaders, and we hope most other Canadians, were distressed at the sight of several provinces being openly critical of our national government in



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Copenhagen. This does nothing to foster a sense of national purpose and is not the image that Canada should be projecting internationally.

Figure 16: Federal and Provincial GHG Targets

<i>Jurisdiction</i>	<i>Base Year</i>	<i>Target</i>
Federal	2005	17% below by 2020
B.C	2007	33% below by 2020
Alberta	2005	50% reduction in emissions intensity
Sask.	2006	20% below by 2020
Manitoba	1990	Below 1990 levels by 2012
Ontario	1990	- 6% by 2014, -15% by 2020
Quebec	1990	Kyoto (6% below by 2012)
Nova Scotia	1990	10% below by 2020
N.B.	1990	1990 levels by 2012, -10% by 2020
N & L	1990	1990 levels by 2010, -10% by 2020
P.E.I.	1990	10% below by 2020

The above table illustrates the differing GHG emissions reductions targets for the federal and provincial governments. Equally important, several jurisdictions are implementing contrasting GHG policies as they apply to business. For example, British Columbia has implemented a broad-based carbon tax applied to the combustion of fossil fuels in the province, whereas Alberta has developed a system of carbon pricing for large GHG emitters. British Columbia, Manitoba, Ontario and Quebec are working with a number of US states in the *Western Climate Initiative*, one of the prime objectives of which will be a cap-and-trade regime with yet another set of objectives and rules. As well, we already have seen some provinces set out different rules with respect to how industrial facilities are required to report their annual GHG emissions.

A National Approach that Respects Regional Differences: It should be clear that by a coherent national policy we do not mean one dictated by



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the federal government. It must instead be built in cooperation with provincial and territorial governments and with buy-in by industry, other key stakeholders, and the broader public. The reality is that Canada has different regional priorities, based in part on the varying stock of energy and other resources. But on an issue as important and global as climate change, we have to think more as a nation and get away from the zero-sum game mentality and the notion that any adjustment for a sector or region must come at the cost of disadvantage to another sector or region. We simply cannot afford to have conflicting policies that work against maximizing Canada's potential to be an energy and environmental leader.

In early 2010 in Washington, several premiers met with state governors and with EPA Administrator Lisa Jackson. They used that opportunity to stress the importance of not allowing conflicting emissions requirements between the US and Canada to unfairly penalize Canadian firms. It is time they applied that same logic to the Canadian federation and worked more diligently on a cohesive approach within our borders.

VIII. FORGING A CANADA-UNITED STATES ACCORD ON ENERGY AND CLIMATE

A fundamental element of any strategy to maximize Canada's energy and environmental potential must be a high degree of policy alignment with our most important trading partner, the United States. In proclaiming Canada's adherence to the Copenhagen Accord earlier this year, Federal Environment Minister Jim Prentice indicated that the country's overall goal for greenhouse gas emissions will mirror that of the United States. As well, Canada's submission to the UN process makes clear that our adoption of that goal is contingent upon a comparable goal actually being enacted by Congress.



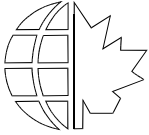
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The logic of such a course for two highly integrated economies is clear enough. As the Prime Minister has indicated, to take more ambitious action in Canada would harm our economy without a measurable improvement in environmental outcomes, while on the other hand, to pursue a weaker course of action would invite carbon tariffs or other border measures to be applied to our exports to the United States. However, beyond merely aligning in numerical terms, the immediate question is what implications this degree of North American coordination will have for the broad suite of policies needed to adequately address Canada's growing greenhouse gas emissions. It is important to look more carefully at what closer alignment might mean in practical terms, where it makes sense to "harmonize" and where it may not, how this could be achieved, and what policies and institutional structures would be needed to support the effort.

This section of the paper explores the rationale for a harmonized Canada-US approach to climate policy, outlines some of the key elements that should make up a bilateral accord, and makes the case that Canada must take the lead in pursuing this agenda.

Rationale for a Harmonious Canada-US Approach to Energy and Climate Policy

While aligning our climate change objectives appears to be the predominant focus, the rationale for a bilateral accord is broader and as noted above stems from the near seamless integration of our two economies. As is often said, we do not simply trade, we make things together. It also is a function of the fundamental importance of energy to that relationship, and from a Canadian perspective, the opportunity we have to ensure that Canada's energy advantage enhances North American prosperity. Canada can be an important partner in

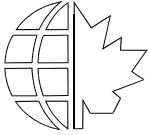


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improving continental energy security and both countries have a common agenda as we seek to expand the supply of all forms of energy -- fossil, hydro, clean coal, wind, solar, biomass and other renewables.

Energy and climate policy also can be part of the mutual agenda we have sought for some time, through initiatives such as the *Security and Prosperity Partnership*, to enhance economic integration and regulatory convergence. We could fashion a compelling example of integrated policy across borders to promote economic growth, energy security and environmental protection. As a recent CD Howe study has shown, the cost of Canada going it alone on climate policy could be twice as high as if we do it in a coordinated way with the United States.¹⁸ Fundamentally, this results from the fact that Canada faces a bigger challenge than the United States in meeting the reduction target that both countries agreed to in Copenhagen, i.e. a 17 percent reduction in GHG emissions from 2005 levels by 2020. Several studies have modeled these differences in costs¹⁹, which result primarily from: a) emissions growing more quickly in Canada, in part because of relatively greater growth in the energy-intensive resource industries in Canada; b) a range of lower cost emissions reduction opportunities in coal-fired electricity generation in the United States, compared to Canada where our generation mix is already relatively low-carbon; and c) the high costs of emissions reductions in the expanding oil and gas sector.

Advancing our common interests on environmental policy will also serve us well in the continuing international negotiations post-Copenhagen, and better ensure an outcome that fits North American needs and circumstances. The Canada-US example also can be a powerful catalyst for encouraging more cooperation and engagement globally. Greenhouse gas emissions know no borders and action in any part of the globe has an equal effect in limiting climate change.



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Accordingly, there are few issues where fostering cooperative international action will be more important, whether it is in stimulating the development of cleaner forms of energy, demonstrating cost-effective policies or encouraging the widespread use of innovative technologies with lower environmental impact. By working with our American neighbours we can increase both public and private sector investment in critical areas -- such as carbon capture and storage, electric and hybrid vehicles and advanced biofuels -- and ensure a bigger share for Canada of this growing global market.

Both before and after the historic meetings in Copenhagen in 2009, some critics have questioned the need to “wait for the United States”, and bemoaned the loss of sovereignty that this implies. The reality is that every agreement where two jurisdictions agree to jointly develop policy -- whether it be expanding trade, increasing security at the border, reducing the risks of an international pandemic or enhancing environmental protection -- theoretically entails some loss of sovereignty. The question is whether it can be demonstrated that such an arrangement has manifest benefits for both sides and be a leading example of how to foster international coherence on key global issues.

It also is important to note that alignment does not mean, as some critics have contended, that Canada must slavishly follow every aspect of US climate policy. There will have to be variances, potentially in important areas where our capacities and opportunities differ. What it does mean is that we have to think carefully before adopting different policies which, at the end of the day, might have very little impact environmentally but come at considerable economic cost.



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Why Canada Must Take the Lead

First and foremost, Canada must take the lead on such an important bilateral initiative because we have more at stake. This comes in large measure from the integrated nature of our economies and the fact that Canada is more reliant on trade, but also because of the critical importance of energy to our future prosperity. Policies properly aligned can improve our position as a reliable supplier of advanced energy to the United States and create spin-off benefits throughout the Canadian economy. Without such coordination Canadian firms easily could be side-swiped by US policy, whether by design or inadvertently. Many recent proposals in the United States could impact Canada significantly including how their federal or individual state governments might define a so-called “low carbon fuel standard”, the rules for determining what qualifies as “renewable” or “green” energy, or the treatment of carbon embodied in imports to the US market.

Another key consideration is to align Canadian and American negotiating strategies so that we are better able to influence the direction of international climate change discussions. As the second-largest global emitter of greenhouse gases and an entrepreneurial powerhouse, the United States is arguably the single most important player in how the world grapples with the challenge of climate change. It will have inordinate influence in setting the international agenda for policy choices in carbon pricing and in the race to develop and deploy the next generation of innovative, low carbon technologies.

In deciding on its climate policy path the United States will not set out with a goal to consider the impact on Canada, nor should we expect them to do so. It will be up to us to engage with them to make our case so as to ensure they understand our perspective and our concerns. And fundamentally we should approach the task with a view to



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showing how our respective interests can be aligned. With a crowded legislative agenda and a multitude of competing interests we will only get real attention in Washington if we can show we are serious players and have something substantial to contribute.

In fact, history has shown that whenever Canada has more to gain than the United States from pursuing a common agenda, the lead inevitably has to come from Canada. This was the case with the Free Trade Agreement and Acid Rain Accord, two seminal initiatives of the 1980s. Whatever the view at the time, it is now beyond argument that these groundbreaking efforts would not have happened without Canada taking the lead, both in advocacy and intellectual content.

Needless to say, there is considerable uncertainty in Washington about the timing and content of federal policy going forward, with the past deadlock in the Senate and many questions about how a new session of Congress will deal with energy and climate issues. However, uncertainty in the American legislative process and the likely delay means we can use the time profitably to develop and advance our case for a bilateral accord.

Key Elements of a Bilateral Accord

Energy: Canada and the United States already enjoy one of the largest and least-encumbered trade relationships in energy between any two countries. In terms of overall energy trade, Canada already is the largest foreign supplier to the United States. The blackout of 2003 clearly demonstrated how interdependent our two countries are with respect to electricity trade and the infrastructure that supports it. Energy policy is thus closely aligned already, but we should examine opportunities to further strengthen the relationship.



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There is an opportunity to build upon what already exists in the FTA and NAFTA and further solidify our partnership on energy by strengthening its application to oil and refined petroleum products, biofuels, and electricity. This might help to ensure that Canada's exports of large scale hydroelectricity can qualify as "renewable" power for US requirements.

Since our current obligations under the FTA and NAFTA preclude Canada from restricting energy exports below the prevailing proportion of domestic and export sales, pointing this out could be an avenue to try to ensure that proposals for a "low carbon fuel standard" (LCFS) in the US do not discriminate against Canadian crudes and so disadvantage the US under these provisions. Indeed, if more jurisdictions in the US follow the California LCFS model, Canada should strongly resist. Not only does California exempt its own heavy oil industry from the requirements, it seeks to impose a standard on Canadian imports using information supplied by Canadian companies and verified according to Canadian regulations, all the while comparing them to other US imports which either lack credible and comparable information or are not subject to verification.

One energy bill in the last session of Congress, while largely dealing with the regulation of offshore drilling, also proposed further support for renewable energy, natural gas and clean technologies. This would be in addition to what the Obama Administration included in the stimulus package. The White House also granted further financial support to construction of new nuclear power plants. All of these are critical to the future of the Canada-US energy relationship and need to be included within the broad framework of a bilateral accord.

Climate Change Policy: One of the key components, if not the most critical, will be the rules as they apply to major industrial sources of



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greenhouse gas emissions. However, this is also the area with arguably the least policy clarity at the moment. Legislation passed in the US House of Representatives (*Waxman-Markey*) would have created an economy-wide cap-and-trade regime covering some 75 percent of US GHG emissions. However, attempts to get similar legislation approved by the Senate failed and the Democratic leadership appears to have abandoned for the time being the idea of an even more modest climate package, with caps applied only to electrical utilities (fossil generation represents about one-third of total US GHGs). There remain significant questions about when and if climate legislation could move ahead in Congress in the future.

Such legislative uncertainty increases the likelihood that the US Environmental Protection Agency (EPA) will move in to fill the void. It has the authority under the *Clean Air Act*, now that it has ruled that greenhouse gases “endanger” the health and wellbeing of US citizens, and that conclusion has been backed by the US Supreme Court. Its legislative mandate means the EPA has traditionally regulated sector-by-sector and even technology-by-technology. But the sheer number and variety of sources of GHG emissions makes going down that route extremely complex, time consuming and in the end extremely inefficient. As well, the EPA has traditionally used a technology-prescriptive approach that could limit firms’ flexibility to choose the most appropriate solution for their needs and to manage costs.

In Canada, the federal government had articulated the broad parameters of GHG regulation in 2007, but lately has signaled that these details will change in light of ongoing developments in the United States. It is important to note that the 2007 framework anticipated applying regulatory requirements to a relatively small number of industries (electricity, oil & gas, chemicals, steel, aluminum, forest products, metal smelting, fertilizers, cement and lime) which



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nonetheless collectively account for about 45 percent of Canada's total GHG emissions. With the announcement by Minister Prentice on the phase-out of coal-fired electricity, and the fact that oilsands facilities have no equivalent in the United States, the scope for a continental cap-and-trade approach is somewhat more narrow.

Thus the key question is likely to be the degree to which we can fashion a common approach going forward to cap-and-trade or regulatory requirements for the energy-intensive manufacturing sectors. As noted above, Minister Prentice has suggested that Canada is prepared to match US policy, whether they ultimately choose a legislated cap-and-trade regime or regulation through the EPA. It is possible that, if at some time in the future the US opts for an economy-wide cap and trade system, Canada could attempt to align with respect to sector coverage and targets, but that is by no means straightforward. Even more challenging would be trying to match EPA-mandated requirements across a broad array of Canadian industries, some with very different products, processes and technologies compared to their American counterparts.

Without a feasible and logical means to demonstrate "comparable effort", Canadian firms selling into the US market might find themselves subject to carbon tariffs or other border adjustments. And we know from past experience the many ways in which the US system can be used to seize on comparatively small regulatory differences as a pretext for protectionism. Two primary considerations come to mind. First, *Waxman-Markey* would have created special rules for so-called "emissions-intensive and trade-exposed" industries, as those are judged most at risk from competitors in other countries with less stringent GHG obligations. Similarly, the current emissions trading system in the European Union also grants special treatment to their most vulnerable industries through an output-based scheme for

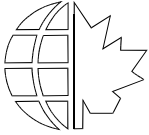


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allocation of carbon permits. And the proposed *Carbon Pollution Reduction Scheme* in Australia would have contained similar protection for domestic industries, had it not been defeated in the Australian Senate. Thus, it will be important that like industries on either side of the border be operating under similar rules, including consistent criteria for calculating, reporting and verifying GHG emissions. The latter is particularly true for trade-exposed sectors such as steel which have developed internationally agreed sectoral methodologies. Second, in the absence of complete alignment, the ultimate test is likely to be whether comparable firms in each country face comparable costs - whether comparable carbon prices where observable or comparable regulatory obligations.

Harmonized standards: There are a number of areas where cooperative efforts have been underway for some time to ensure complementary approaches to standards development. The automobile industry is arguably the most integrated of any North American manufacturing sector and both the American and Canadian governments have finalized a single North American GHG emissions standard for passenger vehicles and light-duty trucks. The same logic applies to common standards with respect to heavy-duty trucks, aircraft, recreational and marine vehicles. Both governments have provided significant support to the development of a domestic biofuels industry and this is another area where a common approach to standards can avoid arbitrary restraints. And finally, both countries have significant opportunities to pursue carbon offsets on forest and agricultural lands as part of GHG mitigation efforts, and policies in these areas should be similarly aligned.

Technology cooperation: As noted above, because of our common energy resources and needs, there already is cooperative work underway in key technologies -- carbon capture and storage, clean coal,



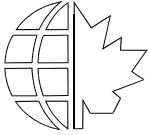
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biofuels, hybrid and electric vehicles, cleaner engines, etc. Much of that is happening through the *Clean Energy Dialogue*, which offers an important opportunity to maximize synergies between existing research efforts of the two countries, as well as a platform to consider where commercial potential can be enhanced.

Harmonized Does Not Mean Identical: As previously stated, a bilateral approach does not mean total conformity or that nothing can be done until there is clarity on US action. We can establish priority areas for coordination and ensure that current policy is flexible enough to adapt to the eventual US system. The overriding objective should be to achieve a common agenda -- bolstering continental economic performance, enhancing energy security and setting a long-term game plan for environmental improvement.

Moving Forward on Canada-US Negotiations

We should not underestimate the difficulty of getting the United States to the table, or to get them to think of Canadian implications before they design domestic policy. On the other hand, we should not be shy about exploiting the potential leverage that Canada has in these negotiations. Having access to a reliable supplier of energy will become increasingly important to US interests and key decision-makers in that country are becoming more aware of the vital role that Canada can play. We have work to do to convince them of our bona fides on improving environmental performance, but as pointed out above, a barrel of oilsands-derived petroleum is no more carbon-intensive than many heavy oil barrels produced in the US and around the world, and not that much more carbon-intensive than the average barrel imported into the US today, and efforts are ongoing to address environmental issues associated with Canadian oilsands development.



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We can remind our neighbours that Canada has other markets interested in our oil exports. This is not to say that we should threaten, but neither should we be shy about pointing out the obvious advantages of further cementing the continental energy and trade relationship. The reality is that they will respond to a negotiator who puts their cards squarely on the table. Ultimately we have to appeal to Americans' own interests -- for example the jobs and economic growth that stem in part from its industries having access to secure supplies of affordable energy. To the extent that Canadian efforts were successful in reigning in some of the excesses of the "Buy American" policy of the US federal stimulus package, it was because we were able to show that the high level of economic integration meant that hurting Canadian suppliers ultimately means impacting American jobs and damaging growth prospects for US firms.

In pursuing this agenda, Canadian business has an important role to play. In addition to making the case to governments in Canada for the benefits of a bilateral Canada-US accord, business leaders should do more to persuade counterpart business organizations in the United States of the merits of greater continental cooperation on energy and environmental issues.

IX. ALIGNING DOMESTIC POLICY

If Canada is to realize what we are describing as a comprehensive approach to responsible energy development and enhanced environmental performance, attention needs to be paid to critical elements of domestic policy.

Strive to be World Leaders in Energy Innovation: As previously noted, Canada is blessed with a vast array of energy resources, from traditional fossil fuels, uranium and hydropower to only partially



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realized potential in biofuels, wind, solar, tidal and geothermal. Our energy and resource endowment has been and will continue to be a significant contributor to the livelihoods and prosperity of Canadians from coast to coast. But that is dependent upon our ability to develop and implement advanced technologies to realize that full potential in an environmentally responsible manner. The global market for cleaner energy is huge and Canada has the opportunity to be a valued and competitive supplier of such energy, together with advanced technologies and related services. At the same time, we have to be on our game, as the competition to capture a share of this burgeoning market is fierce. As one potent example, South Korea has announced that it will invest more than one percent of its GDP in clean technology over the next five years, and China's share of global clean tech investment has now surpassed that of the United States.²⁰ As well, in 2009 China produced 40 percent of the world's solar photovoltaic supply and 30 percent of the world's wind turbines, up from 10 percent in 2007.²¹ We owe it to Canadians to seek a growing share of that critical export market. Long-term energy innovation will be fundamental to enhancing Canada's global brand.

Recognize Energy as a System and Take the Necessary Steps to Modernize Energy Infrastructure: Canada's energy system has grown up over several decades and has a series of complex and interconnected parts. It is critical to maintain effectiveness and efficiency throughout the entire supply chain, as a breakdown in any one part can be critical not just to individual households but also to businesses who depend on reliable and affordable energy to compete. And as illustrated in section VI, there are many places throughout the system where energy is lost and thus multiple opportunities for savings/efficiency.

An important illustration of the systems approach can be found in the QUEST initiative (Quality Urban Energy Systems of Tomorrow) which



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is bringing together key players in the relevant industries, local and regional governments, community leaders and other stakeholders. Their efforts are being designed to try to ensure that an integrated and community-based approach is taken to energy delivery, land-use, transportation, waste and water so that significant reductions in energy use can be realized.

Much of the infrastructure that carries our current energy supply is aging and in need of significant refurbishment or replacement. Additional capacity also will be needed if we are to realize the opportunity to supply cleaner energy to existing and new markets. Efforts are underway to expand pipeline capacity, most notably with new oil pipelines to move oilsands-derived production to markets in the United States and eventually Asia. Pipelines to bring B.C. shale gas to markets in North America are now under construction and a pipeline has been proposed to move captured CO₂ from various sources in Alberta to potential storage sites.

Discussions with the United States under the *Clean Energy Dialogue* will help to improve interlinkages in electricity transmission across the border. In addition to north-south, there is a need to develop the potential for HVDC transmission lines between regions of Canada and smart electricity grids within regions. Electricity transmission improvements are needed to realize the opportunity for expansion of renewables -- wind, hydro and biomass -- as are efforts to establish the refueling infrastructure necessary for alternative transportation fuels.

Finance Clean Energy Research and Technology Deployment: Long-term attainment of our energy and environmental goals can only happen with new generations of technology that provide energy, services and consumers goods at an affordable price and with a reduced environmental footprint. More can be done by the energy sector to



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expand existing R&D efforts and to utilize public-private partnerships to finance investments in clean energy research. The private sector has a key responsibility with respect to research, development, demonstration and deployment of new technologies and products, but the public sector role also is critical, particularly with early financing of potentially breakthrough technologies in both universities and industry and in supporting widespread adoption of energy-saving goods and services by Canadian consumers.

Create a positive climate for investment in energy, infrastructure and advanced technologies. The broader economic policy framework is critical to ensuring Canadian industry's capacity to respond and innovate. Through smart fiscal, tax and other policies governments can help ensure that companies stay healthy and profitable and thus both encourage and enable increased investment in new technologies.

There can be no doubt that the private sector will be the source of the vast majority of advanced energy and emissions-reducing technologies. Canada must provide a policy environment that allows innovative firms to realize their full potential. We need a focused technology strategy combined with a clear, consistent and predictable policy framework that will stimulate domestic and global adoption of more effective technologies today as well as research, development and deployment of low carbon energy and advanced technologies for the future.

Foreign investment has been and will continue to be critical to the development of Canada's multiple energy development opportunities. The federal government has indicated recently that it will be reviewing the Investment Canada Act with respect to any potential national security or related issues raised by the acquisition of Canadian companies and assets, and this issue can arise with respect to



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investments by foreign state-owned enterprises. We understand the concern as to whether some state-owned enterprises may operate according to normal market rules. Clarity in this area of policy is essential as the energy sector is likely to be the critical test ground.

It is important that governments think about policy approaches that, while non-discriminatory in nature, can stimulate greater domestic processing and upgrading of energy and other natural resources. The right policy environment also can strengthen the Canadian base for related industries -- petrochemicals, energy services, financing, etc. -- as well as endeavouring to ensure that access to secure and affordable energy remains a competitive advantage for Canada's energy-intensive manufacturing industries.

Galvanize a stronger commitment from Canadian industry: Canadian businesses already have done a great deal to make their operations and products more energy efficient, to develop new technologies that reduce emissions and costs and to create more sustainable business models. However, we can and must do more. Individual company commitments and sector goals, as well as benchmarking against competitors in other countries, can be powerful motivators to change. In particular, we need to increase the private sector outlay on energy R&D and technology spending to create the innovations that will be key to competitive performance in the future.

Business leaders have an important role to play that goes beyond the actions that have been and will be taken by our enterprises to reduce emissions. We also can be agents of change by enrolling our employees in efforts to address environmental issues, by helping our suppliers and customers to build environmental thinking into their business strategies, and by contributing better products and technologies for both consumer and business application.



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Ensure Effective and Efficient Regulatory Regimes: Too many advances in cleaner energy and environmentally friendly products can be tied up in time-consuming and duplicative approval processes. Businesses do not object to efficient regulatory oversight. But they want to get on with the job of investing in advanced energy solutions, and so need assurance that regulations will be cost-effective, that regulatory processes will be clear, fair and efficient, that multiple levels of governments will cooperate in “one-window” assessment processes and that decisions are reached in a timely manner. As well, it is critical that the full life-cycle impact be considered when assessing new technologies, to realize overall economic and environmental benefits. Governments need to ensure that policies take account of the normal life-cycle of carbon-intensive capital investments, so that valuable, cost-effective assets are not forced into premature retirement.

Create Appropriate Price Signals: As we stated in *Clean Growth: Building a Canadian Environmental Superpower*, the price signal is the most powerful incentive for both industry and consumers to conserve energy and enhance efficiency. Coupled with the appropriate overall policy framework, carbon pricing can lead to innovation and new technologies that have positive outcomes for consumers and position Canadian firms to be suppliers of less carbon-intensive products and services.

The particular label applied -- cap-and-trade, carbon levy or tax -- matters less than the details of how the policy will be designed and the importance of getting longer-term policy clarity so that businesses and consumers can make appropriate decisions about long-lived energy-using equipment. And details do matter, particularly to ensure no regional or sectoral disadvantage, that firms face costs that are not out of line with what their competitors are facing, and that industries and



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consumers are not merely penalized, but have positive reasons to take action. In short, policies aimed at changing behaviour through price signals must deliver positive environmental outcomes in ways that foster an innovative economy and strengthen Canada's competitive advantage.

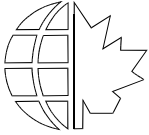
“Trying to make America energy-independent without creating a market-mechanism to price carbon would be the equivalent of President Kennedy launching our national effort to put a man on the moon without building a rocket.”

*United States Senator Joe Lieberman
June 16, 2010*

Fully Engage All Sectors: More work is needed to ensure nationally consistent policies and standards in other sectors -- agriculture, transportation, municipalities, buildings, waste, etc. -- so that every part of Canadian society makes a responsible contribution to the national effort.

Foster Unique Canadian Talents: Canada already has a tremendous asset in terms of our resource base, scientific and human talent and financial and entrepreneurial skills. We need to fully mobilize those assets so that we can be a leader in the development of next generation technologies that will provide cleaner energy and environmentally preferable products and services that can be put to use both here and abroad. Among other things, this will require a significant investment in education and training by both the public and private sectors.

We also need to do a much better job of fully enlisting the current technical expertise that we have available. For far too long, discussion



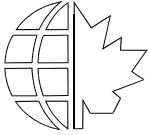
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of climate change and related policies has been dominated by politicians, NGOs and academics. Yet the answers to fostering long-term energy security and environmental enhancement represent one of the most complex engineering challenges Canada and the world has ever faced. It is essential that we focus less on grand-sounding goals and simplistic solutions and bring considerably more technical expertise (engineers, scientists, etc.) to bear on real world applications.

Promote the Canada “brand”: Seizing on the opportunities represented by this kind of strategy can do a great deal to strengthen the Canadian “brand” in our trade and diplomatic relationships internationally. We clearly need to do more to get the facts out on the Canada “story”, both our vast array of energy resources and our responsible approach to environmental management. Our stable democratic values and market-based energy policy make us a secure and reliable supplier not only to the United States but increasingly to other countries. We have a tremendous opportunity to explore markets in developing countries for energy and related products, services and know-how, as well as linkages and new technology partnerships. And we can be a responsible player in meeting climate change and other international environmental objectives.

X. CONCLUSIONS AND PRIORITY RECOMMENDATIONS

Canada is truly blessed with a stock of natural resources that most countries can only envy. But it is by no means a foregone conclusion that they can and will be developed in a timely and cost-effective manner that maximizes Canada’s economic potential. Much of our traditional stock of fossil fuels is increasingly in more remote locations, and can be difficult and costly to extract/process. Renewables and alternative fuels hold considerable promise but are at the higher end of



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the cost curve and for the most part lack the required infrastructure to deliver significant quantities of energy to markets at a competitive cost.

We believe Canada can be an energy and resource powerhouse while also developing the technologies and systems that lead to successful businesses and higher paying jobs in this country, as well as contributing to environmental improvement around the globe. But we have to be on our game, with government, industry and key stakeholders pulling in the same direction and with smart policy that ensures Canada can successfully compete with other locations around the world for the significant investment needed.

As a country we must be prepared to be responsible global players, both by helping to develop the cleaner energy sources and innovative technologies of the future and by doing our part to address pressing environmental issues such as climate change. If we are able to set the appropriate framework for both priority action today and for the necessary longer-term transformation, we can make measurable progress in the short term while also undertaking the needed investments over time that will deliver both an enhanced standard of living and superior environmental performance.

Canadian industry is ready and willing to do its part, but companies need a road map that provides clarity and predictability, anchored in a sound economic competitiveness framework, so they are able to contribute innovative and lasting solutions.

1. National energy strategy

It starts with a coherent national energy framework that makes the most of our opportunities to develop clean energy solutions and position Canada for leadership internationally. The Prime Minister should convene a meeting of First Ministers that would provide



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direction to begin preparation of a national energy strategy. At a recent meeting in Montreal, the federal, provincial and territorial ministers of energy and mines committed to identify “goals and objectives related to energy that will lead to greater pan-Canadian collaboration” and it is time to put that resolve to the test.

It should go without saying that this is not something developed by the federal government in isolation, but in partnership with the provinces and territories and building on each region’s strengths and opportunities. 1980 and the National Energy Program are almost two generations ago. It is time for a more mature and thoughtful discussion on a subject that is critically important to Canada’s economic prosperity.

2. Bilateral accord with the United States

The federal government must signal its serious intention to develop an energy and environmental accord, engage the United States at the highest level and convince them it is in both our countries’ interests. As with the FTA and NAFTA, this will require a very senior Canadian negotiator and a dedicated team with broad policy experience in trade negotiations, finance, energy and environmental policy. Canada’s objective should be to secure greater cross-border collaboration on energy, climate change policy, harmonized standards and development of key clean energy technologies. In the case of GHG regulation for emissions-intensive and trade-exposed sectors, the goal should be comparable regulatory cost impact so as to avoid any legitimate rationale for US border charges.

3. National approach to climate policy and carbon pricing

We must get past the current patchwork of federal and provincial action plans and commit to a coherent national approach to climate



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policy. This is a prerequisite to any coordinated policy with the United States. The federal government already has outlined the regulatory scheme for GHG emissions from the electricity sector, which is in fact a different approach from what is likely to happen in the United States because of differing circumstances in the mix of electricity generation in each country. On the other hand, harmonized Canada-US regulatory standards are the best approach for passenger vehicles, light and heavy trucks and for other goods where production is highly integrated on a North American basis.

We also need a national framework for other GHG-intensive industry sectors. For the upstream oil and gas sector, the approach should be built on the Alberta model of emissions pricing and the federal government should work with relevant provinces to develop a national regulatory model that makes continual progress on emissions management while maintaining the international competitiveness of the upstream sector. For other emissions-intensive and trade-exposed sectors, the apparent inability of the United States to enact a federal climate policy means that further regulation should await sufficient clarity on US policy so as to not put manufacturing industries still in fragile recovery mode at a distinct competitive disadvantage.

We have previously endorsed a national scheme of carbon pricing that will incent both industries and consumers to undertake effective action to curtail their GHG emissions. While we do not have all the answers on how this should be designed, some key principles are paramount:

- It should be broadly applied across the economy and to consumer end-use;
- It will have to start at relatively low levels so as to give time for adjustment and to avoid unnecessary impacts on competitiveness;



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- Revenue raised should be deployed to fund reductions in other taxes and support the development of new technologies;
- Revenue distribution should be designed to avoid an undue cost burden on any particular region or sector;
- Carbon pricing should not merely penalize high carbon industries but ensure the incentive for companies to upgrade and adopt cleaner technologies and to encourage shifts in consumption from high energy-intensive goods to lower intensity goods and services.

4. Coherent technology and innovation strategy

As part of an overall energy strategy, the federal, provincial and territorial governments should engage critical business sectors on a national technology enhancement policy. New generations of technology are absolutely critical to ensuring that Canadians and citizens everywhere have access to reliable energy services without sacrificing their standard of living. We need enhanced policy coordination to ensure that Canadian businesses are able to secure a larger share of the burgeoning global market in clean energy technologies.

As the primary developer of new technology, the private sector has the most important role to play. Canadian firms need to increase their commitment and the share of revenues devoted to energy R&D, and enhance collaboration with universities doing leading-edge research. There is also a role for strategic public sector investments, especially to help with demonstration and commercialization of promising technologies. Going forward, it is essential that a portion of funds raised through carbon pricing schemes be devoted to the development of technology. Alberta's current "technology fund" is a useful model in this regard.



5. Meaningful engagement of Canadians

We need to move the national discussion beyond debates about the environmental impact of specific energy choices to a balanced and informed discussion of Canada's energy future, the role individual Canadians must play and the imperative of creating an ethic of energy conservation. All forms of energy will be required to meet current and future needs, all have some environmental impact and costs are sure to increase. Canadians need to be thoughtfully engaged and contribute to an informed debate about the best means to ensure economic opportunity in all regions of the country, high quality jobs and affordable energy.

It starts with a national commitment from governments and industry to improve Canadian literacy on energy and environment, to bring them into the debate on Canada's national energy strategy and provide better information on the costs and benefits of energy choices. This involves all aspects of the energy value chain, as well as questions of what energy sources are developed and how they are transformed and distributed. Above all, we need renewed effort on building an energy conservation ethic in the country, so that businesses of all sizes and millions of individual Canadians are focused on maximizing energy efficiency and making smarter choices about day-to-day energy use.

This paper has attempted to outline a broad and comprehensive strategy that Canada should pursue to maximize the potential of our resource, technical, financial and human assets to position Canada as an energy and environmental powerhouse. We believe that many of the elements are already in place, but it calls for a compelling vision and far-sighted leaders, particularly in the business community, to make the case. It must be built on cooperation amongst all levels of government, a sound strategy with complementary elements that are



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national, continental and global in scope, and it must effectively mobilize the engagement and support of Canadians.

Ensuring that economic, energy and environmental objectives can be made mutually reinforcing will be a preoccupation of major nations around the world, both developed and developing. Our nation is well-positioned to make a substantive and sustainable contribution to this global challenge. We owe it to future generations of Canadians to strive for nothing less.

¹ International Energy Agency, *World Energy Outlook*, November 2009.

² Fatih Birol, Chief Economist, International Energy Agency, as quoted in *The Globe and Mail*, July 21, 2010.

³ J.D. Power and Associates, as quoted in *The Globe and Mail*, July 22, 2010.

⁴ Estimates from Bloomberg New Energy Finance, as reported in *Bloomberg News*, July 23, 2010.

⁵ Natural Resources Canada.

⁶ Natural Resources Canada.

⁷ Ernst and Young, *Renewable Energy Country Attractiveness Index*, July, 2010.

⁸ Natural Resources Canada.

⁹ Canadian Association of Petroleum Producers, *Environmental Challenges and Progress in Canada's Oilsands*.

¹⁰ Source: "Greenhouse gas emissions from coal-fired power plants and oil sands operations, 2007." Krupski, J. and J. Johnston. Natural Resources Canada, 2009. Reproduced with the permission of the Minister of Natural Resources Canada, 2010.

¹¹ Peter Tertzakian, *The End of Energy Obesity: Breaking Today's Energy Addiction for a Prosperous and Secure Tomorrow*, Hoboken: John Wiley & Sons, Inc., 2009.

¹² Natural Resources Canada, *Energy Efficiency Trends in Canada, 1990-2007*.

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¹⁴ Natural Resources Canada, *Energy Efficiency Trends in Canada, 1990-2007*.



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¹⁵ According to automobile analyst Dennis Desrosiers, as quoted in *The Globe and Mail*, July 28, 2010.

¹⁶ The Pembina Institute, *Canada's Coolest Cities*, May, 2010.

¹⁷ Quality Urban Energy Systems of Tomorrow, *The Capacity for Integrated Community Energy Solutions (ICES) Policies to Reduce Urban Greenhouse Gas Emissions*, October, 2010; see www.questcanada.org

¹⁸ C.D. Howe Institute, *Better Together?: The Implications of Linking Canada-US Greenhouse Gas Policies*, Commentary No. 307, August 2010.

¹⁹ C.D. Howe, *ibid.*; see also National Round Table on the Environment and the Economy, *Achieving 2050, A Carbon Pricing Policy for Canada*, April, 2009.

²⁰ *Bloomberg Business Week*, "America Missing Out in Clean Technology", February 3, 2010.

²¹ Renewable Energy Policy Network for the 21st Century, *Renewables 2010: Global Status Report*, September, 2010.