

Changing *the* Climate

.....
A POLICY FRAMEWORK FOR CANADA'S NEW ENERGY ENVIRONMENT
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The development of *Changing the Climate: A Policy Framework for Canada's New Energy Environment* has been supported by consultation with a range of business, government and academic leaders who have a key interest and expertise in energy policy reform for Canada. The views expressed in this document are not necessarily held in full, or in part by these contributors, or the organizations they represent. The Calgary Chamber of Commerce and Canada West Foundation would like to recognize their contribution and thank them for their participation and direction in the preparation of this report. The report can be downloaded from:

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The Calgary Chamber of Commerce is a member-driven, sustainable organization whose mission is to connect, serve and champion the Calgary business community in its quest to excel. On critical and emerging issues in public policy, the Chamber acts as the leading forum for debate, and advocates public policy solutions that improve the business climate on behalf of our members.

About the Canada West Foundation

For 40 years, the Canada West Foundation has been the only think tank dedicated to being the objective, nonpartisan voice for issues of vital concern to western Canadians. Through our research and commentary, we contribute to better government and industry decisions and a stronger Canadian economy.

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Executive Summary

The increased profile of energy and environmental issues in public debate has raised critical questions about Canada's national energy and environmental policy.

In light of this, the Calgary Chamber of Commerce and the Canada West Foundation initiated, with the support of ENMAX, the *Changing the Climate* policy and event series. Commencing in May 2010 and concluding in June 2011, the series brought together thought leaders from business, government and the broader community to discuss and analyze energy and environmental policy issues critical to Canada's future.

Four main drivers for action were identified through the series:

1. Increasing public expectations for responsible energy development.
2. Canadian energy resources becoming increasingly more difficult to access and energy intensive to extract.
3. The need to be proactive to avoid having other countries dictate the conditions under which Canada exports energy resources.
4. Canada's potential to become a world leader and exporter in energy technologies, expertise and services.

Three main priorities for policy action that a Canadian energy strategy should seek to address include:

1. Strengthening Canada's energy relationship with the United States, and with key Asia Pacific markets.
2. Driving continuous improvement on environmental performance across the energy system without adversely impacting the economy.
3. Building cooperation across the Canadian federation on energy issues.

Key recommendations were distilled from the series, covering intergovernmental collaboration; regulatory enhancement; environmental performance; national carbon management; energy efficiency; energy market diversification; energy sector innovation; and workforce issues in the energy sector.

The reforms identified in the series are both challenging and pressing to address. Achieving progress will require extensive collaboration both between, and within the energy industry and Canadian governments. As such, the creation of an ongoing forum for dialogue on the development of a Canadian energy strategy is a necessary first step.



Changing the Climate Series: Thought Leaders and Topics

(Please see Appendix for a summary of each presentation)

US Energy and Climate Change Policy

Laura Lochman, Consul General of the United States for Alberta,
Saskatchewan and the Northwest Territories
May 10, 2010

Developing Clean Energy to Address Alberta's Climate Change Challenges, and Support Alberta's Green Economy and Green Jobs

Eric Newell, Chairman, Alberta Climate Change and Emissions
Management Corporation
June 14, 2010

Carbon Capture and Storage: A Promising Technology for the Environment and the Economy

Jim Carter, Chairman, Alberta Carbon Capture and Storage Development Council
Ian MacGregor, Chair, Enhance Energy Inc.
June 18, 2010

Canada and US Energy and Climate Change Policy

Gary Doer, Canada's Ambassador to the US
(Introduction by the Hon. Jim Prentice, Canada's Minister of the Environment)
June 29, 2010

The Future of Energy, Energy Security and Canada's Role in a North American Energy Strategy

T. Boone Pickens, Chairman of BP Capital
September 22, 2010

The series concluded with the release of this final report at an event featuring the Hon. Ron Liepert, Alberta Minister of Energy. This event took place shortly before the July meeting of Canada's ministers of energy and mines where a Canadian energy strategy will be discussed.

I. About the Changing the Climate Initiative

Canada needs a vision for its energy and climate change policy that recognizes the interdependency of the Canadian and US energy systems, encourages continuous improvement of environmental performance, and drives technology development. This vision should not adversely affect North American trade relations or create regional disparities.

The *Changing the Climate* policy and event series was a joint initiative of the Canada West Foundation and the Calgary Chamber of Commerce to bring together the business community, a leading public policy institute, and experts on energy and environment policy from the US and Canada to explore the following key themes:

- continental energy and climate change policy;
- Canadian domestic energy and environmental policy;
- economic implications; and
- energy technology and economic transformation.

Changing the Climate explored these topics through a variety of keynote presentations, policy dialogue roundtables and public policy research. Each keynote address was delivered at a public event, and supported by a roundtable discussion involving invited leaders from the business, political and research communities.

The program launched in May 2010 and concludes with the release of this joint Canada West Foundation–Calgary Chamber of Commerce policy paper in June 2011. This final paper aims to summarize expert commentary from the events series, and provide options for energy policy reform in Canada.

This report comes at a time when a national discussion on energy and environment policy reform is underway. Alberta is hosting the next meeting of Canada's Energy and Mines Ministers' Conference in July of 2011 and discussion on greater pan-Canadian collaboration on energy policy is on the agenda.

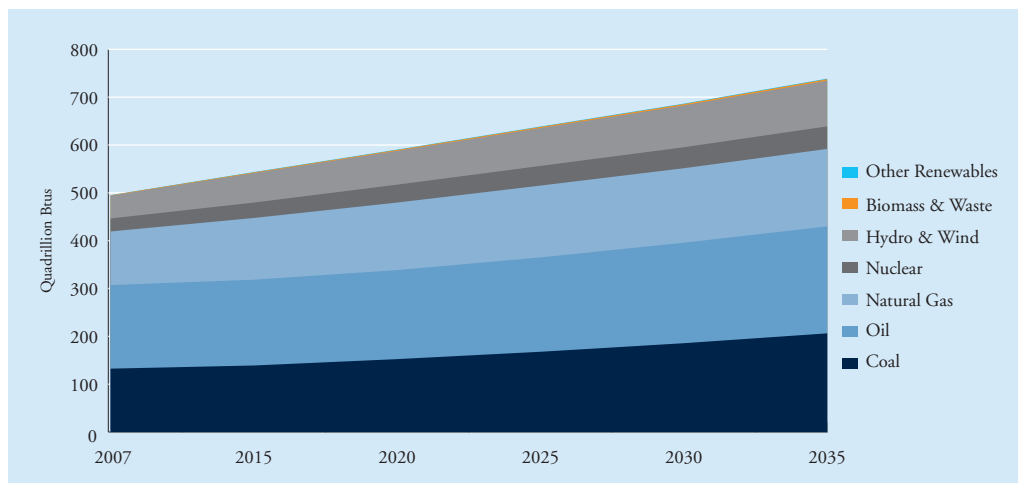
2. The Context

The Global Energy Demand Challenge

Every region in the world faces growing policy challenges in the production and use of energy.

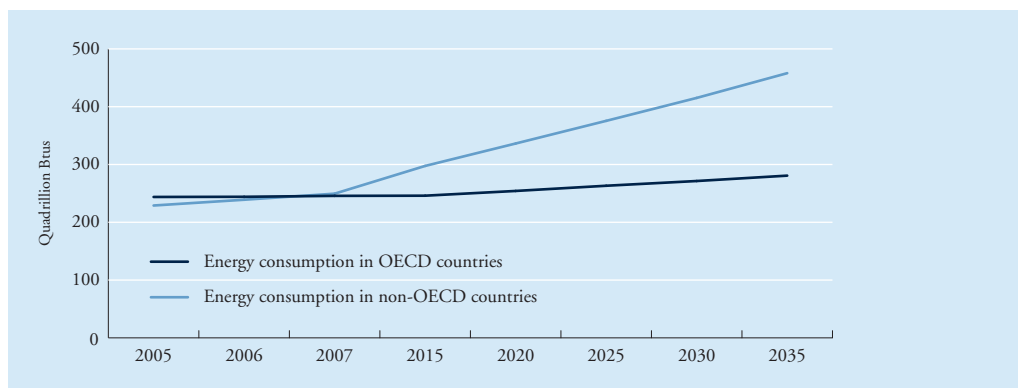
Around the globe demand for energy is increasing to meet population growth and higher living standards. The International Energy Agency forecasts global energy use will grow 36% by 2035 (Figure 1), with future consumption highly uneven between regions. The majority of additional demand for energy is expected to come from rapidly developing countries like China and India, rather than from developed economies such as the US and Europe¹ (Figure 2).

FIGURE 1: GLOBAL ENERGY CONSUMPTION FORECAST



Source: International Energy Agency and Canada West Foundation

FIGURE 2: GLOBAL ENERGY CONSUMPTION – IEA PROJECTIONS



Source: IEA Annual Energy Outlook 2010.

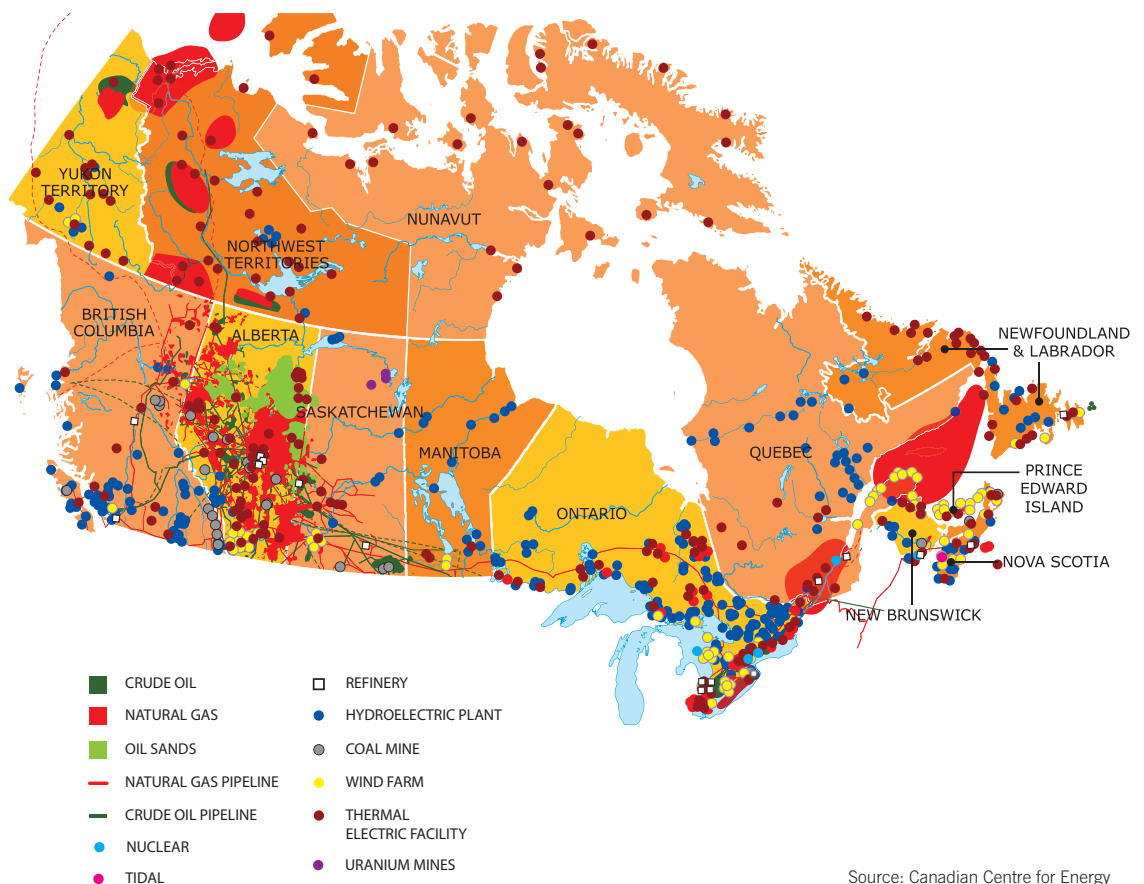
¹ International Energy Agency, 2010. *2010 World Energy Outlook Presentation*.

Meanwhile, there is pressure on government and industry to reduce greenhouse gas (GHG) emissions by lowering the carbon impact of fossil fuels, including more renewable sources within the energy supply mix, improving energy efficiency, and by demonstrating leadership in energy innovation and green technology.

Canada's Energy Circumstances

Canada is a growing net exporter of energy—a country blessed with vast and diverse energy resource endowments spread across the width and breadth of the country, from hydro-power to oil, gas, coal, uranium and vast potential for a range of renewable energy developments (Figure 3). These endowments represent a significant comparative advantage among developed nations. Canada is in the top ten countries in the world for production of oil and gas, coal, hydro and nuclear electricity, and uranium (Figure 4).

FIGURE 3: DISTRIBUTION OF CANADIAN ENERGY ASSETS



Source: Canadian Centre for Energy

FIGURE 4: CANADA'S POSITION AS AN ENERGY SUPERPOWER

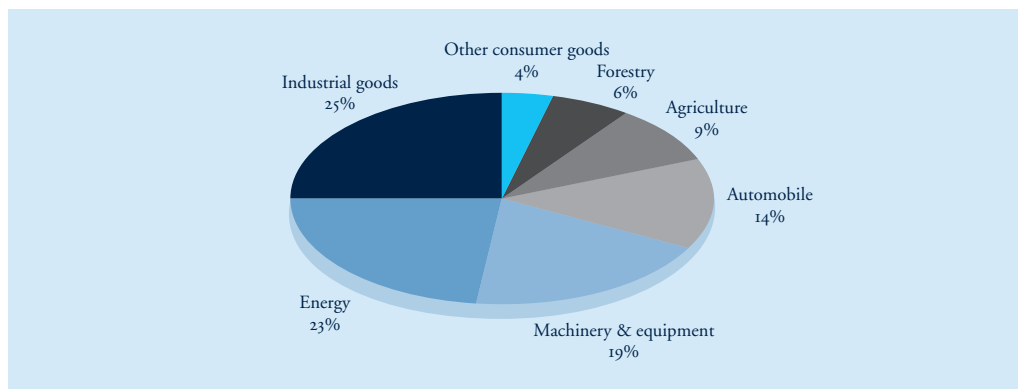
	Qty	Unit	World Rank	% of World Total	Year
Energy Production	407	Mtoe	6	3.3	2008
Of which:					
Crude Oil ¹	152	Mtoe	6	4.0	2009
Natural Gas	159	bcm	3	5.1	2009
Coal (net exports)	20	Mt	9		
Hydro Electricity	383	TWh	2	11.5	2008
Nuclear Electricity	94	TWh	7	3.4	2008
Other Renewable ²	15	TWh	—	—	2008
GDP ³	870	\$US B (2000)	8	2.1	2008
Energy exports	79.9	\$B	—	—	2009
Uranium production	10	Kt	2	20.0	2009

⁽¹⁾ Including synthetic (oil sands). ⁽²⁾ Wind, biomass, solar, geothermal ⁽³⁾ Total economy, PPP basis.

Source: International Energy Agency, Statistics Canada, Canada West Foundation.

While Canada ranks 36TH in the world in terms of population, it ranks 7TH in the world in CO₂ emissions.² The structure of Canada's economy, with the importance of natural resources and emission intensive industries, along with issues like high energy use for transportation and heating, are factors that contribute to Canada's carbon intensity. At the same time, the energy sector is a major contributor to Canadian exports and to economic activity for the country (Figure 5). Within Canada, Alberta is the largest emitter of greenhouse gases due to the province's role as a global energy supplier and its reliance on coal-fired electricity generation.³ Alberta is also home to the four largest industrial emitters.⁴

FIGURE 5: CANADA'S EXPORTS* BY COMMODITY (2010)



* Merchandise only.

Source: Statistics Canada.

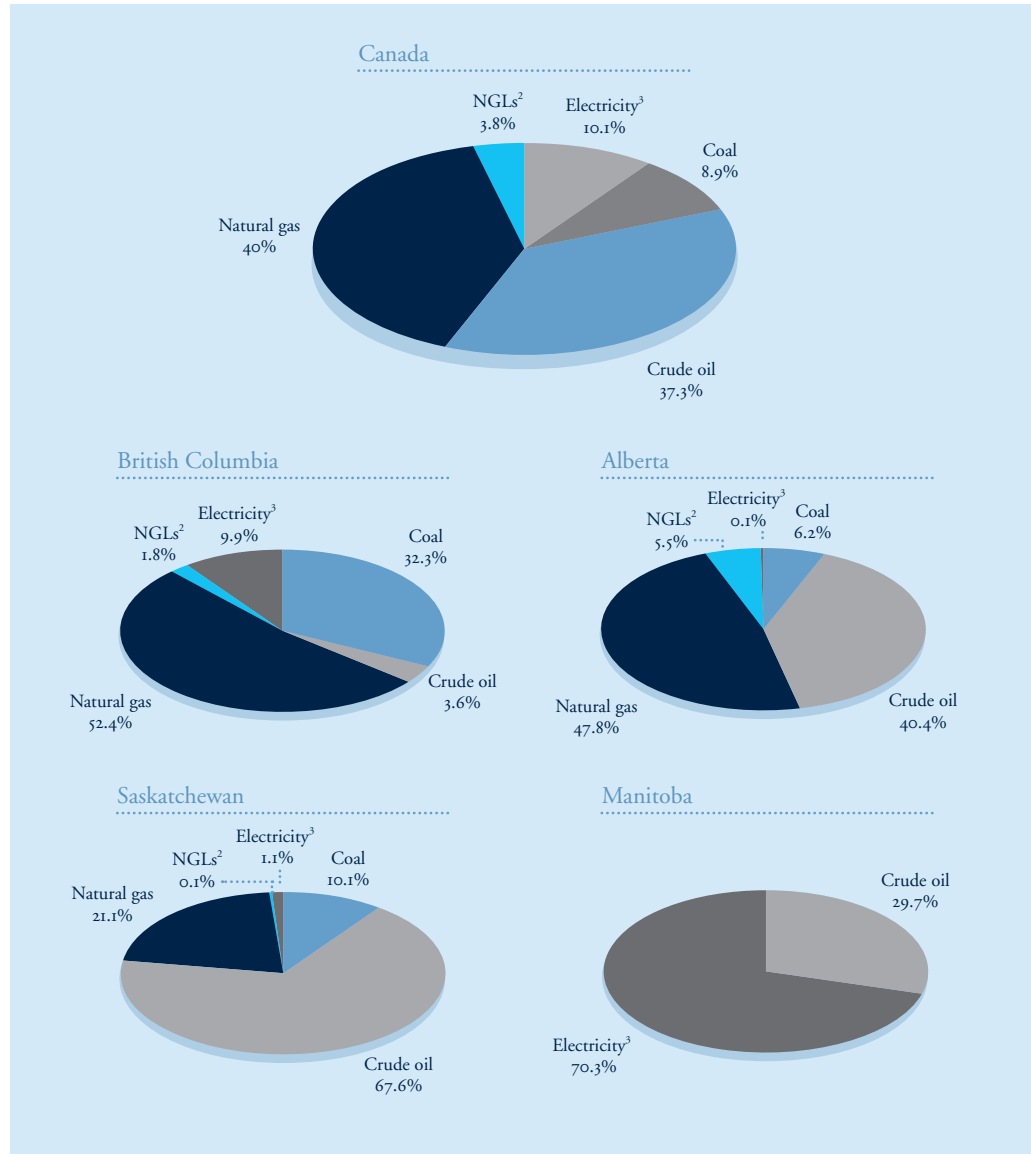
² International Energy Agency. 2010. *2010 Key World Energy Statistics*. Ranking by Canada West Foundation.

³ Government of Alberta. 2011. *Alberta and Climate Change*.

⁴ Environment Canada. 2010a. *Summary of GHG Emissions by Facility (2009)*.

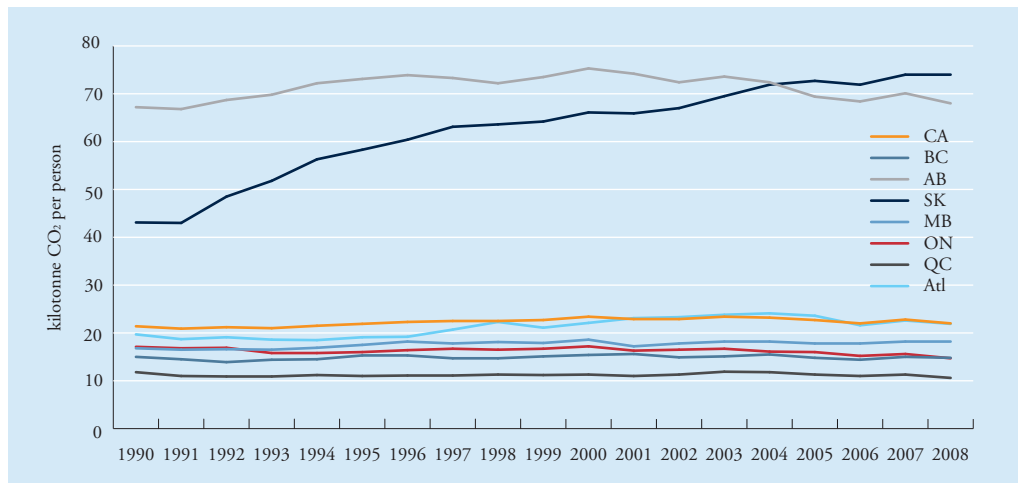
Canada's provinces have very different energy and natural resource endowments. As a result, each province has established its energy generation and distribution system in a way that leverages its strengths (Figure 6). Given this diversity greenhouse emissions intensity also varies substantially across Canada, with Alberta and Saskatchewan having the highest emissions intensity per capita (Figure 7).

FIGURE 6: PRIMARY ENERGY PRODUCTION MIX (2008)



(1) Physical quantities are added together by first converting them to terajoules.
 (2) Gas plant natural gas liquids. Includes propane, butane and ethane.
 (3) Primary electricity only. Includes hydro, nuclear, wind, tidal and solar. Does not include thermal.
 Source: Statistics Canada and Canada West Foundation.

FIGURE 7: GREENHOUSE GAS EMISSIONS PER CAPITA



Source: Environment Canada and Canada West Foundation.

Because of this and the fact that under Canada's constitution natural resources are owned by the people of each province and territory, energy policy across Canada needs to account for a diversity of supply and economic circumstance.

The Unique Canada–US Energy Relationship

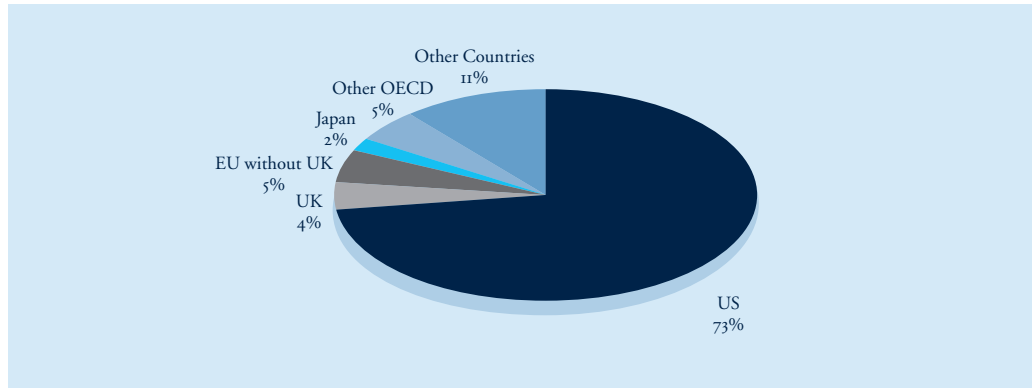
The Canada–US energy relationship is vitally important and provides a range of benefits for both countries. Canada and Alberta are a key source of energy for the United States. As Laura Lochman, Consul General noted:

“The US and Canada enjoy the largest energy trade relationship in the world. Canada is the single largest foreign supplier of energy to the US, providing 18% of US oil imports and 82% of natural gas imports. Alberta alone exports approximately 1.4 million barrels per day of crude oil to the US, supplying 15% of US crude oil imports, or 8% of US oil demand. Alberta also exports approximately 2 trillion cubic feet of natural gas to the US annually, supplying 49% of US natural gas imports and meeting about 8% of US natural gas demand.”

Some 73% of Canada's total exports are to the US (Figure 8). Energy accounts for nearly one-quarter of this trade, and this energy relationship between Canada and the US has been growing in recent years, with a 55% increase in energy exports to the US between 2000 and 2010, compared to a 17% decline in total exports to the US over the same period (Figure 9).

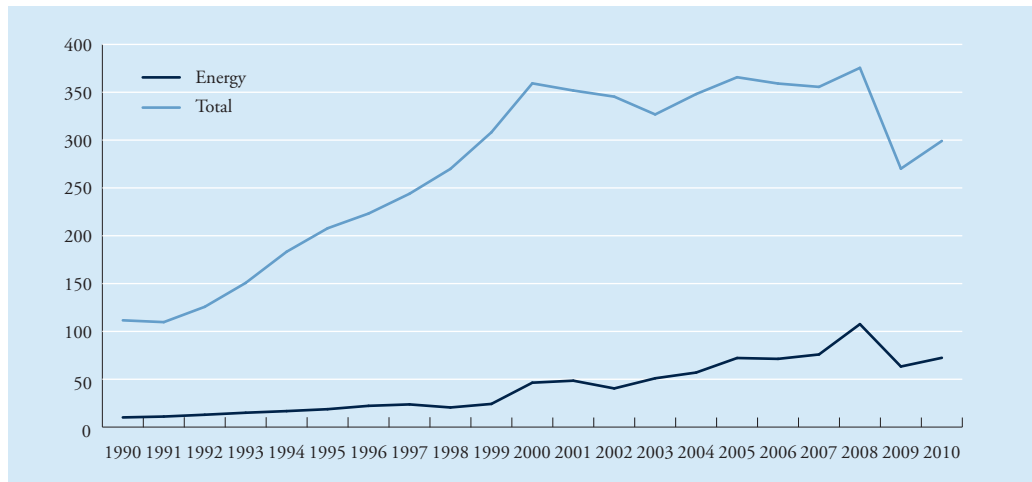
Energy imports from Canada contribute to US energy security by reducing dependence on foreign oil from unstable parts of the world. Equally, Canada benefits from proximity to one of the world's largest energy consuming markets; and energy developments in Canada provide jobs, investment and economic activity on both sides of the Canada–US border.

FIGURE 8: CANADA'S EXPORTS* BY DESTINATION (2010, %)



* Merchandise only.
Source: Statistics Canada and Canada West Foundation.

FIGURE 9: CANADA'S EXPORTS* TO THE US (\$ BILLIONS)



* Merchandise only.
Source: Industry Canada and Canada West Foundation.

State of the Canadian Discussion on Energy Policy Reform

Challenges and opportunities abound in the economic, environmental and energy areas. Canada clearly needs to position itself to embrace them. Over the past few years, a broad range of Canadian groups and organizations have called for reform of the country's energy policy framework. A Canadian energy strategy is needed to provide a platform of principles, goals and policies upon which Canada can build a sustainable energy future by design, rather than hoping for circumstances to dictate a positive outcome now and in the future.

In the absence of a national plan for energy, initiatives have been sprouting all over the country, driven by individuals, organizations and associations. Leaders of Canada's top enterprises, environmental organizations, the energy industry, policy think tanks and academia are all part of the discussion. There are a variety of views on what the objectives and priorities of a Canadian energy strategy should be, as well as what policy mechanisms should be employed and how quickly action needs to be taken. This diversity of participants and views is representative of the fact that provincial energy assets and circumstances differ considerably, in terms of energy supply options and profiles of use and export, as do the goals for energy policy reform. This has a varied impact on local policy and regulation as well as on the direction and timeframe for action. However, an overall consensus seems to have emerged across these diverse stakeholders and that is—Canada needs a plan for energy and it needs it now.⁵

A Canadian energy strategy could guide and promote an orderly transition of the Canadian energy system to one of low greenhouse gas (GHG) emissions over several decades.

Canada's fossil fuel resources, in particular the growth of oil sands production, will be important to Canada's economy during the conversion process. While this transition will be long-term and likely to take until mid-century, increasing oil sands production offers North America a stable and reliable supply to minimize the impact of disruptions in less stable regions of the world such as the Persian Gulf, and temper the associated price shocks.

At the same time, the Royal Society of Canada found that while progress has been made in reducing environmental impacts per barrel produced, increasing oil sands production creates a major challenge for Canada in reducing overall environmental impact, and in meeting international commitments to greenhouse gas reductions.⁶

Much of this energy policy thinking originates from western Canada. As the main source of Canadian fossil fuels, the West has a great deal of expertise and much to contribute to the debate. The region also has a lot more at stake in the transition to a lower carbon future than other regions in Canada. Therefore it makes sense for Calgary, the headquarters of Canada's fossil fuel energy industry, to be a strong contributor to the dialogue. If there is any policy discussion that western Canadians should lead, it is the national discussion on energy policy.

⁵ Canada West Foundation. 2011. *Finding Common Ground—The Next Step in Developing a Canadian Energy Strategy*.

⁶ The Royal Society of Canada. December 2010. Expert Panel on Environmental and Health Impacts of Canada's Oil Sands Industry.

3. The Impetus for Action

Canada has an opportunity to leverage its energy resources and expertise for a secure and prosperous future—economically, environmentally and socially. Four general drivers create an impetus for action.

Responsible Energy Development as a Canadian Priority

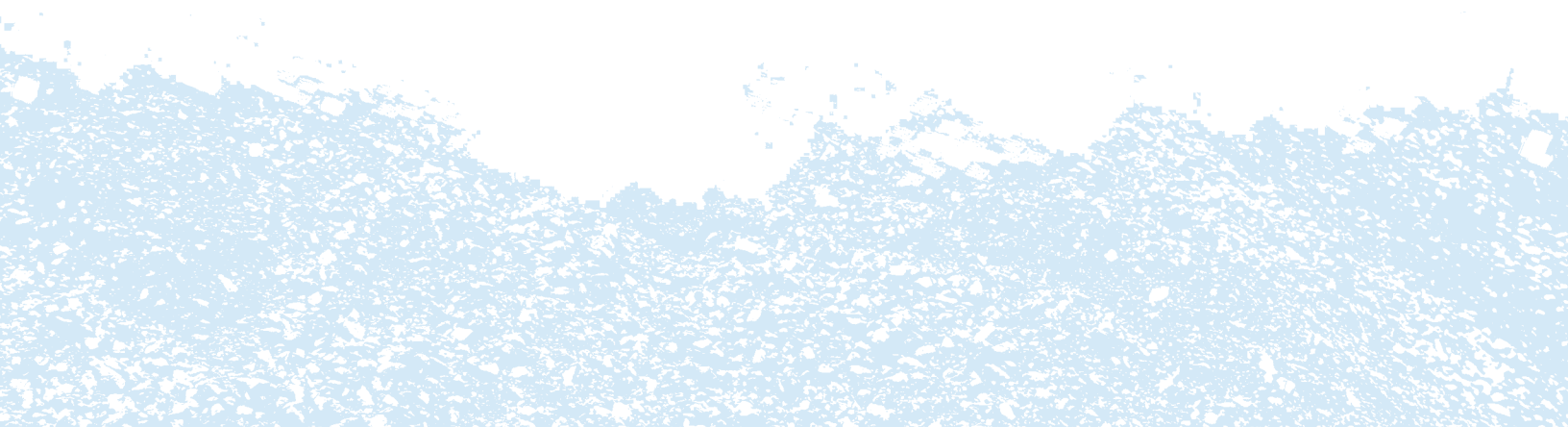
The environmental component of Canada's future is an increasingly important priority for the public. Though the level of urgency that public opinion attaches to this priority ebbs and flows with economic and social circumstances, this priority has become significant enough to lead industry to view environmental stewardship as a prevalent consideration in the development of Canada's energy resources.

Energy companies have responded by focusing greater attention on monitoring environmental performance and setting goals for improvement. Technology development is viewed as integral to meeting the higher standard demanded by Canadians.

Recent developments have made the oil and gas sector one of Canada's top economic growth leaders, while at the same time subjecting the industry to greater environmental scrutiny. Gary Doer, Canada's ambassador to the US, mentioned that while some American commentators criticize the oil sands industry, they seem to forget that greenhouse gas emissions issued from the 650 coal-fired plants in the US are 60 times greater than those of the oil sands.

Despite the high level of attention the oil sands are receiving, responsible energy development is not an oil sands or Alberta-limited issue. There are environmental risks associated with all types of energy. Each energy source has an impact on climate, air quality, water, land, ecosystems or human health.

Just like prosperity from energy is shared across the country, one could argue that the responsibility (and the cost) of improving the environmental performance of the energy sector needs to be shared among all Canadians as well. The case for joint responsibility remains to be made to all Canadians.



Constraints on Accessing Petroleum

Oil sands production in Western Canada represents a growing proportion of Canada's energy exports, and the trend is set to continue. As conventional sources become scarcer and more difficult to access, the global oil industry is moving towards production from sources which are more technically difficult, energy intensive, and expensive, such as deeper offshore and heavier unconventional sources. The higher cost of oil production and the environmental risks and impacts of developing these sources is likely to continue to become more challenging for industry and the public in the future. As such the price of developing these unconventional resources may reach a point where they constrain economic growth.

The Risks of Inaction

As a major fossil fuel exporting region, western Canada faces a complex situation. On the one hand, rising global energy consumption is set to continue to drive demand and prices for fossil fuels over the coming decades. On the other hand, policy, regulatory and reputational uncertainty in our largest export market, the United States, is likely to persist. Climate change and clean energy is clearly on the US policy agenda. Whether change occurs through Congress, at the state level or through the US Environmental Protection Agency, continual improvement of Canada's environmental performance will be an important consideration in trade relations.

If Canada fails to fill the energy policy void, the US may move first and influence the terms under which Canada develops and exports its energy resources. "As one of the world's leading energy suppliers, Alberta shares an obligation, indeed a responsibility, to develop renewable energy supplies and clean technology to reduce the carbon footprint from our fossil fuel production," said Eric Newell, Chairman, Alberta Climate Change and Emissions Management Corporation.

In a report published in January 2011, the National Round Table on the Environment and the Economy (NRTEE), an independent federal advisory agency, recommended putting carbon pricing in place but include a harmonization component to prevent Canada from diverging too much from the US.⁷ The main reason behind the NRTEE's call for a Canadian approach is essentially that the West's carbon emission targets will be difficult to reach so the region should get started right away.

Canada's leadership in setting a framework to encourage new technology is critical to protecting our export markets, and can be viewed as a prudent risk management approach.

⁷ NRTEE (National Roundtable on the Environment and the Economy). 2011. "NRTEE Recommends Phased-In Climate Harmonization Policy with U.S." (News Release).

Opportunity to Lead Energy Innovation

Appropriate action in energy policy can do more than just shore up Canada's reputation and markets. It also has the potential to provide the regulatory certainty that will help encourage research and development (R&D) activity into new forms of energy or new technology to reduce carbon emissions from fossil fuel production and use. This R&D activity can help take the country to the next level, turning Canada into a world leader in—and exporter of—energy technology, expertise and services. As Eric Newell recalled, the Alberta story is a telling example in this regard:

“While the [climate change] challenge may sound a little daunting, history demonstrates Alberta has a great track record in applying technology. For example, there was a time when people didn't think that the oil sands would be viable. Many felt that developing the technology would be too expensive. But, by 1969, Syncrude received approval to begin to build a production facility in the oil sands. The first barrel shipped from Syncrude occurred in 1978.”

Carbon Capture and Storage (CCS) is one high technology area where Alberta's industry benefits from both government support and positive circumstances. As Jim Carter, Chairman, Alberta Carbon Capture and Storage Development Council explained, the Government of Alberta allocated \$2 billion in partnership with industry for four large-scale CCS demonstration projects. According to Ian MacGregor, Chair, Enhance Energy Inc., Alberta has the potential for significant CCS development, as CO₂ used for enhanced oil recovery in depleted reservoirs could unlock \$55 to \$110 billion in oil production.



4. Vision and Outcomes

A robust, coherent and comprehensive energy framework can help Canada realize its ambitions for a prosperous and sustainable future, for meeting climate obligations, and for remaining competitive within the global economy. Five outcomes are attached to this vision.

Energy Security

Canada is endowed with a vast and diverse range of natural resources, which are likely to become increasingly strategic in the future with a rising world population that is hungry for economic development. Canada's oil sands represent the second largest oil reserves globally.

Canada's energy reserves, coupled with our stable government, rule of law and effective regulation compared to other energy producing regions in the world such as the Middle East and Africa mean that Canada can play an important role in providing stable and secure energy, and other resources, to a range of world markets in future. This includes continuing to assist the US to address the conundrum of importing oil from what T. Boone Pickens, Chairman of BP Capital, calls "hostile suppliers" in other parts of the world.

At the same time Canada faces domestic energy security challenges. Canada imports oil and gas, mainly in eastern parts of the country, and should also be conscious of buffering the domestic supply mix from troubles in unstable energy supplying areas of the world. The cost of infrastructure renewal such as that needed for electricity networks to deliver safe and reliable energy services to consumers is also a significant issue, as is protection against deliberate attack.

Energy Affordability

Rising demand and the challenges of obtaining access to resources and adhering to greater environmental performance standards means that energy costs will likely rise in the future. In this context, affordability is not solely about cheap energy, but whether Canada compares favourably with our competitors. The challenge is to ensure that Canada's economy is as energy efficient as possible, not just during resource extraction, but also in delivery and consumption.

From a social perspective, the difficulty is to protect Canadians living in the lowest income ranges from the hardship resulting from more expensive energy, and to accomplish this without distorting the real costs of energy.

Environmental Performance

All forms of energy have some impact on the environment. The challenge is to minimize this impact. This will take a commitment to continuous improvement of environmental performance over a gradual period that respects the natural delays inherent to capital cost turnover and behavioural change. As noted by Eric Newell:

“We must do a better job in minimizing the environmental impacts of our operations. All Canadian governments, federal and provincial, have an interest in securing access to the growing clean energy market. In fact, all provinces have climate change action plans that emphasize developing and implementing technologies that reduce greenhouse gas emissions. As one of the world’s leading energy suppliers, Alberta shares an obligation, indeed a responsibility, to develop renewable energy supplies and clean technology to reduce the carbon footprint from our fossil fuel production.”

Investment Competitiveness

While the impact of a jurisdiction’s tax and royalty structure on the level of investment flows from within Canada and abroad is well documented, regulatory competitiveness, measured in terms of the extent to which government activities make investment more or less attractive, is also an increasingly important factor in securing the capital required for energy development.

Canada’s constitutional configuration means that significant energy projects often must be approved by both provincial and federal levels of government, as well as respect the constitutional rights of Aboriginal communities. The objective should be to develop a world-leading regulatory system that delivers environmental protection and timely, and binding decisions relative to competing jurisdictions.

Innovation and New Economic Growth

Thanks to its substantial energy resources and expertise, Canada is uniquely positioned to be a global innovator in the reduction of fossil fuel related environmental impacts. Calgary has the potential to become a global energy centre, and Canada an international leader in clean energy production.

5. Action Areas

Action is critical to achieving this vision for a comprehensive Canadian energy framework. A number of key action areas are discussed below.

Explore Opportunities for Greater Energy System Integration

Canada's provinces share a number of energy-related goals but their policy responses are very diverse. Provincial energy networks were designed to maximize the use of local resources and meet local demand or for export to the US. This design was based on the local energy endowment, economic factors and technical aspects which make large scale interprovincial transmission capacity prohibitive. This is why, for instance, the electric power generation picture of the West viewed from the outside can be boiled down to a coal-fired centre in Alberta and Saskatchewan, 'sandwiched' between hydro power in BC and Manitoba, with little intertie capability. Provincial energy policies reflect this, and where it makes economic sense, opportunities to benefit from greater integration should be investigated. This would further the economic links already put in place between British Columbia, Alberta and Saskatchewan via the 2010 the *New West Partnership Trade Agreement*, which seeks to eliminate trade barriers between the three provinces. By removing existing interprovincial trade barriers and harmonizing interprovincial standards, interprovincial trade is rendered more efficient, more accessible and allows for greater mobility of trades people and professionals.

Federal-Provincial Collaboration

For constitutional reasons, any national energy policy framework must take into account the respect for the constitutional division of powers and responsibilities in the resource sector between the federal and the provincial levels. It must acknowledge that all levels of government have an important stake in effective policy outcomes, and avoid adding a wealth redistribution component to the already complex balancing act of energy and environment policy. This framework should provide the policy certainty needed for industry in making future investments in Canada. It is also important to acknowledge that a mature and sophisticated regulatory regime already exists to govern Canada's energy sector. This fact is important to highlight in addressing concerns about Canada's environmental record in development of energy resources.



Continuous Improvement of Environmental Performance

Canada needs to demonstrate a clear and observable commitment to continuous improvement of environmental performance, which includes a more efficient use of energy. This will be easier to implement if the industry and the public share a common goal of achieving such improvements while still having access to secure and reliable energy, which benefits both industry and consumers.

Many positive benefits can result from such a commitment.⁸ Canada could maximize development in sensitive areas with physical constraints (e.g., overcoming water scarcity); tap into consumer demand towards a trend of “green” products and services; alleviate the risk of punitive trade barriers from other partners due to insufficient environmental performance; and provide new business opportunities and the potential to export technologies. Continuous improvement also showcases global leadership and enhances Canada’s image abroad.

Starting from the premise that both industry and the public share a common goal of achieving cost-effective energy that is secure, reliable and meets a high standard of environmental protection, Canada needs to create a vision for responsible energy development that balances these factors across federal and provincial jurisdictions. This includes having a complementary and consistently applied best practice benchmark for environmental performance.

Create a National Carbon Management Strategy

A national level carbon strategy is necessary to internalize the environmental externality and reflect the true cost of energy production and consumption. Whether through regulation, a carbon price compliance mechanism or other methods, the price signal must be strong enough to initiate action by industry and consumers to reduce emissions, but not set at such a level that impedes the short to medium term productivity and competitiveness of the Canadian economy. As such, correct design of a national carbon pricing scheme must account for emissions intensive and trade exposed sectors of the economy to avoid carbon leakage, where emissions offset in one jurisdiction are created elsewhere. Ideally, it must also include consumers—not just large industrial emitters—even though this is politically more problematic.

It is also important to ensure that the diverse benefits of Canada’s energy sector are shared across the country, as are the costs in improving environmental performance from the sector. Therefore a national carbon price cannot be seen as a wealth transfer between provinces—it must be designed to strengthen the Canadian federation, not weaken it.

⁸ Energy Policy Institute of Canada. 2011. *A Strategy for Canada’s Global Energy Leadership*.

A range of carbon pricing regimes are already in place in various states and provinces in Canada and the US. Broadening the size of carbon markets across jurisdictions is one way to capture more low cost greenhouse gas abatement opportunities, reducing the overall cost of emission reduction to industry and consumers.

Alberta's intensity-based carbon pricing scheme has had demonstrated success.⁹ Since Alberta's program began in 2007, 23 million tonnes of emissions have been eliminated that would have normally been released. This is the equivalent of removing 4.8 million cars from the road for a year.¹⁰ According to Eric Newell, "Establishing a price on carbon has stimulated much activity. The offset market is established and growing, emissions credits are being traded and funds are being collected and dedicated to technology development. Most importantly, real reductions in emissions are occurring."

Drive Innovation

Achieving large reductions in greenhouse gas (GHG) emissions with acceptable costs will take technological breakthroughs across systems of energy production and use. It will also require innovation in the way that industry and governments work together to design policy and regulation that facilitates implementation of existing technologies in new and productive ways. Energy is used in all parts of our society, from food production, to manufacturing and transportation, to the built environment; it is not the case that one zero carbon technology will be completely transformational. It will take many ideas, directed at both the demand and supply sides, to develop a low carbon economy in Canada.¹¹

Thus, creating a culture of innovation is critical to solving this issue as well as creating new jobs and prosperity. It is important to look at all areas of opportunity throughout the innovation chain and to remove barriers to adoption (Figure 10). Collaboration and dialogue both within industry and government, and between the two sectors will be critical. The Oil Sands Leadership Group¹² is an example of the type of forum that is needed to identify and advance adoption of technologies and practices to improve environmental performance.

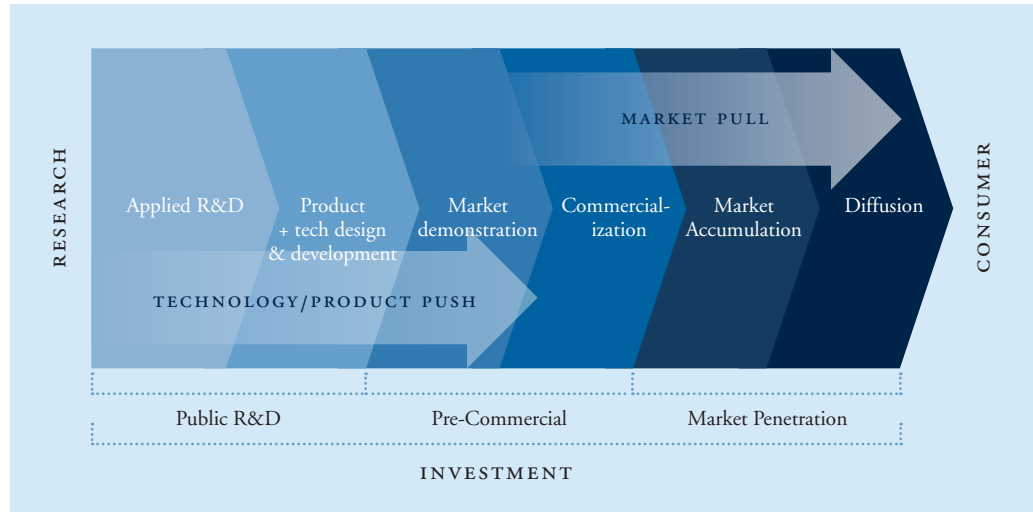
⁹ The target requires a 12% improvement in energy intensity for those emitting more than 100,000 tonnes per year. The carbon price is set at \$15/tonne CO₂e.

¹⁰ Government of Alberta. 2010. "Alberta results demonstrate responsible, clean energy production." May 3, 2011 Government of Alberta news release.

¹¹ Grubb, Michael. 2004. "Technology Innovation and Climate Change Policy: An Overview of Issues and Options." *Keio Journal of Economics*.

¹² The Oil Sands Leadership Initiative (OSLI) is a collaborative network between ConocoPhillips Canada, Nexen Inc., Statoil Canada, Suncor Energy Inc. and Total E&P Canada.

FIGURE 10: STEPS IN THE INNOVATION CHAIN



Source: Climate Change and Emissions Management (CCEMC) Corporation.

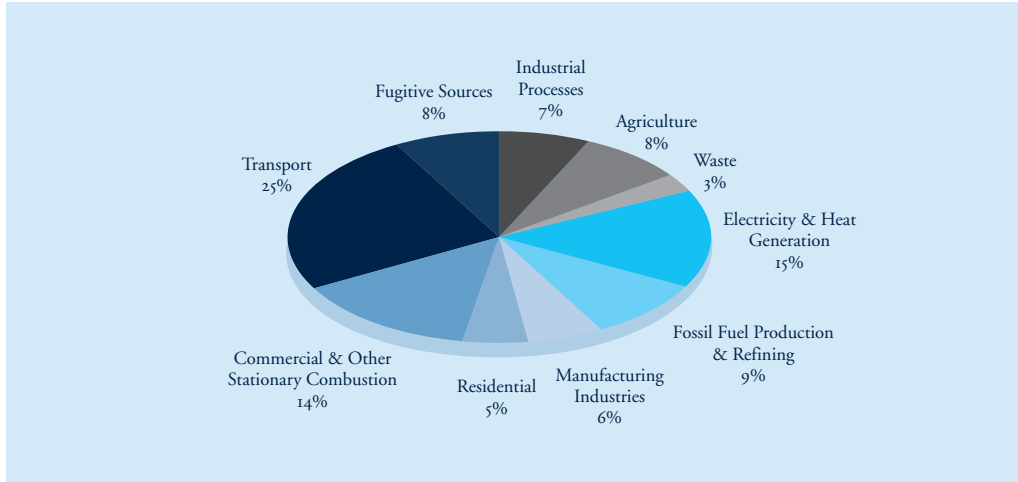
Emissions pricing can spur innovation and lead to transformative technology development in the long-term. However, a significant carbon price gap exists between what consumers are willing to pay and the price required for investment in high cost and technically risky technology. Incentives and partnerships between industry and governments will be necessary to capitalize on emerging technologies that are deemed promising but too expensive to implement in their current state.

Encourage Demand Side Management

Given that the growth in population and economic activity is generally coupled with rising greenhouse gas emissions, developing a low carbon growth plan for Canada is a challenging but necessary endeavour. Canada is one of the world's largest energy users per capita.¹³ However, the majority of Canadian CO₂ emissions come from energy consuming activities, rather than from production or transmission (Figure 11). This means that clear demand side measures (DSM) are critical to the energy and climate change policy discussion.

¹³ US Energy Information Administration, International Energy Statistics.

FIGURE II: SOURCES OF GREENHOUSE GAS EMISSIONS, CANADA (2008)



Source: Environment Canada and Canada West Foundation.

Measures to curb demand side emissions growth could include where feasible: the implementation of smart electrical metering and grids; the strengthening of building codes to reduce energy use as well as to support retrofit/renovation programs; and adoption of urban planning policies that reduce urban energy use and emissions. Additionally, better education programs for consumers will encourage energy efficient behaviour. Correctly designed carbon pricing could also have a significant impact on energy consumption behaviours.

Diversification Into New International Markets

As outlined in the context section of this paper, the Canada–US energy relationship provides a range of benefits for both countries and will continue to be vitally important in the future. However, the current heavy reliance on the US as an export market for Canada's oil and gas presents a risk for Canada due to slower demand growth in the US market, and greater uncertainty in terms of US policy, which is driven by environmental concerns. One example of this is the uncertainty over US government approval of the Keystone XL pipeline to take Canadian oil to the US Gulf Coast.

Global economic rebalancing, with the rise of new powers like China, India and other developing economies is driving rapid but uneven demand growth for energy of all types as outlined earlier (Figures 1 and 2). This uneven demand growth outlook between developed and rapidly developing economies is set to drive even larger price differentials for oil, gas and other energy products than those that currently exist between North American and Asia-Pacific markets. Unless Canada can diversify its customer base beyond the current heavy reliance on the United States, it will continue to forego attracting world prices for energy exports, the realization of which would lead to greater profitability for industry and royalty streams for governments in Canada.

Access to Asia-Pacific markets is currently limited by the lack of pipeline and associated transportation infrastructure. Kinder Morgan Canada's Trans Mountain pipeline is the only pipeline in North America to transport crude oil and refined products to Canada's West Coast. Various West Coast oil export projects are being proposed including expansion of the Kinder Morgan line and a new pipeline and facilities at Kitimat, BC. Canadian National Railway has also proposed a 'pipeline on rail' option.

The emergence of shale gas production has created a substantial development opportunity in Western Canada and other areas of North America. Traditional Eastern markets now have the potential to be well served by major shale developments in the US, with their lower production and transportation costs. Western Canadian gas producers will need to seek new export destinations—with markets in the Asia-Pacific region again providing a major opportunity. Currently there is no natural gas liquefaction facility on the West Coast. Though there is a natural gas pipeline connection between Alberta and the West Coast, it is aimed at servicing BC customers more than for overseas export purposes.

Building infrastructure to enable oil and gas exports off the West Coast will provide access to growing markets such as the Asia-Pacific and reduce the risks associated with overreliance on a sole export market in the United States. It is also clear that new projects of this type face significant challenges particularly in regards to environmental concerns over both pipelines and tankers, and potential opposition from stakeholders including Aboriginal groups. Making progress on this front will again certainly require effective and ongoing collaboration between industry, government and the community.

Regulatory Enhancement

Canada's multi-jurisdictional regulatory environment can result in policy inconsistency, duplicative approval processes, and/or a lack of certainty for project proponents. As a result, regulatory costs and risk can be significant.

Coordination within and between governments is vital if Canada is to make timely investment approval decisions. Clarity and consistency regarding Aboriginal consultation and accommodation is also key. Harmonization or a single regulatory window could provide more efficient and enhanced environmental oversight, an approach that would ideally be administered by the provinces and territories. As Ian MacGregor, Chair of Enhance Energy, points out, "It is important that the regulatory framework does not impede companies to take risks." The regulatory system must provide appropriate balance between environmental protection and economic benefits, and it must have a focus on timeliness and finality of rulings to give adequate investment certainty.

Canada–US Relationship—Increasing Education and Collaboration

Americans are Canada's largest foreign consumer of energy and a close ally. Canada and the US share a strong commitment to free trade, energy security and environmental performance. Nearly all of Canada's oil exports head south. Canada is the largest supplier to US, representing about 20% of US imports, and twice as much as any other country. Canada is also the leading supplier of natural gas and the primary source of foreign electricity imports.

While Canada and Mexico are the largest oil suppliers and represent a stable and reliable source, other large US suppliers including Saudi Arabia, Nigeria, Venezuela, Iraq and Angola¹⁴ have added risk. These regions face the threat of political instability, war, terrorism and piracy. Americans have an opportunity to reduce reliance on unstable sources through greater use of Canadian energy.¹⁵

The key to Canada meeting America's strategic goal of reducing foreign oil imports from unstable countries is the development of infrastructure. Here increasing pipeline capacity, including the building of the Keystone XL pipeline, will be vital. Also important will be sharing facts and increasing education of the Canada–US energy partnership with political leaders inside of Washington and in other key jurisdictions. It is critical that Canada commit appropriate resources to telling our story of being a safe, secure and reliable supplier. In addition, the two countries must continue to collaborate on technology development through avenues such as the US-Canada Clean Energy Dialogue.

¹⁴ U.S. Energy Information Administration. 2011. *Crude Oil and Total Petroleum Imports Top 15 Countries*. YTD 2010.

¹⁵ Beatty, Perrin. *Powering Up Canadian Prosperity*. May 31, 2011 speech at the Calgary Petroleum Club.

¹⁶ National Roundtable on the Environment and the Economy. *Parallel Paths: Canada–US Climate Policy Choices*. January 2011.

When considering the question of whether Canada should “lead,” “lag” or “harmonize” with US carbon policy, analysis by the National Roundtable on the Environment and the Economy has found that Canada’s growing emissions intensity relative to the US is a critical factor to consider. As such Canada may not be best served by adopting the same targets as the US and may in fact need to get started earlier to avoid higher costs in the future.¹⁶

Seizing Workforce Opportunities

The Canadian energy sector faces a serious challenge. In the next decade, many skilled workers will begin to retire at the same time as the labour pool shrinks. In the oil and gas industry, the Petroleum Human Resources Council estimates that 39,000 new workers will be needed to replace those retiring, assuming a low commodity price level. If prices remain high, the need could be massive—139,000 new hires.¹⁷

A skilled worker shortage could severely impede the economic growth of the industry as well as the potential for R&D advances. This shortage creates a tremendous opportunity for Canadians and new immigrants with the skills demanded. It will involve ensuring Canada has the appropriate training—both foundational and continuing education. It is also important to fully involve labour groups currently underutilized, particularly the Aboriginal community, mature workers, youth, those with disabilities and new immigrants. The latter requires that our immigration and temporary foreign worker processes be as streamlined as possible. Our education system also needs to cater to both the current and future needs for skills and capabilities in our energy sector.

¹⁷ Petroleum Human Resources Council. 2011. *The Decade Ahead: Labour Market Information Projections and Analysis to 2020*.

6. Recommendations

The critical importance of energy as an economic enabler and the equally important need to mitigate environmental and social impacts necessitate a policy framework which reflects Canada's changing energy circumstances. Such a framework will have to navigate the difficult and sometimes contradictory imperatives inherent to energy policy:

- Promoting economic development and job creation while preserving the environment.
- Fostering the development of both renewable and non-renewable energy.
- Increasing the efficiency of both energy production and energy consumption.
- Taking into account the diversity of energy conditions and drivers, from the provincial jurisdiction level all the way up to global markets.
- Being responsive to regulatory and market changes in the United States without losing track of other external markets.

With this in mind, it is recommended that the national policy framework put forward the following actions:

Continuous Improvement of Environmental Performance

1. Establish a vision for responsible energy development that is applicable across federal, provincial and territorial jurisdictions, complete with equitably applied best practice benchmarks for environmental performance.

Intergovernmental Collaboration

2. Respect provincial and territorial jurisdiction. The framework should be developed either by the provinces and territories on their own or by the federal government in consultation with the provinces.
3. Develop and apply a consistent framework to consult and engage with Aboriginal communities in Canada.

Emissions Pricing

4. Develop a national level carbon strategy that is manageable for the economy. This could take different forms such as a carbon tax which would be the most simple to implement, or other options such as a regulatory approach with a performance standard and multiple compliance options (e.g., Alberta's regulatory approach). Whichever approach is taken, the following principles should apply:
 - Establish targets and timeframes that are realistic and respect the cost of capital stock turnover rates.
 - Select a system that can accommodate growth (e.g., emissions-intensity versus absolute targets).
 - Include provisions for cost containment (e.g., ceiling price, floor price, and/or strategic offset reserve in the case of a cap and trade program) to minimize financial risk and provide investment certainty.
 - Apply pricing to greenhouse gas emissions economy-wide (where feasible) and ensure equity among and within sectors, and consumer groups.
 - Allow for equivalency agreements to recognize national carbon management strategy frameworks across provincial, federal and US jurisdictions.
 - Provide an opportunity for contributions to technology development as a major option for compliance.
 - Reinvest any carbon charge within the industries and jurisdictions in which it originates to develop technology and infrastructure to reduce GHG emissions at the source.
 - Take into account the action of competitors to ensure the emissions price does not disadvantage trade-exposed sectors.

Innovation

5. Continue to partner with industry to make strategic investments in technologies to reduce GHG emissions.
6. Continue to apply tax incentives to encourage new technology development.

Energy Efficiency and Conservation

7. Direct significant attention to encouraging energy efficiency and conservation Canada wide—particularly from an energy consumption perspective.

Market Diversification

8. Work with the western provinces and Aboriginal communities to encourage additional West Coast export options for energy producers.

Regulatory Enhancement

9. Harmonize policies where appropriate and reduce or eliminate duplicative approval processes between levels of government to move to a single regulatory window, which could be administered by the provinces and territories.

Canada–US Relationship

10. Treat uncertainty on policy action on energy and climate change in the US as a reason to be proactive on positioning Canada for policy reform.
11. Commit sufficient resources in a sustained effort to inform American leaders and the public about Canada's important role as a stable, reliable and conscientious source of supply.
12. Work with US authorities to ensure sufficient infrastructure is in place to serve US needs.
13. Continue to work with the US through the Clean Energy Dialogue.
14. Encourage trade partners to avoid using emission performance and reduction mechanisms as new forms of non-tariff trade barriers.

Workforce

15. Undertake efforts to engage underutilized sources of talent into the workforce, such as Aboriginal Canadians and older workers.
16. Work with industry to streamline immigration and temporary foreign worker programs based on labour market needs to meet skill demand.

Forum

17. Create an ongoing forum for dialogue on the development of a Canadian energy strategy.



Appendix: Event Series

The *Changing the Climate* event series explored Canada's need for a vision of energy and climate change that recognizes the interdependency of Canadian and US energy systems, encourages continuous improvement of environmental performance, and drives technology development. This vision should not adversely affect North American trade relations or create regional disparities.

US Energy and Climate Change Policy

Laura Lochman, Consul General of the United States for Alberta,
Saskatchewan and the Northwest Territories
May 10, 2010

Canada and the US represent a truly North American energy market, in part because Canada is a "pillar of US energy security," the most reliable foreign source of energy in the world for the United States. The challenge is to find the best ways for both countries to work together on energy development and the transition to a less carbon-intensive economy, which can be challenging as both countries are common stewards of shared resources such as air and water.

There is a complex and uncertain political and regulatory landscape in the US. Possibilities include a new bill or regulation by the US Environmental Protection Agency. However, some progress was made in two areas. The first one is the US-Canada Clean Energy Dialogue established by Prime Minister Harper and President Obama to expand clean energy research, build a clean and renewable electricity grid and develop new technologies. The Dialogue includes, as a sub-component, a Working Group on Carbon Capture and Storage. Another shared project is the Carbon Capture and Storage (CCS) project in Weyburn, Saskatchewan, which uses carbon imported from a coal-fired power plant in North Dakota for enhanced oil recovery and storage.

Developing Clean Energy to Address Alberta's Climate Change Challenges, and Support Alberta's Green Economy and Green Jobs

Eric Newell, Chairman, Alberta Climate Change and Emissions Management Corporation
June 14, 2010

Alberta has an important role to play in making Canada a clean energy superpower. While the challenge may sound a little daunting, Alberta has a great track record in applying technological solutions to solve energy-related issues. Establishing a price on carbon has produced many results. The offset market is established and growing, emissions credits are being traded and funds are being collected and dedicated to technology development.

Since March 2008, Alberta companies that annually produce more than 100,000 tonnes of greenhouse gas emissions are legally required to reduce their intensity by 12%. Large greenhouse gas emitters have to cut down emissions, buy carbon offsets or pay \$15 per tonne emitted per year. The funds resulting from the third option are managed by the Alberta Climate Change and Emissions Management Corporation (CCEMC), an arms-length corporation which redistributes the sums as grants to finance research and development projects aimed at mitigating climate change by making energy production cleaner, encouraging energy efficiency, implementing carbon capture and storage, or developing renewable energy. A rigorous evaluation process has been put in place for all the applications CCEMC receives, some of them highly technical. In 2010, the first series of CCEMC grants spread \$71 million among 16 projects, each one jointly funded to a maximum of 50% by CCEMC and the project's proponent.

Carbon Capture and Storage: A Promising Technology for the Environment and the Economy

Jim Carter, Chairman, Alberta Carbon Capture and Storage Development Council

Ian MacGregor, Chair, Enhance Energy Inc.

June 18, 2010

Carbon capture and storage (CCS) has big potential but the main challenge is cost. CCS is currently too expensive to be widely commercially applied. Project specific costs range between \$70–150 per tonne of CO₂, with 80% of the cost going to the capture process. This is not a reason for being discouraged though. Similar previous technological challenges were overcome when given enough time. For instance, the cost of removing sulphur dioxide (SO₂) from the exhaust flue gases of power plants is now half what it used to be.

CCS is proven technology with a vast body of experience. Large-scale use of carbon dioxide for enhanced oil recovery (EOR) could result in one billion additional barrels of crude reserves, giving new life to Alberta's conventional oil industry. CCS and EOR could result in \$100 billion in economic activity, with \$10–30 billion in royalties. CCS also changes the long-term outlook for coal-fired power plants, which are the main source of CO₂ emissions in Alberta and much higher than the oil sands. Alberta holds 70% of Canadian coal reserves. This represents hundreds of years of production.

The Government of Alberta's climate change strategy places high hopes on the technology, with 70% of planned greenhouse gas reductions coming from CCS. It recently allocated \$2 billion in partnership with industry for four large-scale demonstration projects to be ready by 2015.

Canada and US Energy and Climate Change Policy

Gary Doer, Canada's Ambassador to the US

June 29, 2010

Canada and the United States have the same carbon reduction target. Both countries have signed the Copenhagen Accord with the target to reduce carbon emissions by 17% by 2020 from 2005. It is time to respect each country's distinct challenges, and American lawmakers should do just that by making sure they do not impede Canada-US trade by introducing disruptive border measures. It is hard to understand why some people would want US greenhouse gas policy to target Canada's oil sands, given that emissions from the United States' 650 coal-fired power plants are 60 times greater than those of the oil sands.

The two countries are working closely together on regulatory approaches. In April 2010, the US and Canada both increased the fuel efficiency requirements for all passenger cars and light trucks. The two countries are now working on regulations that would do the same for heavier duty vehicles.

The similarity of Canada's carbon reduction target to that of the US, the notion of energy security and the potential for high paying jobs have been the major selling points of Canadian energy development in discussions with US politicians.

The Future of Energy, Energy Security and Canada's Role in a North American Energy Strategy

T. Boone Pickens, Chairman of BP Capital

September 22, 2010

The US needs to improve its energy security by reducing oil imports from the Middle East. One way to do this is to start using natural gas in the country's 8 million heavy duty trucks. This could allow the US to cut its oil imports from OPEC countries by half.

This is one key part of the Pickens Plan, a blueprint unveiled in 2008 to help the US become energy independent. The Plan also recommends transmission grid upgrades, energy efficiency, and major investment in wind and other renewable forms of energy.

As to Canada's oil sands, which are being labeled by some US environmentalist organizations as "dirty oil," they have become an issue that has been blown out of proportion by US media. The US welcomes Canadian oil, especially if it means relying less on imports from hostile countries. To help clarify priorities in energy policy, Canada and the US need to form a North American energy alliance, which could take the form of a bilateral commission.

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