



**HOUSE OF COMMONS
CHAMBRE DES COMMUNES**

THE OIL SANDS: TOWARD SUSTAINABLE DEVELOPMENT

Report of the Standing Committee on Natural Resources

**Lee Richardson, MP
Chair**

MARCH 2007

39th PARLIAMENT, 1st SESSION

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FOURTH REPORT

Pursuant to its mandate under Standing Order 108(2) and the motion adopted by the Committee on September 28, 2006, the Committee has studied Canada's Oil Sands and has agreed to report the following:

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THE OIL SANDS: TOWARD SUSTAINABLE DEVELOPMENT

INTRODUCTION

Canada now produces over 1 million barrels of oil each day from the oil sands. The Committee heard testimony that this rate of output could very well triple within the next ten years and even increase by five times by 2030. The pace of development of the oil sands is affected by a number of factors. As the National Energy Board reports:

“It is expected that there will continue to be rapid growth in the development of Canada’s oil sands. There are, however, issues and uncertainties associated with the development of the resource. The rate of development will depend on the balance that is reached between the opposing forces that affect the oil sands. High oil prices, international recognition, geopolitical concerns, global growth in oil demand, size of the resource base and proximity to the large U.S. market, and potentially other markets, encourage development. On the other hand, natural gas costs, the high light/heavy oil price differential, management of air emissions and water usage, insufficient labour, infrastructure and services are concerns that could potentially inhibit the development of the resource.”¹

The Committee is of the view that many of these factors warrant a closer inspection. Indeed, the rapid expansion of oil sands activities poses a number of important public policy challenges. While the development of Alberta’s oil sands undoubtedly provides an important economic stimulus to western Canada and to Canada as a whole, it also gives rise to important social, environmental and economic problems that have yet to be adequately addressed.

In particular, greenhouse gas emissions from oil sands activities are of increasing concern and have yet to be tackled head on. The Committee heard from a number of witnesses who argue that if Canada forges ahead with the development of the oil sands in a business as usual manner,² it may face major environmental problems. As one witness from the Pembina Institute put it, Canada risks becoming known “not as an energy superpower but as a superpolluter.”³

¹ Jim Donihee, National Energy Board, *Committee Evidence*, 24 October 2006.

² Tony Clarke of the Polaris Institute uses the term “haphazard” development. *Committee Evidence*, 21 November 2006.

³ Dan Woynillowicz, Pembina Institute, *Committee Evidence*, 2 November 2006.

As this report will make clear, Alberta's oil sands are an enormous economic and strategic advantage for this country. We have only begun to tap into this vast resource. As a global energy leader, Canada has a responsibility to find even better ways to maximize the value of this resource while minimizing the social and environmental costs of oil sands activities. How the development of Alberta's oil sands is managed in the coming years will have important long-lasting repercussions on Canada's economy, society, environment and international reputation, and will serve as a litmus test for Canada's commitment to sustainable development.

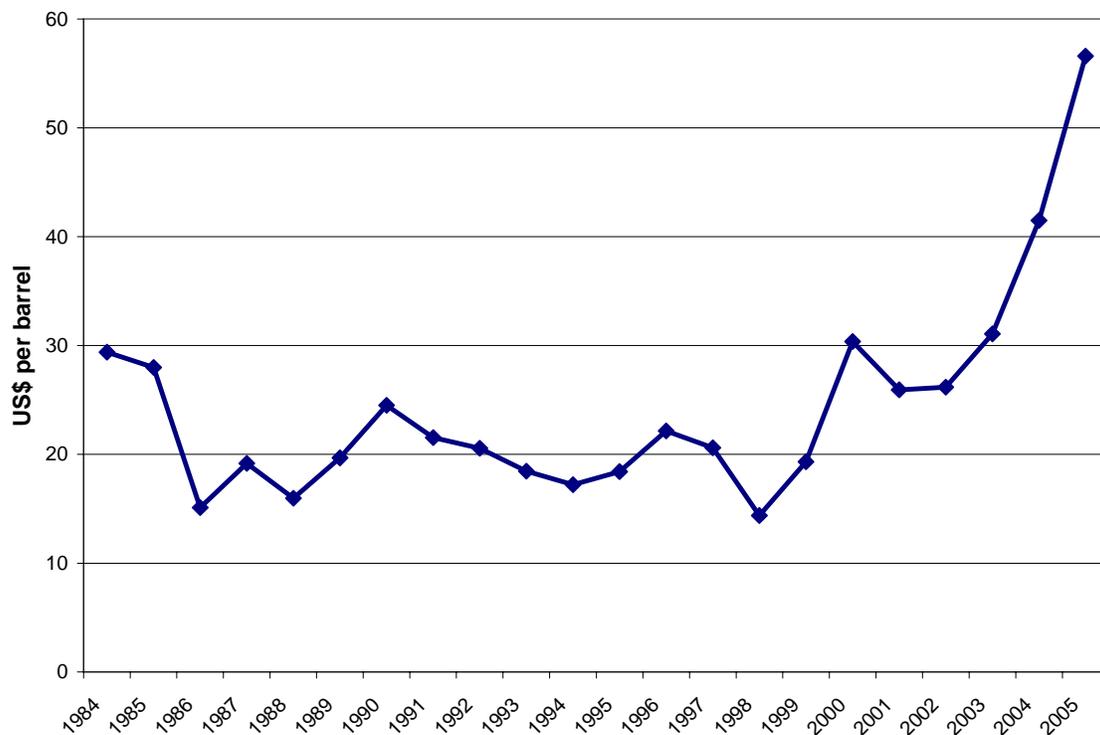
The development and commercialization of new technologies will undoubtedly play an important role in helping the industry develop the oil sands in a more sustainable manner. Governments have a role to play, both through the deployment of policy signals and through strategic investments, in making sure that such technologies are developed, brought to market and widely adopted in a timely manner. The time to act is now. With so many new long-lived oil sands projects in the planning stages, it is critical that the right policy framework be put in place as soon as possible so that businesses can promptly make the necessary investments in innovative technologies that will reduce the environmental and social footprint of oil sands activities and help transform Canada into a true clean energy superpower.

CHAPTER 1: THE OIL SANDS—AN OVERVIEW

Economic and geo-political context

The development of the oil sands is largely being driven by robust continental and global demand for crude oil. Strong growth in demand for oil and geopolitical tensions in the Middle East and elsewhere have led to an important increase in the price of oil in recent years (see chart, below) and have served to highlight many of the relative advantages of the oil sands.

Average Crude Oil Price (Spot WTI), 1984-2005



Source: BP Statistical Review of World Energy 2006.

The Committee heard testimony that global demand for energy will continue to increase and that hydrocarbons such as oil and gas will continue to be the dominant sources of primary energy on a global basis.⁴ As a witness observed, given the scale by which energy is produced and used in the world today and the infrastructure that is in place, fossil fuels are likely to supply most of the world's energy for the foreseeable future.⁵

From that perspective the oil sands are likely to play an increasingly important role in meeting energy demand over the coming years and decades. Moreover, political instability and geopolitical tensions in the Middle East and in other oil-producing regions serve to highlight the relative advantages of Canada's oil sands. Canada's political climate is "extremely stable" compared to that in many other oil-producing countries.⁶

The resource

Oil sands are composed of bitumen, a heavy and viscous tar-like oil, contained in a mixture of sand, clay and water. Bitumen accounts for about 10-20% of Alberta's oil sands. Oil sands deposits are found beneath an area of north-eastern Alberta covering about 140,000 square kilometres (or about twice the size of New Brunswick). The oil sands are extracted in the Athabasca, Cold Lake and Peace River areas of Alberta. It is estimated that there are upwards of 1.7 trillion barrels of bitumen in place in the province, which, according to some, is "equal to or exceeds the conventional oil deposits in the world."⁷ Of the approximately 1.7 trillion barrels in place it is estimated that about 315 billion barrels are potentially recoverable. Established oil sands reserves, that is, the portion of the resource that can be economically extracted using current technologies, are estimated at about 174 billion barrels. According to the Canadian Energy Research Institute these oil sands reserves could "supply Canadian demand for oil for 250 years."⁸ Because of the oil sands Canada is in the enviable position of holding the second largest oil reserves in the world after Saudi Arabia (see chart).

⁴ Michael Raymont, Energy Innovation Network, *Committee Evidence*, 26 October 2006.

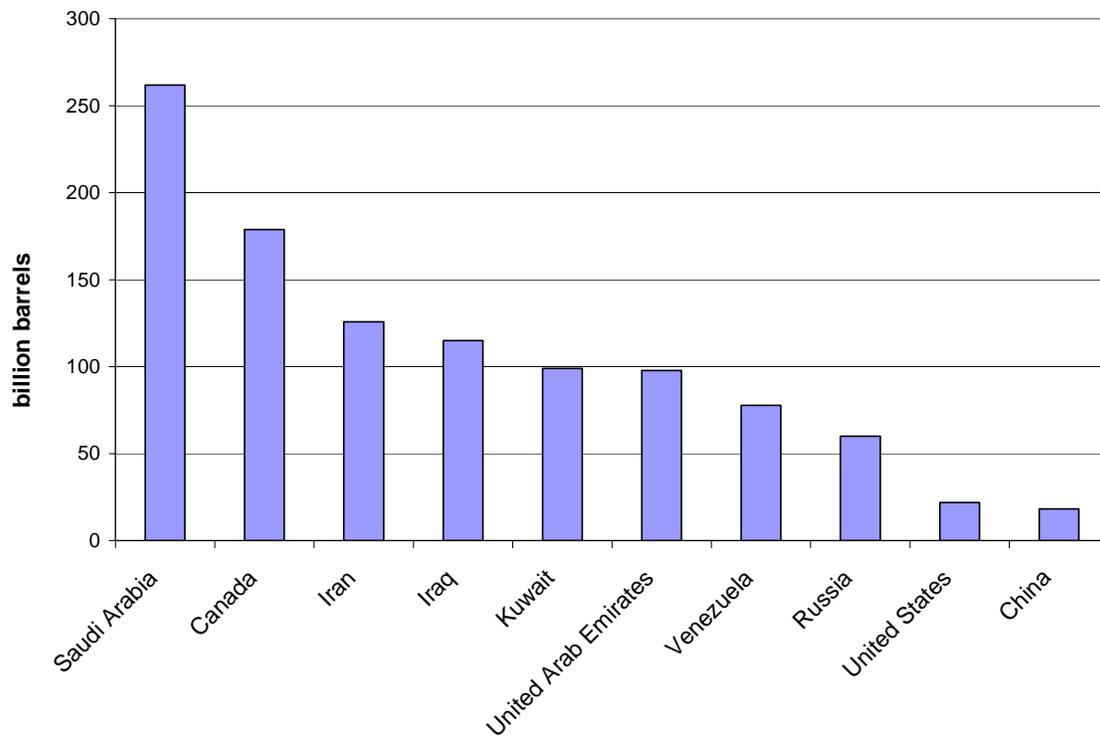
⁵ Ibid.

⁶ Jim Donihee, National Energy Board, *Committee Evidence*, 24 October 2006.

⁷ Marwan Masri, Canadian Energy Research Institute, *Committee Evidence*, 24 October 2006.

⁸ Ibid.

Crude Oil Reserves (January 2004)



Source: U.S. Department of Energy, Energy Information Administration. Data are from the *Oil and Gas Journal*.

While there are oil sands deposits in other countries, most notably Venezuela, it is thought that the largest deposits occur in Canada. Moreover, “Canada is the only area in the world where [such deposits] are being commercially exploited.”⁹

Developing the oil sands—Canadian innovation at work

The oil sands were first surveyed by scientists from the Canadian Geological Survey (now part of Natural Resources Canada) in 1875, about a century after fur traders and explorers first recorded their experiences of seeing bitumen along the banks of the Athabasca River.¹⁰ Building upon the knowledge garnered in the 1930s and 1940s when a number of small privately—and publicly—financed oil sands plants were constructed, the Great Canadian Oil Sands project (now owned by Suncor Energy Inc.), located just north of Fort McMurray, Alberta, was completed in 1967. At the time, this commercial-size 45,000 barrels per day project, the first of its kind, was described as “the biggest gamble

⁹ Howard Brown, Energy Policy Sector, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

¹⁰ Syncrude Canada Ltd., <http://www.syncrude.ca/users/folder.asp?FolderID=5657>.

in history" and a "daring venture into an unknown field."¹¹ A second, larger, project, this one developed nearby at Mildred Lake, Alberta, by the Syncrude consortium, a joint public-private venture, came online in 1978.

The development of the oil sands has been described as a Canadian success story. For example, it took vision and innovative Canadian research and development to find ways to separate bitumen from the sands and to ultimately bring the oil sands into commercial production. In the words of Mr. Jim Carter, President and Chief Operating Officer of Syncrude:

"We're talking here about research and development that's been done right here in Canada. This is homegrown stuff, the mining and the extraction of the bitumen from the sand and the turning of it into a viable product that we can put into the marketplace. If we hadn't done that thirty years ago, we would be in dire straits today in terms of our crude oil supplies [...] So I think we're very fortunate; we're the pioneers. I can tell you from my own personal experience [...] I've spent 28 years with Syncrude Canada, every day of it living in Fort McMurray, and the first 15 years that we worked in this business, we were toiling in obscurity. People didn't believe it could be done. They didn't believe we could actually make this into a viable business; they treated it as an R and D curiosity. Through that effort and energy, the development has occurred, and we've continued to invest in R and D [...] I think Canada would be in a far less enviable position today if the oil sands had not been developed—and that's all of Canada. A lot of our product goes to the Edmonton area refineries, but it also comes to Sarnia, and it goes over the mountains to the west coast as well. This product goes across the country, and it is really helping to secure our energy security in the country."¹²

¹¹ Suncor Energy Inc. <http://www.suncor.com/default.aspx?ID=9>.

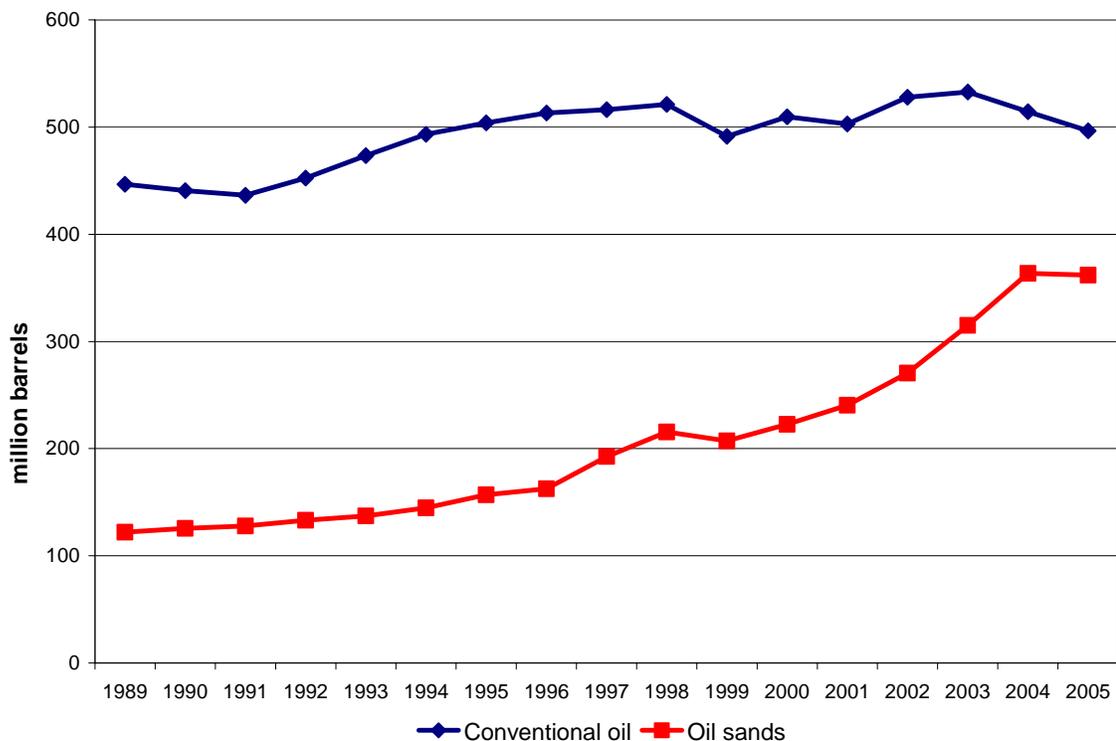
¹² Jim Carter, Syncrude, *Committee Evidence*, 21 November 2006.

CHAPTER 2: CANADA—AN ENERGY SUPERPOWER?

Recent developments

In the mid-1990s, the National Oil Sands Task Force projected that production of oil from the oil sands would reach 1 million barrels a day by 2020. That level of production was in fact achieved in 2004, or sixteen years “early”. While production of conventional crude oil in Canada has been rather flat for the last ten years and is projected to decline, the oil sands have experienced tremendous growth (see chart, below), and are expected to more than compensate for any decline in the production of Canadian conventional crude oil. Indeed production from the oil sands now exceeds conventional crude oil production in western Canada and will soon surpass total Canadian production of conventional crude oil.

Canadian Crude Oil Production, 1989-2005

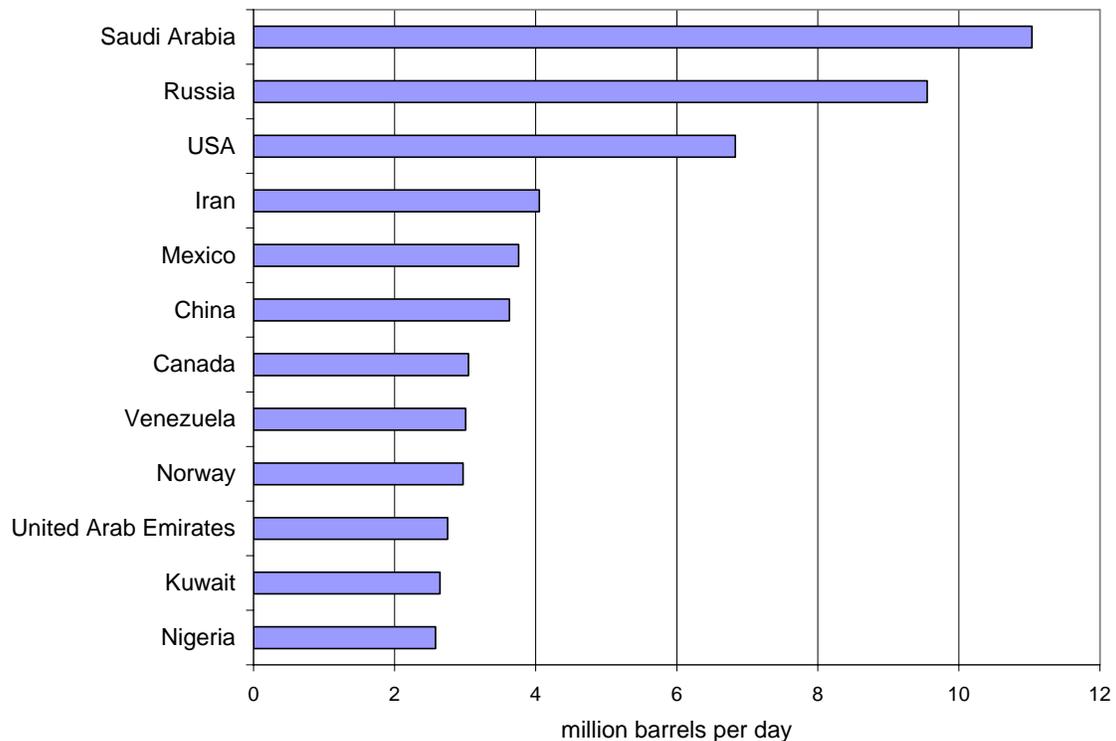


Source: Statistics Canada, *Energy Statistics Handbook*, 2nd Quarter 2006.

Future growth

The National Energy Board (NEB) envisages oil sands production reaching 3 million barrels a day by 2015 while the Canadian Association of Petroleum Producers (CAPP) calculates that oil sands production could reach 3.5 million barrels a day by 2015 should all announced projects go ahead as planned. According to the NEB over 40 major bitumen recovery projects have been announced for the period 2006-2015.¹³ Investments are expected to average about \$10 billion per year over that period. The result of such investments is that Canada could soon emerge as one of the largest oil producers in the world, climbing from 7th largest producer in the world in 2005 (see chart, below) to 4th or 3rd largest by 2015 according to CAPP's analysis.¹⁴

Oil Production¹⁵ by Country, 2005



Source: BP Statistical Review of World Energy 2006.

¹³ The National Energy Board's submission to the Committee identifies 46 major bitumen recovery projects.

¹⁴ Greg Stringham, Canadian Association of Petroleum Producers, *Committee Evidence*, 2 November 2006.

¹⁵ Production includes crude oil, shale oil, oil sands and natural gas liquids.

Natural Resources Canada (NRCan) officials told the Committee that by 2030 up to 5 million barrels a day could be extracted from the oil sands.¹⁶ Interestingly, development may not be constrained to Alberta. The National Energy Board testified that there are oil sands deposits in certain regions of Saskatchewan (e.g. in the northwest and eastern central regions of the province).¹⁷ According to NRCan there is burgeoning interest in the development potential of that resource.¹⁸ The estimates by the NEB and NRCan suggest a wide range of development potential for the oil sands including 3 million barrels per day by 2015 and potentially up to 5 million barrels per day by 2030 from the current level of 1.1 million barrels per day. The Committee did note, based on evidence from the developers, that constraints to development could well curtail development or cause some projects to be delayed. As a result, the range of production could be less than the projected amounts as provided by the NEB and NRCan which will impact the economics and the environmental aspects of these projects.

And while about two-thirds of the oil sands in place cannot currently be extracted by either mining or *in situ* methods,¹⁹ it is conceivable that new technologies could one day be developed that would allow for the development of that untapped resource. Such developments would further cement Canada's reputation as a top tier energy producer.

Risks to this outlook

With oil prices hovering between US\$50-60 per barrel, the incentive to develop the oil sands is enormous and indeed in most cases compensates for the risk and expenses involved in developing such long-lived, capital-intensive projects. As George Eynon of the Canadian Energy Research Institute cogently told the Committee, under current market conditions "There's an economic incentive for the owners of the [oil sands] leases to monetize their assets."²⁰

That is not to say that oil sands projects are without risk. In fact, the costs of extracting and upgrading bitumen are significant and have recently been exacerbated by rising material, labour and natural gas costs. According to the National Energy Board's latest assessment of the oil sands, it can cost up to CAD\$40 to supply synthetic crude oil from the oil sands, and this even before accounting for the environmental costs

¹⁶ Howard Brown, Energy Policy Sector, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

¹⁷ Jim Donihee, National Energy Board, *Committee Evidence*, 24 October 2006.

¹⁸ Howard Brown, Energy Policy Sector, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

¹⁹ Hassan Hamza, CANMET Energy Technology Centre—Devon, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

²⁰ George Eynon, Canadian Energy Research Institute, *Committee Evidence*, 24 October 2006.

associated with greenhouse gas (and other) emissions. The NEB testified before the Committee that should oil prices fall into the US\$35 to US\$40 per barrel range, “it’ll result in a significant slowdown” in the industry.²¹

Other challenges also exist. If production from the oil sands is to continue to grow rapidly in the coming years, new upgrading facilities and pipelines will be needed. In fact, the National Energy Board believes that production from the oil sands could outstrip pipeline capacity as early as this year.²² New upgrading capacity is also needed to process increasing volumes of bitumen since most refineries can only process very limited quantities of raw bitumen. Additional sustainable investments in upgrading and refining, both value-added activities, should be encouraged, with a view that such investments would provide substantial economic benefits to Canada. While it is up to the relevant companies to make the necessary investments, federal, provincial and territorial governments can help by working together to ensure that proposed projects are reviewed in a timely and rigorous manner.

Finally, though Canada is increasingly characterized as an energy superpower, largely because of the development of the oil sands, it risks also becoming known as a major polluter unless innovative policies and technologies are adopted to reduce the environmental impacts of oil sands activities. The needs of the people and communities most directly affected by oil sands projects must likewise be addressed if Canada’s reputation as a responsible global energy player is to be upheld.²³

The oil sands—a resource of strategic importance to North America

The oil sands are of great strategic importance for Canada. Importantly, production from the oil sands is offsetting the decline in conventional oil production from the Western Canada Sedimentary Basin, historically Canada’s richest oil-bearing zone.²⁴ This allows Canada to benefit from secure revenues derived from oil exports and provides Canada with a natural resource which today is a cornerstone of our modern way of life.

The United States, Canada’s largest trading partner and the world’s largest consumer of oil, is striving to diversify and secure its energy supplies and in that context recognizes the strategic importance of the oil sands. Indeed the production of crude oil from Canada’s oil sands displaces oil imports from overseas.²⁵ As Tony Clarke of the

²¹ Bill Wall, National Energy Board, *Committee Evidence*, 24 October 2006.

²² National Energy Board, *Canada’s Oil Sands—Opportunities and Challenges to 2015: An Update, An Energy Market Assessment*, June 2006.

²³ See Appendix for data on greenhouse gas emissions by country (absolute and per capita).

²⁴ National Energy Board, *Canada’s Oil Sands—Opportunities and Challenges to 2015: An Update, An Energy Market Assessment*, June 2006.

²⁵ Rob Seeley, Albian Sands Energy Inc. (Shell Canada), *Committee Evidence*, 21 November 2006.

Polaris Institute noted in his appearance before the Committee, “clearly, from the United States’ standpoint, from Washington’s standpoint, having access to Canadian oil—certainly in terms of the potential reserves that the oil sands project—ensures a secure supply, a safe supply, and a friendly neighbour supply.”²⁶

Until alternatives become economical and are commercialized on a wide scale, Canadians and Americans alike will continue to depend on liquid hydrocarbons to meet many of their energy needs, beginning with transportation energy needs. A growing portion of such energy needs will be met by production from the oil sands, a vast resource located “right in our own backyard.”²⁷

Operators of oil sands projects are therefore investing billions of dollars in new oil sands extraction and upgrading projects, confident in the knowledge that demand for oil, within North America and in emerging Asian markets, will continue to increase and that prices will likely remain high by historical standards.

But though hydrocarbons, including oil sands, will likely continue to be the dominant source of energy supply for some time yet, mounting environmental and social costs associated with oil sands activities in particular make it increasingly clear that it would be irresponsible to continue on a “business-as-usual” course. It is time to begin the transition towards a clean energy future. The development of the oil sands is a great Canadian technological and economic achievement. With the right mix of innovative policies and technologies, Canada could harness the energy that the oil sands offer while minimizing the social and environmental impacts of such activities, making the oil sands part of a clean energy future and capping this great Canadian success story.

²⁶ Tony Clarke, Polaris Institute, *Committee Evidence*, 21 November 2006.

²⁷ Jim Carter, Syncrude, *Committee Evidence*, 21 November 2006.

CHAPTER 3:

ROLE OF GOVERNMENTS

Constitutionally, the provinces have ownership and management responsibility over the natural resources within their territory. In the case of Alberta, mineral rights²⁸ were transferred by the Government of Canada to the provincial Crown by virtue of the *Natural Resources Transfer Act* of 1930. The Department of Alberta Energy reports that the Alberta Crown owns 97% of oil sands mineral rights; freehold owners hold the remaining 3%.²⁹ Alberta therefore has jurisdiction over the oil sands and manages this resource on behalf of its citizens. To encourage the development of this resource by private interests, the Government of Alberta generally leases to interested parties the right to develop and use oil sands resources. In exchange, the Government of Alberta receives lease payments, royalties and income taxes. According to the Canadian Association of Petroleum Producers, Alberta received about \$4 billion in royalty and lease payments in 2006.³⁰ In addition to making such payments, oil sands developers, regardless of whether they are domestic or foreign-owned, must obey all applicable provincial and federal laws and regulations.

The Government of Canada's role in the oil sands for the most part pertains to protection of the environment, the protection of waterways and fisheries, and Indian lands. Relevant laws that may be used by the federal government to exercise jurisdiction over certain aspects of oil sands projects include the *Fisheries Act*, the *Canadian Environmental Protection Act, 1999*, (CEPA, 1999) the *Canadian Environmental Assessment Act*, the *Navigable Waters Protection Act* and the *Indian Act*. For example, CEPA, 1999 gives the federal government powers to regulate harmful emissions. The *Fisheries Act* grants the Government of Canada the authority to impose restrictions on any activity that could harm fisheries.

The *Canadian Environmental Assessment Act* and the *Fisheries Act* often work in tandem. For example, a federal environmental assessment may be triggered in the case of an oil sands project which could have an impact on fish habitat.

Contributing to the complexity surrounding environmental protection is the fact that the environment, which has emerged as a key issue in the context of oil sands activities, is not specifically mentioned in the *Constitution Act, 1867*. In practice the environment is a

²⁸ Mineral rights extend to petroleum, natural gas, oil sands, and other minerals.

²⁹ Alberta Energy, Alberta Oil Sands Tenure Guidelines, June 2006.

³⁰ Greg Stringham, Canadian Association of Petroleum Producers, *Committee Evidence*, 2 November 2006.

matter of shared jurisdiction between the federal and provincial governments. Dealing with areas of shared jurisdiction is complex and requires close co-operation between the relevant orders of government. As the Commissioner of the Environment and Sustainable Development noted in an earlier report, “both levels of government have constitutional powers over various matters that permit them to pass legislation to deal with environmental issues.”³¹

Environmental assessments of oil sands projects are primarily done pursuant to Alberta’s *Environmental Protection and Enhancement Act*, R.S.A. 2000. While it was argued that the Government of Canada has the authority to undertake broad environmental assessments of oil sands projects, in practice the federal government is generally very careful to respect Alberta’s jurisdiction. For example, the Committee received testimony from the Pembina Institute that the Government of Canada has not to date been involved in an environmental assessment process looking at all the impacts associated with oil sands projects, including, for example, transboundary air pollution and greenhouse gas emissions.³²

Finally, it is also worth noting in the context of the oil sands that the federal government can enact laws concerning interprovincial and international trade and commerce, while the provinces have jurisdiction over property and civil rights as well as local works and undertakings. Generally speaking, the Government of Canada, mindful of the barriers to development that can sometimes result from unwieldy and uncoordinated laws and regulations, is working to improve the efficiency with which its laws and regulations are brought to bear on industrial activities.³³

Besides passing and enforcing legislation that pertains to resource extraction projects, the federal government also has “important responsibilities in terms of the overall policy framework, including the macro-economic policy framework ensuring a stable place to invest” and has chosen to be involved in technology development in the oil sands and other energy-related areas through programs managed by Natural Resources Canada.³⁴ On the labour front, the federal government is responsible for developing policies and programs to help Canadians participate in economic activity. The federal government is also responsible for immigration policy. Canada continually seeks to admit immigrants, foreign students, visitors and temporary workers who enhance Canada’s social and economic growth.

³¹ Office of the Auditor General of Canada, *2000 Report of the Commissioner of the Environment and Sustainable Development*, “Chapter 7: Co-operation Between Federal, Provincial and Territorial Governments,” <http://www.oag-bvg.gc.ca/domino/reports.nsf/html/c007ce.html>.

³² Dan Woynillowicz, Pembina Institute, *Committee Evidence*, 2 November 2006.

³³ Howard Brown, Energy Policy Sector, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

³⁴ Ibid.

Finally, the National Energy Board, a federal regulatory agency, notably regulates the construction and operation of interprovincial and international pipelines. The Board also regulates the export of oil and gas, monitoring the supply and demand of those commodities to ensure that quantities exported do not exceed the surplus remaining after Canadian requirements have been met.³⁵

Respect for jurisdiction is a principle which today underlies the energy policy of federal and provincial governments.³⁶ Ultimately it is up to the province of Alberta to decide how best to develop its oil sands deposits; as has been noted by a senior Government of Canada official, “Alberta is the owner of the resource and it’s really up to Alberta to decide whether it wishes to pursue that rapidly or not.”³⁷ That is not to say that the federal government has no role in how the oil sands are developed. The Government of Canada has at its disposal a number of regulatory and policy mechanisms to influence the scale and nature of oil sands activities. Some of these will be discussed in greater detail later in this report. It is however important to recognize that success in ensuring that oil sands activities benefit all Canadians while posing minimal environmental risks and social dislocation is more likely to come from continued inter-governmental cooperation than from inter-governmental conflict over particular policies or laws affecting the oil sands.

With respect to the role of governments, the Committee recommends that the federal government, specifically the Department of Natural Resources, base all of its actions in the area of oil sands development on sustainable development and polluter-pays principles.

³⁵ National Energy Board, http://www.neb.gc.ca/AboutUs/history_e.htm.

³⁶ Howard Brown, Energy Policy Sector, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

³⁷ Ibid.

The Committee also recommends that the federal government recognize the jurisdiction of the provinces with respect to the pace of development in the oil sands, and that it reject any suggestions of nationalizing the oil sands.

CHAPTER 4:

ECONOMIC BENEFITS OF THE OIL SANDS

Investments in the oil sands ripple throughout the Canadian economy

Oil sands activities increasingly contribute to economic activity in Canada. Significant investments in the oil sands have repercussions not only in western Canada but also throughout the country in the form of spin-off benefits to related industries such as business services, manufacturing, retail, finance and insurance.

According to the Canadian Association of Petroleum Producers, investments in the oil sands totalled approximately \$8.5 billion in 2005 and about \$8.8 billion in 2006.³⁸ The industry forecasts that capital expenditures in the oil sands over the next five years will range between \$8 billion and \$12 billion annually.³⁹ In fact, the Committee heard that up to \$125 billion dollars in oil sands investments have been announced for the period 2006-2015.⁴⁰ While not all announced oil sands projects will go ahead, the figure is nevertheless indicative of the buoyancy of this industry.

Impact of the oil sands on Canada's gross domestic product

With growing production from the oil sands, the Canadian Energy Research Institute (CERI) estimates that the value of bitumen and synthetic crude oil produced over the 2000-2020 period could total over \$500 billion.⁴¹ CERI estimates that oil sands and oil sands-related activities together could, according to their model, contribute some \$789 billion to Canada's gross domestic product (GDP) over the study period (2000-2020). While the majority of the economic benefits associated with the oil sands will be felt in Alberta, CERI believes that Ontario could also see a \$102 billion boost to its economy over the 2000-2020 period, while the GDP impact of oil sands and oil sands-related activities on other Canadian provinces and territories is estimated at \$53 billion dollars over the same period. Provinces other than Alberta are affected by the oil sands mainly because "Even though the resource is located in Alberta, the goods and services

³⁸ Canadian Association of Petroleum Producers, Submission to the Natural Resources Committee, 2 November 2006.

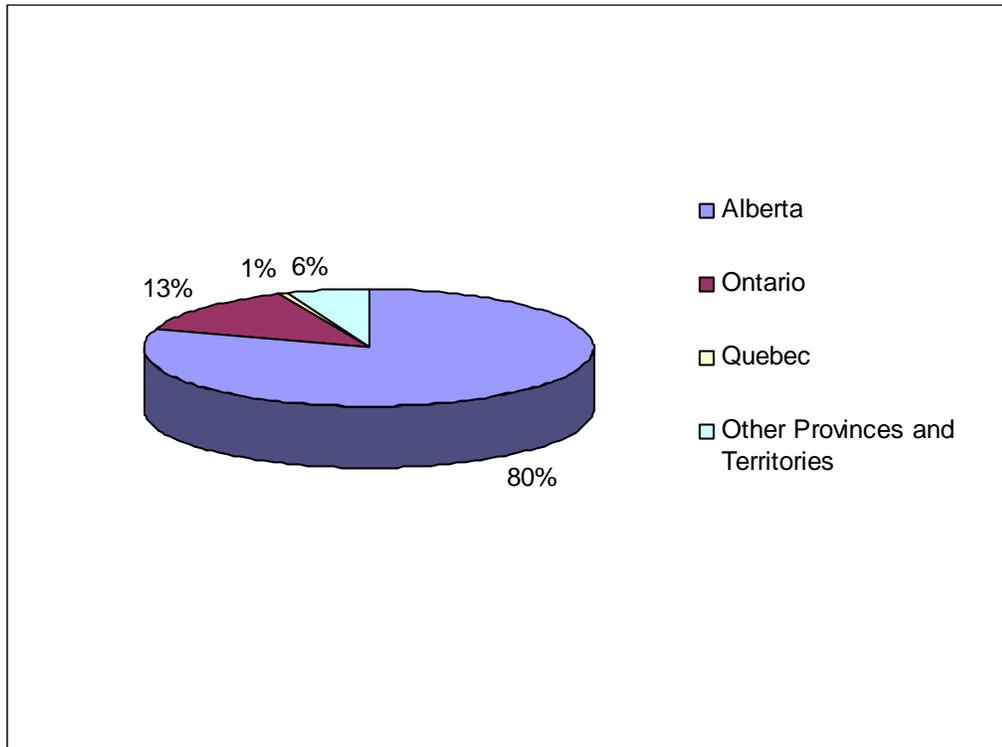
³⁹ Jim Carter, Syncrude, *Committee Evidence*, 21 November 2006.

⁴⁰ Howard Brown, Energy Policy Sector, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

⁴¹ Canadian Energy Research Institute, *Economic Impacts of Alberta's Oil Sands*, October 2005. CERI data are expressed in 2004 dollars.

and equipment are coming from all over Canada.”⁴² CERI’s analysis shows that outside of the crude oil and oil sands sector it is the finance, insurance, real estate, and manufacturing industries in places like Alberta and Ontario which stand to benefit the most from the development of the oil sands. Indeed oil sands projects are stimulating demand not only in Alberta but throughout Canada and beyond for business services, banking and insurance services, steel, vehicles and manufactured equipment and components. Nationally, CERI estimates that oil sands and oil sands-related activities will account for about 3% of Canada’s GDP by 2020, up from about 1.5% in 2000.

GDP Impact of Oil Sands Development, 2000-2020



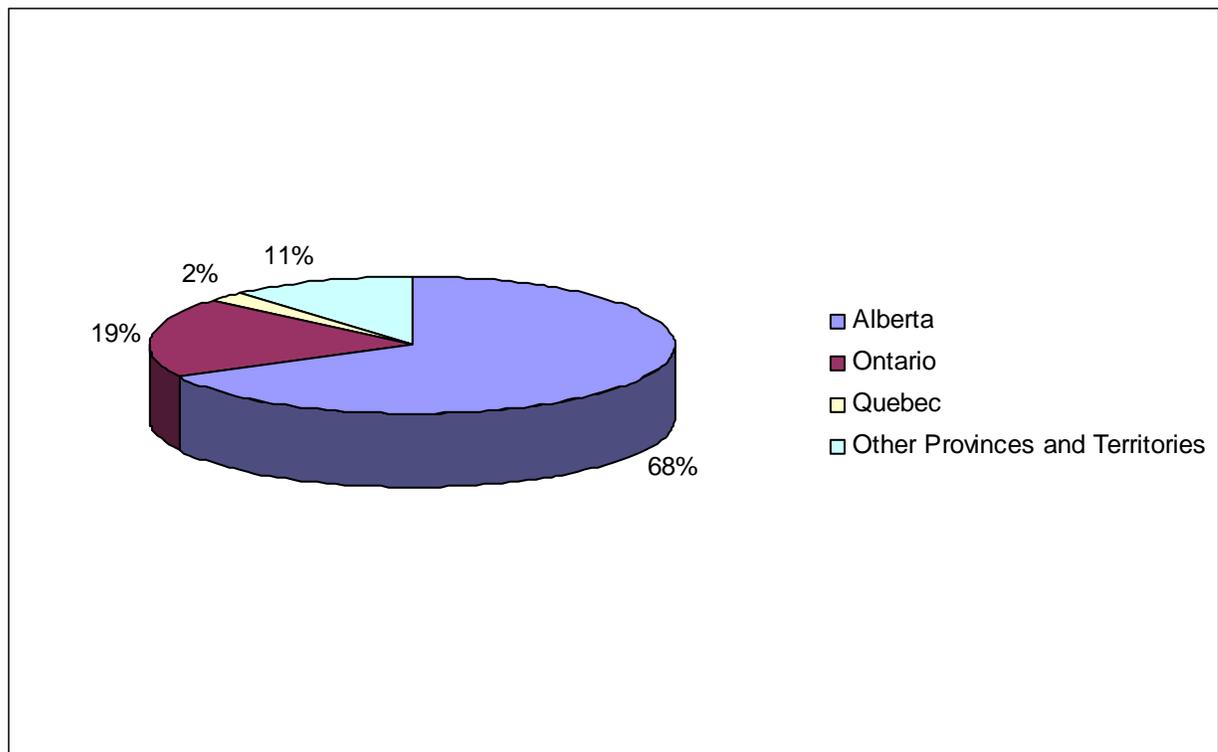
Source: CERI brief, 24 October 2006.

⁴² Greg Stringham, Canadian Association of Petroleum Producers, *Committee Evidence*, 2 November 2006.

Impact of the oil sands on employment

CERI estimates that oil sands activities will generate approximately 5.4 million person years of work in Canada over the 2000-2020 period. While about two-thirds of the employment impacts will be felt in Alberta, the CERI study interestingly finds that oil sands activities contribute to substantial job creation in other sectors such as manufacturing and retail in other provinces and countries. As Mr. Marwan Masri testified before the Committee, “four times more jobs will be created outside the oil and gas sector than in the oil and gas sector as a result of this development.”⁴³ Moreover CERI finds that about 19 percent of the total employment impacts within Canada will be felt in Ontario, notably in the business services and manufacturing sectors.

Employment Impact of Oil Sands Development, 2000-2020



Source: CERI brief, 24 October 2006.

⁴³ Marwan Masri, Canadian Energy Research Institute, *Committee Evidence*, 24 October 2006.

The economic impacts of the oil sands are also being felt in other, more subtle, ways. For example, Canadians from all regions of the country are leaving regions where employment opportunities are sparse and moving to Alberta in order to participate in the development of the oil sands. The salaries they earn often sustain other family members who have stayed behind in their home community. The Committee heard from a number of witnesses who emphasized time and again that the economic impacts of the oil sands are truly being felt across the country. For example, Syncrude's Jim Carter offered this observation:

"One need only consider the number of direct flights that have been added between Fort McMurray and other parts of Canada over the past few years to gauge the economic impact of oil sands across the entire country. We anticipate that the \$54 billion on capital investment projected over the next five years will create 26,000 direct jobs by 2011. For each of these, studies indicate a further three jobs are created in the service and support sectors, resulting in a total of 100,000 jobs created."⁴⁴

The oil sands and government revenue

While those companies active in the oil sands sector are clearly generating healthy profits, the development of the oil sands also generates considerable revenue for the Alberta Government, which owns the resource, as well as for the Government of Canada. The Canadian Energy Research Institute estimates that, in total, oil sands production and development activities could generate about \$123 billion for governments in Canada during the 2000-2020 period, mainly in the form of corporate and personal income taxes, property taxes, and, in the case of Alberta, royalties. According to CERI's model, the Alberta Government stands to collect about 36% (\$44 billion) of that total while municipalities in Alberta would collect 10% (\$11 billion). The Government of Canada's share is modeled to reach 41% (\$51 billion), the clear implication being that the oil sands industry is important not only to the Alberta Government but also to the country as a whole.

The other side of the ledger

Of course, besides contributing to economic expansion, job growth and government revenue, the development of the oil sands also gives rise to difficult to quantify but non-trivial environmental and social costs that must also be considered

⁴⁴ Jim Carter, Syncrude, *Committee Evidence*, 21 November 2006.

when assessing the impacts of the industry. These are discussed in greater detail in the sections that follow. Considerable emphasis is placed on greenhouse gas emissions and water use associated with oil sands activities.

The oil sands can be an important component of a secure future for Canada, but only if the right policies and technologies are developed and implemented so that this resource can be developed in a sustainable manner.

CHAPTER 5: THE CHALLENGES

Introduction

The development of the oil sands and the rapid expansion of the industry pose tremendous challenges on many levels. First, the industry must raise large amounts of capital to deal with increasing capital and energy costs, if only because of the nature of this type of industrial activity. Added to that is the growing difficulty of recruiting specialized and non-specialized workers. There are equally great environmental challenges, particularly those involving the boreal forest, water use and treatment, greenhouse gas emissions, the evaluation of cumulative impacts, land reclamation, etc. Issues relating to the local infrastructure (housing, roads, drinking and waste water), health services and the Aboriginal populations also generate numerous challenges.

Natural Resources Canada acknowledges that, despite all the economic advantages associated with oil sands development, some aspects remain problematic, particularly the environmental footprint, the increased need for natural gas, the capacity of pipelines and refineries, and the availability of qualified workers, a problem that is considered extremely crucial.

As I mentioned at the start, there are some important issues raised by the development of the oil sands—perhaps most importantly, the environmental footprint, but also what it might mean for natural gas markets, and whether the pipeline capacity is adequate, whether there is enough labour, and so on.⁴⁵

The House of Commons Standing Committee on Natural Resources believes in achieving a balance among three main factors: the resource's potential, the necessary investment and the environmental effects. In that regard, the Committee subscribes to a scenario evoked by the President of EnergyInet, Michael Raymont, to wit:

⁴⁵ Howard Brown, Energy Policy Sector, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

... we can enter an era of responsible and reliable energy supply. All we need to do is focus on the responsible development of conventional energy resources, with particular emphasis on our lower carbon footprint and reduced collateral resource requirements. By this I mean water and other things necessary to produce energy. We should accelerate the development of unconventional and alternate sources of energy, including renewables, while emphasizing technology development and deployment. We also need a responsive regulatory environment and, equally important, a more certain and stable business environment, so that the private sector can make and deploy the technology necessary to obtain environmentally benign forms of energy production and usage.⁴⁶

The Committee heard experts say that the industry already has all the technology needed to produce non-polluting energy. What is really missing are the conditions that would encourage the private sector to invest in that technology.

In the update of its 2004 report,⁴⁷ the National Energy Board (NEB) reviewed its initial assessments of the current rapid growth in oil sands development. For the purpose of its analysis, the Board considered a reference scenario that envisages an increase in daily production from 1.1 million to 3 million barrels a day by 2015. The analysis takes account of factors that tend to precipitate or encourage growth, such as the high price of crude, the growing global demand for energy, technological innovations, the great stability of Canada's investment climate, and the vast U.S. market. These growth factors are counter-balanced by the need to develop markets and build pipelines, the increase in capital and labour costs, the increase in operating costs, the shortage of labour, inadequate infrastructure, and the need to manage the environmental impacts of development projects.

Cost increases

Many of the witnesses that the Committee heard insisted that the pace of oil sands development in the next few years would depend in large part on the industry's capacity to deal with rising costs and the availability of qualified workers. Some, including the Assistant Deputy Minister for Energy Policy at Natural Resources Canada, Howard Brown, feel that the labour shortage could even become the main factor limiting that growth. Others feel that it is various market factors, taken together, that could put a damper on the effervescence currently on display in Alberta's oil sands sector.

⁴⁶ Michael Raymont, EnergyInet, *Committee Evidence*, 26 October 2006.

⁴⁷ National Energy Board, *Canada's Oil Sands: Opportunities and Challenges to 2015: An Update, An Energy Market Assessment*, June 2006.

Given the strength of the economy in the Canadian West—driven by the development of oil and gas, potash, uranium, municipal and Olympic infrastructure—a certain number of oil sands projects have already been delayed or extended over a longer period because the companies themselves recognize that there are problems related to costs and other factors that do not operate in their favour.⁴⁸

Labour

The consensus among those who appeared before the Committee is that the availability of workers is one of the most serious problems for oil sands development. There has already been some slowdown in the development of new projects, largely because the labour shortage in Alberta is forcing costs up. The labour shortage has become so serious that the industry labour forecasts had to be revised between fall 2005 and fall 2006. The new data presented by the Canadian Association of Petroleum Producers indicates that the employment peaks for industrial construction projects in the oil and gas sectors have shifted by some two years and increased from 32,000 to more than 34,000 jobs.⁴⁹

Since Alberta has only a limited number of qualified workers, the oil sands sector has a problem not only finding the qualified workers it needs, but also attracting them to the region of Fort McMurray. Moreover, this problem affects not only qualified and specialized labour, but every sector of the economy, notably the services and house-building sectors. In fact, when any new oil sands development project is approved and begun, it brings new workers to the Fort McMurray region, thus increasing the pressure on the housing industry. For several years now, there has been an observable increase in labour mobility from eastern Canada, Newfoundland and Labrador and the Maritimes in particular, to Alberta. Some even fear that this westward movement could result in new labour shortages in the East.

The labour shortage forces the industry and governments to develop new approaches. Among these, apprenticeship programs have had some success producing apprentices, and particularly recruiting people from the growing Aboriginal population of Alberta, Saskatchewan and Manitoba. In the oil sands industry, companies are requiring the equivalent of Grade 12, which helps raise the level of education among Aboriginal people and make them more employable. Vocational programs in Aboriginal communities are essential in this respect.

⁴⁸ Pierre Alvarez, Canadian Association of Petroleum Producers, *Committee Evidence*, 2 November 2006.

⁴⁹ Canadian Association of Petroleum Producers, *Canadian Oil Sands—Costs and Advantages—Fiscal Regimes and Challenges*, brief to the Standing Committee on Natural Resources, 2 November 2006.

Immigration is also being called on to play an increasingly large role. Until now, companies have found almost all the workers they need in Canada, but the industry's future expansion will make immigration an unavoidable necessity. The federal government can play a major role here; for example, the Department of Citizenship and Immigration has opened what it calls "temporary foreign worker units" in Calgary and Vancouver, as part of a pilot project to meet labour needs. As the President of the Fort McMurray Chamber of Commerce, Mike Allen, mentioned, the governments of Canada and Alberta signed an agreement in May 2004 to allow temporary foreign workers to enter the country to meet the urgent need for qualified workers for oil sands projects. The federal government recently announced changes to the Temporary Foreign Workers Program to speed up hiring when there are no Canadian citizens or landed immigrants in Canada to occupy the vacant positions. Furthermore, the range of jobs was expanded to some 170 different professions, which demonstrates the extreme pressure on the labour market in the region. There are still challenges to be met in terms of recognition of foreign degrees or helping immigrants with prior education to develop their skills sufficiently to meet Canadian standards.

Based on the evidence heard, the Committee recommends that the federal government, in cooperation with the Government of Alberta, renew efforts to fill the shortages of specialized and non-specialized workers in the oil sands sector.

The Committee was also made aware of another aspect of the labour problem. The shortage of, and thus demand for, qualified workers is not limited to the oil sands sector; it extends to certain federal government agencies responsible for enforcing energy legislation. That is the case, for example, with the National Energy Board, which lost 55 employees last year from a staff of 300. Most of them left for the private sector, which was able to respond more quickly to their salary and other demands. Given the growth in the oil sector and the number of projects that the Board must assess, the need to retain its qualified staff in order to be able to handle and study extremely technical questions becomes an enormous challenge. The main difficulty is not to recruit talented and competent young employees but rather to retain and attract experienced employees and managers. This phenomenon is not limited to the NEB but also affects Natural Resources Canada, a department that does a great deal of research and therefore requires a highly qualified staff.

The Committee recommends that the Department of Natural Resources carry out a study and propose a human resources action plan to retain experts within the Department and mitigate the brain drain to the oil and gas industry. The Committee recommends that the federal government, and Natural Resources Canada in particular, develop and implement measures to ensure that the highly qualified scientific personnel needed to carry out its mission and its various mandates are retained and replaced when they leave.

Capital costs

It is clear that labour availability has a real impact on the industry's capacity to continue developing the oil sands, primarily because of the rising costs engendered by labour shortages. However, labour is by no means the only area in which costs are rising. Indeed, the growth of the oil sands industry is significantly dependent on the cost of material, energy and capital. As Mr. Jim Carter, President and COO of Syncrude, pointed out, all this affects the economic evaluation of projects.⁵⁰ When costs are rising, promoters tend to wait longer before making decisions. Already, some projects have been pushed back and, if the cost of crude oil continues to fall and costs continue to increase, it is likely that we will see more projects delayed or abandoned.

Investments costs, for steel alone, have increased considerably since 2003. For example, a 100,000 barrels a day oil sands project that cost around \$3.3 billion then might cost \$6 to 10 billion today, primarily because of the quick and steep rise in the world price of steel. The rising cost of steel affects construction projects throughout the world, while labour availability is a problem that primarily affects North America.⁵¹

The projections for oil sands development by 2015 will require capital investments estimated at \$125 billion in order to increase production from 1 million to between 3 and 3.5 million barrels a day. The extent of the projected investments in the oil sands is so great that companies and their shareholders may become more hesitant without assurances of a worthwhile return on their investment and an acceptable degree of certainty in the investment cycle.⁵²

Another important aspect of the deployment of new projects is the flow of the new production to the markets. Indeed, "if the production does grow in the manner in which it is predicted to grow, there is a need for additional transportation in order to bring the oil that would be produced to market."⁵³ According to NEB estimates, the current system of pipelines is expected to reach full capacity in 2007, which is why something must be done very quickly about the distribution on certain pipelines or to increase transport capacity by building new pipelines. At present, bitumen and synthetic crude are marketed primarily in Chicago, and to a lesser extent in Colorado and Washington State. To maximize economic performance, producers need markets that are as diversified as possible.

⁵⁰ *Committee Evidence*, 21 November 2006.

⁵¹ Canadian Association of Petroleum Producers, *Committee Evidence*, 2 November 2006.

⁵² Michael Raymont, EnergyInet, *Committee Evidence*, 26 October 2006.

⁵³ Jim Donihee, National Energy Board, *Committee Evidence*, 24 October 2006.

Numerous pipeline projects are currently under development, and once some are completed it should generate sufficient capacity in the next few years to transport bitumen and synthetic crude. One of these projects is a major increase in the capacity of the Trans Mountain Pipeline, which runs from Alberta to Vancouver. This will make it possible to send larger quantities of oils sands production to refineries in the Puget Sound region of Washington State. Other projects involve the Chicago region that will send products to the U.S. Gulf States. Finally, a third area affected by the construction of new pipelines would be between southern Alberta and Wyoming and Colorado.⁵⁴

It is not enough to transport bitumen and synthetic crude; such products must also be refined. In this case, it is not the overall refining capacity that is the problem but rather whether refineries are equipped to process bitumen and produce synthetic crude. There are a number of projects under way in the United States and Canada to transform refineries in order to increase their capacity and ensure that they are able to process larger quantities of the product extracted from the oil sands. One example is the Petro-Canada refinery in Edmonton. It should be noted that no refineries have been built in Canada in 20 years or in the United States in 30 years, since the industry limited itself to increasing the capacity of existing refineries. Although questions still arise about the wisdom of investing in the construction of large refineries, some projects are under way, one in eastern Canada and the other in the West.⁵⁵ The decisions that are made about pipelines and refineries essentially are related to the capacity of the markets to absorb oil sands production if it is more than 2 million barrels a day higher than current production levels.

The industry in Canada already upgrades 800,000 barrels a day out of a total production of 1.1 million barrels or some 72% of total production . The plans to expand existing plants and to build 10 new upgrading facilities should give Canada a domestic upgrading capacity of 3 million barrels, which would be sufficient to transform roughly 85% of an estimated production of 3.5 million barrels a day. While not all oil sands upgrading will be done in Canada, industry representatives told the Committee that the vast majority should continue to be done here.⁵⁶ However, it should be noted that the processing or upgrading currently done in Canada is basic, being limited to transforming bitumen, the least valuable product, into synthetic oil. Some feel that there is no reason we could not refine synthetic oil to produce gasoline, diesel and other petrochemical products.⁵⁷

⁵⁴ Howard Brown, Energy Policy Sector, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

⁵⁵ Ibid.

⁵⁶ Canadian Association of Petroleum Producers, *Committee Evidence*, 2 November 2006.

⁵⁷ Michael Raymont, Energylnet, *Committee Evidence*, 26 October 2006.

Increase in the consumption of natural gas

Along with the use of water and reduction of emissions, the use of natural gas in the extraction and processing of oil sands represents one of the greatest challenges facing the industry. Some of those who appeared before the Committee were quite categorical about the increased use of natural gas for the development of oil sands deposits. For example, Mr. Michael Raymont of Energylnet feels that using natural gas as a fuel in oil sands development is “like turning gold back into lead.” In fact, the natural gas used as a fuel to extract and upgrade bitumen is a relatively clean fuel. It is used in the oil sands primarily for historical reasons, that is, because there was an abundance of gas in this region 40 years ago. Today, however, we realize that this fuel can be put to better use, particularly given the price levels in recent years. The need to find an alternative to natural gas is made all the more pressing by the belief that there might not be enough to produce the projected three to five million barrels a day from the oil sands.⁵⁸

Current estimates say that it takes between 500 and 1000 cubic feet of gas to produce a barrel of synthetic oil, depending on the quality of oil that is produced. In monetary terms, it takes between \$3.50 and \$7.00 worth of gas to produce a barrel of oil. According to the Canadian Association of Petroleum Producers, natural gas is the most important operating cost in an oil sands plant, which is why the industry is looking for replacement fuels. NEB projections indicate that natural gas requirements for the industry could reach 2.1 billion cubic feet a day in 2015, compared to the 0.7 billion cubic feet a day used in 2005.⁵⁹ From a broader perspective, primarily that of North American consumption of natural gas, Natural Resources Canada estimates that the oil sands currently represent roughly 1% of total consumption in North America and predicts that this percentage will remain relatively stable over the next 15 years. The Department does not feel that 1% is a negligible amount by any means, but it is felt that this is not a sufficient quantity to have a decisive impact, positive or negative, on the natural gas market.⁶⁰ While the impact of the general natural gas market was not part of the study, the Committee recognizes that there could be an impact on the use of other fuel choices if the 2.1 billion cubic feet per day of natural gas was available for other uses.

In addition to strictly economic considerations, other elements are likely to influence the pace of development and replacement of natural gas, particularly future environmental and atmospheric emissions regulations. Already, a number of technological solutions are being studied to replace natural gas in the production of steam for *in situ* development projects or of hydrogen for upgrading bitumen. Aside from cogeneration, which generates steam and electricity at the same time, one of the most promising technologies mentioned before the Committee is gasification, of coke, coal or bitumen

⁵⁸ Ibid.

⁵⁹ Jim Donihee, National Energy Board, *Committee Evidence*, 24 October 2006.

⁶⁰ Howard Brown, Energy Sector Policy, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

residues. According to Dr. David Keith,⁶¹ gasification, with CO₂ capture and storage, is more competitive in oil sands operations—which require both heat and hydrogen—than in the electricity sector. Roughly speaking, gasification involves breaking materials down into their constituent elements in a closed system and reassembling these elements with other elements—such as oxygen—in order to make different products. If the gasification process generated a great deal of CO₂ during oil sands operations, it would be possible to separate this flow and then store it. In a recent report prepared for the Minister of Natural Resources Canada, gasification technologies were identified as the first of four major priorities, the second being storage, on which the federal government should focus its attention in energy research.⁶²

Gasification will soon be used in the Long Lake Project, where two companies, Opti and Nexen, have begun building *in situ* oil sands development facilities that will produce between 70,000 and 150,000 barrels a day. Natural Resources Canada says that gasification of residues, such as the coke that the industry is currently storing at development sites, is probably one of the most promising technological developments for processing residue with no other use into synthetic natural gas. In fact, the gasification of coal and residues is not a new technology, but it has been improved over time to the point that it is now more commercially viable. Many say that it would reduce the environmental footprint of oil sands development because of the capacity to extract carbon dioxide and certain other atmospheric pollutants (particulates, NO_x and SO_x, etc.).⁶³

Another possible replacement for natural gas that was mentioned several times during the Committee's hearings is using nuclear energy to produce steam and electricity. The Committee heard from one of the proponents of this approach, Mr. Wayne Henuset of the Energy Alberta Corporation.⁶⁴ According to its proponent, nuclear energy has the advantage that it does not emit CO₂ and would be cost competitive with natural gas. If the regulatory process to authorize a CANDU 6 plant began in spring 2008, it would take another eight years, or until 2016, before it was fully operational. The energy produced by such a plant, which could produce some 740 megawatts of electricity, would be sold either through direct agreements with an off-taker or through an open bidding process.

⁶¹ University of Calgary; *Committee Evidence*, 7 December 2006.

⁶² Angus Bruneau, National Advisory Panel on Sustainable Energy Science and Technology, *Committee Evidence*, 7 December 2006.

⁶³ Howard Brown, Energy Sector Policy, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

⁶⁴ Wayne Henuset, Energy Alberta Corporation, *Committee Evidence*, 7 December 2006.

Some feel that the nuclear option has its share of drawbacks, and that is not even considering the question of how to manage the resulting radioactive waste. First, they point out the limitations on the distribution of hot water or steam over great distances. Thus, hot water could be sent over roughly 75 kilometres, but steam over only 25 kilometres. As well, it is estimated that a plant of roughly 600 megawatts could supply a processing plant producing 60,000 barrels of synthetic crude oil a day. Given that, it would take almost 20 reactors to meet the forecast production needs as of 2015.⁶⁵ For others, the main problem is that classic nuclear plants are too big for oil sands development and that smaller plants would have to be considered, on the order of 100 megawatts, a size better adapted to the characteristics and needs of individual oil sands development projects.⁶⁶ Others think that gasification technology, coupled with CO₂ capture and storage, is more competitive than nuclear energy for the oil sands. This is because it can generate hydrogen, which nuclear energy cannot do as cost effectively.⁶⁷

Based on the evidence heard, the Committee recommends specifically that Natural Resources Canada, together with its various partners, step up its R&D efforts to stimulate innovation in the area of replacing natural gas with clean sources as regards greenhouse gases in the extracting and processing of oil.

The Committee further recommends that the government implement a joint public/private task force to find solutions as quickly as possible to reduce the use of natural gas in oil sands production, thereby conserving this resource for a more valuable use.

Furthermore, the Committee recommends that no decision be made on using nuclear energy to extract oil from the tar sands until the repercussions of this process are fully known and understood.

The introduction of new technologies

The solution to many of the challenges facing the oil sands industry, such as replacing natural gas in extraction and processing, reducing emissions and reducing the impact on water, will require the development and introduction of new technologies in the relatively short term. As mentioned previously, a number of these technologies are now beyond the research stage and are already pilot projects or semi-commercial facilities. The Committee heard convincing and enthusiastic evidence about the technological

⁶⁵ Ibid.

⁶⁶ Michael Raymont, EnergyInet, *Committee Evidence*, 26 October 2006.

⁶⁷ David Keith, University of Calgary, *Committee Evidence*, 7 December 2006.

possibilities in the oil sands sector. Some experts say that technology will be able to solve many of the problems, if it is used properly and if the government sends the right signals. Technological innovation could be the key to increasing oil sands production in a responsible manner. However, some obstacles remain and will have to be overcome quickly, primarily with government support.

Some feel that the innovation system is not working: “We put billions of dollars into the front end of research and development, and we are not seeing the benefits coming out the back end.” There are, the Committee was told, gaps in the main links of the “innovation chain,” such as in the transition from basic R&D to implementation, by building a pilot plant or demonstration plant or doing marketing; these are the essential elements in the under-funded portion of the innovation chain. Ideally, it should be three parts private investment to one part public investment. In Canada, the ratio is 1.18 to 1; something must therefore be done to encourage the private sector to do more R&D and improve this ratio.⁶⁸ Representatives of the oil industry told the Committee that the energy sector as a whole currently spends \$720 million a year on R&D, all activities included.⁶⁹ More specifically, companies in the oil and gas sector invest only 0.36% of their revenues in research and development,⁷⁰ which represents less than a tenth of the Canadian industrial average.

This Committee is concerned that the public sector has borne too great a proportion of oil sands research and development in comparison to the private sector. This Committee therefore calls upon the industry to increase its commitment to research and development to meet the Canadian industrial average, and further calls upon the federal government to shift its research focus to emerging renewable and sustainable technologies.

While federal spending on research and development in the energy sector has declined by 70% from its peak during the 1980s,⁷¹ the federal government, and Natural Resources Canada in particular, are nevertheless active in energy R&D. In fact, Natural Resources Canada has very clear responsibilities regarding research, development and innovation and has been active in this area for many years, particularly through the network of the Canada Centre for Mineral and Energy Technology (CANMET). One of the three main centres in the Energy Technology and Programs Sector (CANMET-CTEC), the Devon centre in the Edmonton region has concentrated on oil sands and crude oil since 1995. The Devon Centre, which has 80 to 120 scientists and engineers depending

⁶⁸ Michael Raymont, EnergyNet, *Committee Evidence*, 26 October 2006.

⁶⁹ Greg Stringham, Canadian Association of Petroleum Producers, *Committee Evidence*, 2 November 2006.

⁷⁰ Report of the National Advisory Panel on Sustainable Energy Science and Technology.

⁷¹ David Keith, University of Calgary, *Committee Evidence*, 7 December 2006.

on the projects, works in close cooperation with the industry and universities to resolve various problems and help ensure that the oil sands are developed in a more responsible fashion. Natural Resources Canada spent a total of \$212.9 million on research and development in 2005-2006, including \$81.7 million for the energy sector. In other words, some 40% of total R&D spending went to energy, including a significant proportion to projects with an environmental bent.⁷² At the CANMET Centre in Devon, over 90% of the R&D work is related to the environmental aspects of the oil sands, the goal being to develop new technologies that consume less energy, require less water, produce fewer emissions, etc. Some of this technology is already at the implementation stage.⁷³

While there is diverse opinion on the future development potential of the oil sands, an important question is: can innovation and technology keep pace with the frantic growth and development of the oil sands sector? Of course, the investment in research and development is designed, in part, to improve environmental performance, but the industry is also looking for a cost payout. Take greenhouse gas emissions; the industry will be inclined to invest primarily in energy efficiency, rather than CO₂ capture and storage, which does not necessarily have an economic benefit. On the other hand, if there is a clear signal from the government and some form of cost accounting for emissions reductions, the dynamics of investment in research and innovation may quite likely change as a result.⁷⁴

Many of those who spoke before the Committee feel that the government has an obligation to share the risks of innovation and implementing new technologies. That does not necessarily mean that the government must itself be involved in every facet of technological innovation, but it must at least find solutions to ensure that the risks assumed by the private sector are mitigated by certain government actions. There is no question that the government must do something to encourage companies that want to begin using new technologies and that want to make long-term investments by reducing the obstacles to innovation as much as possible.

On the basis of the evidence heard, the Committee recommends that Natural Resources Canada acknowledge and follow up on the first two priorities identified in the Report of the National Advisory Panel on Sustainable Energy Science and Technology, that is, gasification technologies and CO₂ capture and storage technologies.

Moreover, recognizing that the federal government plays a recognized and indisputable role in R&D, the Committee recommends that it

⁷² Howard Brown, Energy Policy Sector, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

⁷³ Hassan Hamza, CANMET Centre - Devon, *Committee Evidence*, 19 October 2006.

⁷⁴ Dan Woynilowicz, Pembina Institute, *Committee Evidence*, 2 November 2006.

maintain its participation as it relates to the various facets of oil sands development.

Apart from R&D, some of the evidence presented to the Committee showed that there are serious shortcomings in Canada's innovation system. Concrete measures must be developed and implemented, particularly in the energy and environmental sectors.

Environmental impacts

Alongside the constraints and challenges being faced by the oil sands industry, environmental impacts represent an equally great, if not greater, challenge in terms of the development of this huge resource. The main environmental challenges are impact assessment, greenhouse gas emissions and other pollutants, water use and treatment, land reclamation, etc. Although some technical advances have been made, much remains to be done to reduce the impact of extracting and processing the oil sands.

1. Federal and Provincial Government Assessment Processes

As previously described under the heading of the respective roles of the federal and provincial governments in developing the Alberta oil sands, environmental issues are a shared jurisdiction whereas natural resource management is a provincial jurisdiction. One of the federal government's roles is to conduct environmental impact assessments for a number of environmental activities and aspects. Thus the triggers for federal involvement in environmental impact assessment for oil sands development projects relate to protection of the environment, waterways, fisheries and Indian lands.

When they appeared before the Committee, representatives of the Canadian Environmental Assessment Agency (CEAA) explained that at the federal level, responsibility for assessments rested with the authority responsible for the decision on the project under review. For oil sands development projects, it is mainly Fisheries and Oceans Canada and Transport Canada that intervene, whereas Environment Canada, Natural Resources Canada and Health Canada act as experts to contribute to the analysis process. In 1993, the federal government signed the "Canada-Alberta Agreement for Environmental Assessment Cooperation", under which a single joint assessment allows both authorities to discharge their legal obligations by pooling information required by the developer and to hold public hearings, where applicable. This form of "one-stop shopping" mainly prevents duplication, with each government retaining legislative authority in their areas of jurisdiction and remaining responsible for environmental assessment decisions.⁷⁵ At the provincial level, Alberta Environment and

⁷⁵ Canadian Environmental Assessment Agency, *Committee Evidence*, 5 December 2006.

the Alberta Energy Utilities Board contribute to this harmonization process in oil sands development projects.

According to the CEAA, the review of environmental impacts also includes the cumulative environmental impacts that the project, together with other projects or activities, may cause to the environment. It also factors in or recommends measures that are achievable both technically and economically to mitigate significant negative environmental impacts of a project. Under federal environmental assessment regulations, oil sands development projects of over 10,000 m³ per day are automatically subject to a comprehensive study, and if the Minister responsible requires, a review panel. To date, the Millennium Project was comprehensively studied in 1998, whereas the more recent Jackpine, Horizon, Kearl and Muskeg projects were assessed by a joint review panel. With the exception of the Kearl project, on which the panel is to report in March 2007, the Jackpine, Horizon and Muskeg projects all received the approval of the panels assigned the task of assessing them, but were subjected to a series of requirements and conditions such as monitoring fish and sedimentary organisms, as well as water quality and the health of Aboriginal populations affected by these projects.

Although the question of the cumulative impact of all oil sands development projects was taken into account in the federal and provincial assessment processes, hearings held by the Committee revealed a degree of perplexity among several stakeholders both about the role of each government authority and the comprehensiveness of this stage of the assessment process. Several witnesses suggested that in terms of the assessment of cumulative impacts, the authorities tended to give too much credence to others and hence to restrict their level of involvement in this area. Some felt that the scope of the assessments had been very narrow in the past, so much so that the federal government is not involved in an assessment process that would truly factor in all of the impacts, including transborder pollution, greenhouse gases, etc.⁷⁶ However, as Dr. Mary Griffiths of the Pembina Institute pointed out, "That's where the federal government still does have a role, and maybe it could exercise that role with more enthusiasm than has been apparent in the past. [...] At the moment, a lot of it is discretionary. Sometimes the Department of Fisheries and Oceans will not take such a powerful opportunity as they might, because of the discretion. I think there's been reluctance by the federal government to get too involved."⁷⁷

Part of the problem with assessing cumulative impacts probably stems from the existence of the Cumulative Environmental Management Association (CEMA), a multipartite, consensus-based organization of representatives from industry, environmental groups, Aboriginal peoples, and municipal, provincial and federal governments. The mandate of this broad group is to try to assess cumulative

⁷⁶ Dan Woynillowicz, Pembina Institute, *Committee Evidence*, 2 November 2006.

⁷⁷ Mary Griffiths, Pembina Institute, *Committee Evidence*, 9 November 2006.

environmental impacts throughout the Wood Buffalo region. Some feel that one of the CEMA's problems is that it works within a multisectoral, multi-stakeholder mechanism that requires consensus.⁷⁸ Moreover, there is nothing to indicate that the CEMA has a legislative mandate, because it is a not-for-profit non-government organization that was established in June 2000 to provide a forum to various stakeholders who wanted to discuss development-related environmental problems with a view to resolving them.⁷⁹

Despite the CEMA's role and the important contribution of its work to date, the Committee's view is that its role is *complementary* to the legislative responsibilities of the federal and provincial governments with respect to the assessment of cumulative impacts.

In view of the level of development reached in the Wood Buffalo region and the many projects that are either already underway or planned, the Committee recommends that the federal government, working together with the Government of Alberta, undertake a comprehensive assessment of the cumulative impacts of oil sands development projects already underway and planned for the future. The Committee further recommends that the federal government, through in-house resources or through a specific mandate to an organization, conduct a full and detailed assessment of the socio-economic and environmental impacts of oil sands activities, analogous to the macroeconomic analysis conducted by the Canadian Energy Research Institute (CERI) to cover a 20-year period (2000-2020).

⁷⁸ Jim Vollmershausen, Mackenzie River Basin Board, *Committee Evidence*, 9 November 2006.

⁷⁹ Judy Smith, Cumulative Environmental Management Association (CEMA), *Committee Evidence*, 5 December 2006.

Moreover, this Committee calls upon the Government of Canada to employ existing legislation such as the *Canadian Environmental Protection Act (CEPA)* and the *Canadian Environmental Assessment Act (CEAA)* in a more comprehensive way to address such environmental concerns as trans-boundary air pollution, greenhouse gas emissions, and harm to waterways and fisheries. Use of such legislation should, wherever possible, be done in cooperation with the province, and should respect areas of provincial jurisdiction.

In the fall of 2006 the Government of Alberta launched a multilateral consultation on the oil sands with the federal government as a participant. It has been argued that this constitutes a high-level regional environmental assessment on the basis of which the Alberta government is attempting to determine the impact of development in the northern part of the province. Clearly the findings of the research and consultations conducted by the Oil Sands Multi-stakeholder Committee would make a genuine contribution to an exhaustive assessment of the cumulative impacts of oil sands development projects.

2. Greenhouse Gas Emissions

The major environmental concern with respect to oil sands development, apart from issues related to the use of water, are greenhouse gas emissions and other pollutants. Indeed, increased production of bitumen and synthetic crude oil over the last decade has led to a substantial increase in emissions, making this industry sector the most rapidly growing source of emissions in the country. Scenarios in which production is scheduled to accelerate over the next 10 to 15 years are worrisome unless measures to reduce emissions are put in place.

Owing to the amount of energy required to extract bitumen from the oil sands and increase its quality in order to produce synthetic oil, the volume of pollution attributable to the greenhouse gases released per barrel is approximately three times higher for the oil sands than for the production of conventional oil. The production of greenhouse gases is not solely the result of heavy energy consumption, but also from the vapour released from solvents used to mobilize the oil. Some of these solvents act as a catalyst on global carbon dioxide emissions.⁸⁰ In view of the significant planned increases in oil sands production, this resource is the most rapidly growing source of greenhouse gas emissions. According to the Pembina Institute, the oil sands could account for half of the increase in greenhouse gas emissions in Canada between 2003 and 2010.⁸¹

⁸⁰ Hassan Hamza, CANMET Energy Technology Centre—Devon, Natural Resources Canada, *Committee Evidence*, 19 October 2006.

⁸¹ Dan Woynilowicz, Pembina Institute, *Committee Evidence*, 2 November 2006.

At the moment, the Pembina Institute estimates greenhouse gas emissions in 2005 at approximately 37 megatonnes, compared to 23 megatonnes in 2000; in fact, emissions have doubled since 1995.⁸² According to the NEB 2006 update, total emissions could reach 67 megatonnes per year by 2015—some say that this level will be reached by 2010—if production reaches 3 to 3.5 million barrels per day.

Significant progress has been made in reducing the intensity of greenhouse gas emissions by oil sands operators. Indeed, the intensity of greenhouse gas emissions per barrel of oil produced decreased by more than 20% between 2000 and 2005, but this was offset by the overall increase in production, as a result of which the total volume of greenhouse gases emitted into the atmosphere has continued to increase each year.⁸³ Even though the industry is continuing to improve the energy efficiency of its bitumen extraction and processing methods, including by reducing or replacing the use of natural gas, there appears to be agreement about the fact that it is essential to introduce CO₂ capture and storage technologies to reduce overall greenhouse gas emissions.

3. Carbon Dioxide Capture and Storage

The capture and storage of sulphur in treatment processes is already being successfully practised at a number of facilities, as evidenced by the huge piles of solid sulphur observed by members of the Committee at the Syncrude operations site. A number of observers feel that CO₂ capture and storage technologies have reached a level of maturity that would justify their use on a large scale. Nevertheless, some barriers remain to be overcome, both economically and technically.

According to Natural Resources Canada, there are now commercially viable CO₂ capture and underground storage processes because the underground storage of carbon dioxide increases the recovery rate of oil from wells, which largely offsets the additional cost. The Department has been working closely with several other government, industry and academic partners on in the Weyburn Saskatchewan International Energy Agency (IEA) project to monitor and store carbon dioxide, which is now in the second phase. This major project involves injecting a considerable quantity of carbon dioxide in the subsoil to significantly increase oil production. For this project, however, the CO₂ comes from U.S. coal gasification facilities in North Dakota, which is leading many observers to believe that the same could now be done in Alberta by capturing CO₂ from the oil sands.

In the specific case of the oil sands, the CO₂ capture technology already exists, but the gases emitted from the stacks are already at atmospheric pressure, and there is also the risk that compressing it into a usable form could produce CO₂; it is also a very costly process. In fact, the industry feels that it could cost \$50 to \$60 per tonne, and companies

⁸² According to data from the NEB and the Pembina Institute.

⁸³ Jim Donihee, National Energy Board, *Committee Evidence*, 24 October 2006.

involved in enhanced oil recovery say that they cannot pay more than about \$20 to \$25 per tonne.⁸⁴ It is therefore necessary not only to improve CO₂ capture technology at source, but also to send large quantities to the sites where it will be used.

According to the NEB, a special dedicated CO₂ pipeline from Fort McMurray to major deposits of light oil or coal gas (natural gas) in central Alberta to encourage the capture, storage and use of large volumes of CO₂ is necessary to enhance the extraction of oil and gas, for example in the oil fields of Pembina or Midale (Williston Basin). There have been various proposals for the construction of such pipelines, including those from Penn West, Apache, and Kinder Morgan. Once the CO₂ has been transported to the emission sites where they would be used, there is a risk of rapidly reaching the usable capacity in the enhanced recovery of oil and natural gas deposits. The evaluation carried out by the Alberta Geological Survey reports the cumulative capacity of Western Canadian reserves at 3.2 Gt of CO₂ for gas deposits and 560 Mt for oil deposits.⁸⁵ That is why many studies have looked into various forms of straightforward CO₂ storage deep underground.

The UN Intergovernmental Panel on Climate Change (IPCC) considers the capture and storage of CO₂ to be an interesting option among the mitigating measures to stabilize the concentration of greenhouse gas in the atmosphere. According to IPCC, current methods could capture from 85 to 95% of the CO₂ processed in a capture facility, but in order to do so, 10 to 40% more energy would be required to capture it and compress it. In the context of an in-depth analysis of CO₂ capture and storage techniques, and of sequestration options around the world, the IPCC found that deep saline aquifers were preferable because the carbon dioxide chemically changes with saline water, becoming denser and sinking to the bottom. So the risks of having any of it come back to the surface and presenting a hazard or contributing to greenhouse gas emissions again, would be very low.⁸⁶

According to various witnesses heard by the Committee, the geology of the western sedimentary basin would appear ideal for the permanent sequestration of CO₂, particularly in deep saline aquifers. However, this approach has a high cost to the industry; hence the urgent need to find mechanisms that would enable the private sector to internalize these external factors. The Pembina Institute is very interested in the potential represented by the capture and storage of CO₂. In a recent report⁸⁷ the Institute reports an analysis of what it would cost oil sands operators to make their development carbon neutral or to achieve zero net greenhouse gas emissions by 2020. According to

⁸⁴ Canadian Association of Petroleum Producers, *Committee Evidence*, 2 November 2006, and National Energy Board, 24 October 2006.

⁸⁵ Michael Raymont, Energylnet, *Committee Evidence*, 26 October 2006.

⁸⁶ Dan Woynillowicz, Pembina Institute, *Committee Evidence*, 2 November 2006.

⁸⁷ *Carbon Neutral by 2020: A Leadership Opportunity in Canada's Oil Sands*, Dan Woynillowicz, Pembina Institute, *Committee Evidence*, 2 November 2006.

the Institute's estimates, it would cost between US\$1.76 and \$13.65 per barrel for carbon neutral production to be achieved, and this is without including the possible sources of revenue related to enhanced oil recovery or the likely cost reductions that would stem from improvements in technology after companies begin to use it.

The industry is showing a keen interest in this technology, as evidenced by the establishment in 2005 of the "Integrated CO₂ Network", or ICON Group, an alliance of 12 major Western oil and gas companies, to study a large-scale project on sequestration in geological formations (underground saltwater groundwater deposits and depleted oil and gas reservoirs). CO₂ captured and stored in this manner would not come solely from oil sands extraction processes, but also from coal, oil and natural gas electrical generating stations, in addition to refineries and other oil and gas processing centres. The group feels that the project being studied could store approximately 20 megatonnes of CO₂ per year, but adds that the main barrier to the implementation of the technology is the high cost, estimated at between \$30 and \$50 per tonne of CO₂. The evidence heard by the Committee made it clear that the industry was not prepared to assume the costs of implementing the CO₂ capture and storage technology by itself. The industry believes it essential to establish a mechanism to encourage the implementation of such technologies, whether through grants, the sale of carbon credits or any other analogous mechanisms.⁸⁸

Furthermore, alongside the introduction of CO₂ capture technologies, the sequestering of atmospheric CO₂ in forests and underground ought not to be neglected. As the representative of the BIOCAP Canada Foundation argued, it has been estimated that at least 30 million tonnes of CO₂ equivalents could be stored in this way by 2050.⁸⁹

The Committee therefore recommends that the Government of Canada continue to fund government, university and industrial research into important carbon sequestration measures such as improved forest management, agricultural and landfill practices, the use of algae, and the use of biomass as fuel.

In addition, the Committee strongly endorses the goal of the Pembina Institute that the oil sands should become carbon neutral by 2020 through the adoption of new technologies such as carbon capture and sequestration, and/or through the purchase of offsetting carbon credits. Furthermore, this Committee believes that being able to sell a "carbon neutral" barrel of oil will help the industry to maintain access to markets where there is concern about greenhouse gas emissions.

⁸⁸ "Integrated CO₂ Network" (ICON Group), *Committee Evidence*, 12 December 2006.

⁸⁹ David Layzell, BIOCAP Canada Foundation, *Committee Evidence*, 12 December 2006.

The Committee further recommends that the federal government introduce a regulatory framework that would place constraints requiring the industry to introduce technologies to drastically reduce greenhouse gas emissions, along with mechanisms such as emission credits trading, as incentives for financing these technologies.

Moreover, the Committee believes that any future expansion of oil sands development should be done in a way that it does not jeopardize Canada's international Kyoto obligations on GHG emissions and climate change. We call upon the federal government, in keeping with an emissions reduction strategy for large final emitters, to introduce hard emissions caps for the oil sands for 2008 to 2012, 2020 and 2050, based on absolute levels and not based on "intensity."

Not everyone shares the same vision about who should pay for the capture and storage of CO₂. Some argue that in view of the oil and gas industry's record profits in 2005, and the capacity for innovation in terms of technology and performance, it has demonstrated in the past that it could cope with economic and environmental challenges, and therefore that the industry has no choice but to meet the challenge of CO₂ sequestration and storage. Many of the witnesses heard by the Committee also mentioned the accelerated capital cost allowance available to the oil sands industry.

4. Fiscal Treatment of the Oil Sands

The Government of Canada does not directly subsidize oil sands activities. It does however assist the industry by providing tax incentives that encourage investment and development. The Committee heard convincing testimony that capital investments in oil sands mines and *in situ* oil sands projects are treated preferentially relative to the broader energy sector. In particular, oil sands investments benefit from the *accelerated* capital cost allowance, similar to mining operations.

The capital cost allowance (CCA) is a non-refundable tax deduction that reduces taxes owed by permitting the cost of business-related assets to be deducted from income over time. CCA rates are generally set to reflect the economic life of assets. Most capital assets used in the extraction and processing of conventional oil and gas can be deducted at a rate of 25% per year on a declining balance basis.⁹⁰

⁹⁰ This method involves applying the CCA rate to the undepreciated capital cost of an asset, or group of assets from the same class, at the end of each year.

Oil sands investments, however, benefit from an accelerated capital cost allowance rate of 100%. In practice this means that no federal corporate income taxes are paid on the income that flows from new oil sands projects until all eligible capital costs associated with those projects are first written off for income tax purposes. It is important to recognize that accelerating the capital cost allowance for oil sands investments results in a deferral of taxes payable. It does not change the overall level of tax that is payable. The tax expenditure then is the cost to the federal government of having taxpayers claim deductions sooner rather than later. In others words, the tax expenditure is a function of the time value of money. But by allowing oil sands capital investments to be depreciated in this accelerated manner, the federal government is providing an important stimulus for investing in the oil sands and deferring tax revenue in a temporary manner.

The Committee therefore recommends that the government of Canada eliminate the accelerated capital cost allowance currently applicable to the oil sands industry in order to place it on an equal footing with the broader oil and gas industry.

5. Use of Water

Fort McMurray and the Athabasca River are part of the vast watershed of the Mackenzie River, which covers an immense area of 1.8 million square kilometres, or one sixth of Canada's surface area. However, the population is only 360,000. Unlike most of the major river basins of the world, where development and populations are found mainly downstream, close to the mouths of the rivers, the development of the Mackenzie basin is occurring upstream. The Wood Buffalo and Fort McMurray region is without a doubt the region undergoing the most intensive development in recent years.

Generally speaking, the use of water in the oil sands has become an issue because of the large quantities of water required to extract and process bitumen. And yet, the Pembina Institute was also keen to point out that oil sands mining—the most visible of the oil sands activities—which has a very strong impact on rivers and wetlands, first requires that wetlands be drained before removing the surface layers to expose the bitumen. Likewise, the bottom aquifer, which is the layer of water below the bitumen, must also be drained to avoid flooding the mines. This procedure can therefore lead to a considerable reduction in the amount of water and surface area of wetlands in the region.

Nevertheless, according to the Institute, the most water is used by the processes that extract bitumen from the sands and that produce synthetic crude oil. In fact, although bitumen only accounts for approximately 10 to 12% of the total quantity of mined material, two to four and a half barrels of water are nevertheless required, even with water

recycling, to produce one barrel of synthetic crude.⁹¹ Most—two thirds in fact—of all water removed from the Athabasca River is for oil sands recovery; hence its enormous importance in supplying water to the industry. For example, it has been estimated that operations currently under way use as much water as the City of Calgary, which has a population of approximately one million.⁹² If projects that are at the planning stage are added to the existing projects, then the amount of water used would be approximately the same as for the City of Toronto, and this is only for oil sands mining operations. Also according to the Pembina Institute, less than 10% of this water is returned to the Athabasca River and people are wondering whether there is enough water in the river to provide the flow required to keep the aquatic ecosystem healthy, particularly in view of the very low flow rate in winter which can vary significantly from one year to the next.

In view of the inability of the Cumulative Environmental Management Association (CEMA) to determine the flow requirements for the river prior to January 2006, the Alberta Department of the Environment had to establish a provisional framework for flow requirements and water management over the lower portion of the Athabasca River. The framework established a number of flow thresholds, potential environmental impacts and management requirements, but it has not yet been implemented. The most recent draft, dated July 10, 2006, to which Fisheries and Oceans Canada contributed, is considered inadequate by Aboriginal and environmental groups because the framework would still allow the removal of water from the Athabasca River, even when there is a serious risk involved. New water allocation decisions could well be taken even though no sound water management framework is yet in place.

Some are also worried by the impact of drainage from the Athabasca River into the Peace River and Athabasca River delta, the largest boreal delta in the world and one of the largest nesting and rest areas for waterfowl in North America. According to the Pembina Institute, “More research is needed to determine how the oil sands activities actually impact on the ecosystem and also on the aboriginal fishing in the delta.”⁹³

In addition to the removal of water from the Athabasca River, the issue of residual water remains a concern to a number of witnesses heard by the Committee. According to Dr. Mary Griffiths of the Pembina Institute, only a small percentage of the water taken from the Athabasca River would be returned to it, with most of the water diverted to tailings ponds. Some people argue that it is difficult to talk about tailings ponds because the tailings catchment area covers approximately 50 km² (5,000 hectares).⁹⁴ The National Energy Board also considers tailings management a major challenge, because once the

⁹¹ NEB, *Canada's Oil Sands: Opportunities and Challenges to 2015: An Update, An Energy Market Assessment*, June 2006.

⁹² Twice as much if the projects that have been approved are added.

⁹³ Mary Griffiths, Pembina Institute, *Committee Evidence*, 9 November 2006.

⁹⁴ *Ibid.*

bitumen has been separated out, much of the water becomes contaminated with residual sand and bitumen as well as related contaminants. Specialists from the CANMET Energy Technology Centre in Devon have described the process as follows:

The problem is that while the sand in the waste stream settles rapidly when it's dumped into the pond, the clay stays suspended, and over about three years it forms a thin sludge called mature fine tails, which is why they're called tailings ponds. This is about the consistency of ketchup, and it doesn't settle any further. The water in these ponds is much saltier than river water, and it is toxic, due to the presence of naphthenic acids, although this toxicity does disappear with time, as natural bacteria break down the naphthenic acid molecules, usually over one or two years.⁹⁵

It is therefore essential that water from the tailings ponds does not get into the groundwater or the soil. The introduction of new technologies designed to reduce the volume of water used in bitumen extraction is therefore key. For about 15 years now, the CANMET Energy Technology Centre in Devon has done a great deal of research into tailings. For example, it made an active contribution to the "Fine Tails Fundamental Consortium", a joint initiative over five years at \$3.8 million per year, which resulted in a method for treating composite tailings that produce mud with a lower water content. Experiments on consolidated tailings did succeed in the reclamation of approximately ten hectares on which a few plants are growing, but could not guarantee the rehabilitation of the boreal forest and natural peat bogs that were there prior to development. As to the use of bitumen extraction processes that produce composite tailings or dry tailings, Mary Griffiths of the Pembina Institute noted that it may take until the year 2030 before any breakthroughs are made or any alternatives to bitumen extraction using water.⁹⁶

The issues are somewhat different for *in situ* oil sands operations. Although these at the moment account for only a third of bitumen production in Alberta, these methods will certainly increase gradually in the longer term because a high percentage of bitumen is located too deep for mining. According to NEB baseline forecasts, net volumes of bitumen produced by open pit mining, *in situ* thermal separation and *in situ* non-thermal primary recovery will respectively account for 52%, 44% and 4% of production by 2015.⁹⁷ *In situ* production uses a great deal of water to produce the steam that is injected into the bitumen to heat it and soften it so that it can be pumped to the surface. However, the water used for this purpose comes mainly from underground saline phreatic water and soft groundwater at low depth. The problem is that knowledge of the aquifers is still very still fragmentary, not only in Canada but in Alberta as well—with the possible exception of the Paskapoo aquifer, which is what has led the Pembina Institute to say that we do not

⁹⁵ Margaret McCuaig-Johnston, Energy Technology and Programs Sector, Natural Resources Canada, Committee Evidence, 9 November 2006.

⁹⁶ Mary Griffiths, Pembina Institute, *Committee Evidence*, 9 November 2006.

⁹⁷ NEB, *Canada's Oil Sands: Opportunities and Challenges to 2015: An Update, An Energy Market Assessment*, June 2006.

have enough baseline data to be able to determine the impact of *in situ* operations on groundwater. In view of the significant drainage that would be required for wetlands prior to mining, and potential climate changes, there are serious concerns about the rate at which shallow soft water aquifer levels can be restored. The Geological Survey of Canada, which falls under the Department of Natural Resources, has conducted in-depth research and done detailed mapping of the whole Northern Alberta area in order to acquire a better understanding of what is happening with aquifers and groundwater. However, it is the provinces' responsibility to supervise and monitor groundwater.

The Committee therefore recommends that Natural Resources Canada, through the Geological Survey of Canada, and working together with the province, ramp up and accelerate work on research into aquifers in Alberta, particularly in the current and potential oil sands operations areas.

Pilot projects to reduce the use of water have attempted to use a mixture of solvents and steam. The "toe to heel air injection" (THAI) process that burns the bitumen *in situ* to heat it up, and then uses the heat from the residual burn to heat up adjacent bitumen, which melts. However, it is still too early to establish whether these techniques can be used.

The water recycling rates from oil sands extraction and treatment processes varies from 50 to 80% in mining operations and can reach as high as 90% and over in *in situ* recovery when the water is treated to make dry saline waste and cleaner water for steam generation.⁹⁸ The industry has certainly made significant progress in reducing its use of water. For example, Suncor has doubled production over the past five years without increasing its water consumption.⁹⁹ Similarly, Syncrude has reduced its water consumption by 60% since the early 1980s through, for example, the on-going implementation of better ways of recycling, monitoring, maintaining and retrofitting equipment. Syncrude now imports 2.3 cubic metres of water from the Athabasca River per cubic metre of crude oil produced, which is less than half of the industry average and the lowest water intake rate in the oil sands industry. At Syncrude's operations, every cubic metre of imported water is recycled 18 times.¹⁰⁰ As explained during the Committee's visit of Syncrude facilities in November 2006, such achievements in water recycling are possible since the company has had years to fill out its retention ponds from which it then takes used water for certain processes. New projects rely to a greater

⁹⁸ Margaret McCuaig-Johnston, Energy Technology and Programs Sector, Natural Resources Canada, *Committee Evidence*, 9 November 2006.

⁹⁹ Gordon Peeling, Mining Association of Canada, *Committee Evidence*, 31 October 2006.

¹⁰⁰ Don Thompson, Syncrude, *Performance & Potential: Report Card on Syncrude's Management of Environmental & Socio-Economic Issues*, Presentation before the Committee in Fort McMurray, 20 November 2006.

degree on water taken from the Athabasca River, at least until sufficient quantities of water have accumulated in associated retention ponds and can then be recycled.

Real progress has been made by the industry, but in view of the pace of development being considered, the Athabasca River basin could encounter serious problems unless there is a radical change in technology in terms of water use. One promising example of a technology that uses virtually no water and less energy is the THAI process, mentioned by Dr. Michael Raymont. It uses underground combustion that is initially started by combustion gas and then carried along by air injection to improve the viscosity of the oil sands and make it possible to collect the bitumen through an underground pipe before pumping it to the surface.¹⁰¹

The evidence heard by the Committee clearly shows that the water issue remains crucial at several levels when it comes to developing the oil sands. The Committee is concerned about the impact of current and projected oil sands activity on water systems of the Athabasca River basin. It believes that it is imperative to reduce water consumption, and to deal with the processing of toxic wastewater in order to re-use it in industrial processes before returning it to the river. These are enormous challenges to the industry and to researchers.

Therefore, the Committee recommends that the federal government work together with its partners in the Governments of Alberta, Saskatchewan and the Northwest Territories, universities and industry to step up research in order to:

- **determine the true impact of oil sands activity on the Athabasca River ecosystem, as well as on Aboriginal fisheries in the Peace and Athabasca river delta;**
- **accelerate the treatment of toxic wastewater that has accumulated in the retention ponds so that these waters can be re-used in industrial processes and ultimately returned to the river; and,**
- **accelerate the introduction of technologies that will radically reduce the use of water in bitumen extraction and treatment processes.**

¹⁰¹ Michael Raymont, EnergyInet, *Committee Evidence*, 26 October 2006.

6. Land Reclamation

The very nature of oil sands means that developing them, whether by mining or the *in situ* method, causes incredible disruption to land and landscape over immense areas. For oil sands mining, the forest needs to be cleared and the covering layer of earth removed before the sands can be excavated. Estimates show that the disturbed area could be as extensive as 3,000 km². For *in situ* operations, landscape degradation may appear less severe, but the need to dig several wells and to build roads, pipelines and transmission lines requires the clearing of a considerable portion of the boreal forest. The impact on the landscape may seem to be less drastic, but the most serious impact is the fragmentation of habitat for both flora and fauna. This form of development could affect tens of thousands of square kilometres of boreal forest over the long term.¹⁰²

Therefore, the Committee recommends that the federal government, in partnership with the provincial government, assess the impact of all oil sands development projects on the boreal forest, and that it consider the introduction of compensatory conservation methods for the creation of protected areas in the region surrounding the oil sands, as well as in the broader region of the Mackenzie River watershed.

Under Alberta legislation, oil sands developers, in order to obtain the required permits, need to conduct an environmental impact study of their project and submit a detailed land reclamation plan to be implemented once the extraction of bitumen has been completed. Generally speaking, land reclamation means returning the layer of arable land after setting it aside prior to operations—and revegetating with trees, shrubs and other plants indigenous to the region. The process takes many years. Companies that conduct oil sands mining operations are also required to pay a performance bond equivalent to the cost of future land reclamation work.

Suncor and Syncrude have been pioneers in land reclamation, with Suncor beginning its reclamation activities in the 1960s. It is nevertheless a slow and long-term process because of the challenges involved. Fewer than 1,000 hectares of land have been rehabilitated by Suncor, and 4,500 hectares by Syncrude, which anticipates that work will have to be spread over 50 years to meet government requirements. A company official testified that Syncrude has made steady progress in recent years:

¹⁰² Bruce Friesen, Syncrude, and Alan Young and Matt Carlson, Canadian Boreal Initiative, *Committee Evidence*, 28 November 2006.

To summarize, at the Syncrude Mildred Lake site we are already reclaiming land more rapidly than we're disturbing land. We are drawing down the footprint of that site. At the pace we're currently reclaiming land, 260 hectares, about one square mile last year, we have about 50 years of work ahead of us. We have about 30 years of mining at that site, and after mining is finished, the reclamation has to be completed, perhaps another five or ten years' work. So it's a 35 or 40-year project. Working at the current pace, we'd get it done in 50 years. We really should pick up the pace a bit, but only a bit. We're pretty well where we ought to be.¹⁰³

For the time being, no certification from the Government of Alberta has been requested or granted for land reclamation; once certified, these lands would become public property once again. The Government of Alberta estimates that approximately 42,000 hectares of land have thus far been altered by oil sands mining.

Despite all the efforts and money spent by the industry in the field and on research, not everyone shares its optimism. Some feel that there has not yet been sufficiently large-scale reclamation to demonstrate that it is possible to restore diversified boreal ecosystems. There are also fears that once the groundwater and surface water circulates in rehabilitated areas where solidified residues have been incorporated into the landscape, there will be a risk of various toxic substances being released. There are therefore questions about the repercussions with respect to the long-term ecological viability of these sites after they are considered to have been rehabilitated. Fears have also been expressed about mature fine tails, because we do not yet know enough about how they can be effectively managed over the long term. At the moment, these sludges, which contain residual toxins, sink to the bottom of what is called kettle lakes, the water in which could flow into the Athabasca River. Some observers feel that oil sands are being developed over vast land areas without any demonstration of the effectiveness of reclamation methods.¹⁰⁴

While acknowledging the major commitment made by the CANMET Devon Centre to research reclamation issues, the Committee believes it is incumbent upon the industry itself to take the lead and to accelerate research and action in land reclamation, particularly with respect to the potential toxicity of tailings and water.

Social issues

Oil sands development produced unprecedented economic growth in the vast Fort McMurray region. There was no way to have predicted such rapid growth in development

¹⁰³ Bruce Friesen, Syncrude, *Committee Evidence*, 28 November 2006.

¹⁰⁴ Dan Woynilowicz, Pembina Institute, *Committee Evidence*, 2 November 2006.

projects since the end of the 1990s. In 1995, it was estimated that the very ambitious production target of a million barrels a day would be reached around 2020; it was in fact reached in 2004, 16 years ahead of schedule. While such a production level has a major economic impact on the region and Canada as a whole, it has also created equally significant upheavals on a municipal and social level. What is more, oil sands development is occurring in a region with a major Aboriginal presence.

1. Impact of oil sands activities on First Nations

The development of the oil sands has brought about an unprecedented economic boom to the Wood Buffalo region of Alberta. First Nations have been able to carve out some benefits from this economic activity. For example there are now employment and business opportunities for Aboriginal peoples where none existed previously. Some companies, such as Syncrude, are making a concerted effort to reach out to Aboriginal peoples and support their involvement in the oil sands industry. In 2005, the industry spent \$310 million in contracts to source goods and services within aboriginal businesses.

Unfortunately, the economic benefits that flow from the oil sands are not evenly distributed, and many residents of First Nations communities continue to live in poverty in spite of the region's tremendous wealth. The Committee heard poignant testimony to that effect from Pat Marcel, chair of the Athabasca Chipewyan First Nation elder's Committee. Mr. Marcel pointedly explained to the Committee that poverty persists in the Wood Buffalo region despite the billions in investments and rising oil revenues:

“[N]ear Canada's Athabasca oil sands, where purchases are measured in the billions and the average annual salary is approaching six figures, there is a group of people living as if they live not in Canada, but in a third-world country. To be clear, our elders are struggling to put food on the table while industry is getting their approvals and government is getting billions in royalties from our traditional lands.”¹⁰⁵

Mr. Marcel stated that the oil sands activities are also jeopardizing the traditional ways of the region's Aboriginal inhabitants and possibly endangering their health. Oil sands mining and *in situ* projects are taking up ever larger portions of First Nations' traditional territories and disrupting the landscape and ecosystem from which First Nations traditionally sustain themselves. There is also evidence that the Wood Buffalo region is increasingly polluted, such that the Aboriginal inhabitants “are afraid to eat the traditional foods that have sustained us for thousands of years.”¹⁰⁶

¹⁰⁵ Pat Marcel, *Committee Evidence*, 23 November 2006.

¹⁰⁶ *Ibid.*

While Aboriginal peoples in the Wood Buffalo region are deriving some economic benefits from oil sands activities, it is not clear whether such benefits compensate for the long-term social and environmental impacts of this very rapid industrialization. The Committee heard Mr. Marcel's plea "not to forget the people whose land it is they're getting the tar sands from and all the development there. They're my traditional lands."¹⁰⁷

This Committee endorses the plea of Pat Marcel not to forget the aboriginal peoples in the Wood Buffalo region whose traditional lands are impacted by oil sands development. The Committee strongly encourages industry and government to continue and expand consultations with residents, both aboriginal and non-aboriginal, whose communities are affected by these developments. Further, the Committee recommends that the federal government take necessary measures to improve living conditions for the aboriginal communities whose way of life has been impacted by extensive oil production on their traditional lands.

2. Social impact of oil sands activities

Just like the economic and environmental considerations, the local and social aspects also pose problems and enormous challenges for the communities at the heart of oil sands development. In addition to the labour availability issues raised earlier, there are equally important issues of the local infrastructure and social services that are often related intrinsically to other facets of the region's frenetic development. The Committee heard a great deal of evidence that provides perspective on the extent of the problems encountered in the Regional Municipality of Wood Buffalo.

The Regional Municipality of Wood Buffalo, which includes the town of Fort McMurray, has a population of over 80,000—not counting a shadow population estimated to be between 10,000 and 12,000—while the municipal development plan assumes a population of 52,000 in Fort McMurray. If the rate of growth continues for the next six years, a conservative estimate, it would mean that the population of Fort McMurray could almost double by 2012. The projects in recent years and those approved for the next few years thus exceed all the forecasts made in the municipality's plans, as was made clear by the Mayor of the Regional Municipality of Wood Buffalo:

¹⁰⁷ Ibid.

[...] we're spending \$160 million for a new waste water treatment plant that's going to open with an immediate need for expansion, and we're currently exceeding our production capacity. We have \$40 million for an expansion to the water treatment plant, which will reach capacity next year; \$107 million for a MacDonald Island recreation centre redevelopment; \$24 million for new landfill; and \$51 million for a new RCMP facility, and that budget, in fact, started at \$30 million for two facilities, not just one.¹⁰⁸

In addition, rental costs are the highest in Canada and real-estate costs are the highest in Alberta. It currently costs around \$485,000 for an average single-family home in the Fort McMurray region. The supply of new houses is considerably delayed by the lack of land and the shortage of construction workers. The regional municipality is experiencing traffic jams worthy of one of the country's major cities because of the lack of either public or private transportation infrastructures adapted to the new needs created by the rapid increase in activities.

Mayor Blake stated that, on a social level, the health-care system requires a 100% increase in the number of resident doctors, a new funding formula, a new continuous care facility and 150 additional staff members. The municipality needs more schools, more teachers and more educational resources, while the social programs, services and facilities do not meet current needs for daycare, substance abuse, domestic violence and homelessness services.

According to the NEB, \$1.2 billion in capital spending will be needed over the next five years to meet all of the region's public infrastructure needs.¹⁰⁹ The Mayor of the Regional Municipality of Wood Buffalo says that the municipality's capacity to respond to the basic infrastructure needs is stretched beyond its limits given the current pace of oil sands development. Without additional assistance, this simple reality threatens the sustainability of oil sands development. The problems and challenges are so great that the Council of the Regional Municipality of Wood Buffalo is now considering a delay in, but not a moratorium on, some oil sands development projects until adequate mechanisms can be established to ensure responsible development that benefits the people of Wood Buffalo, Alberta and Canada.¹¹⁰

The Committee was able to see the extent to which the accelerated development of the oil sands has had an impact on the Wood Buffalo region and how urgent it is to find adequate, concerted responses to the local and social problems created by the region's excessively quick growth. If it deems it advisable, the Government of Alberta

¹⁰⁸ Melissa Blake, Regional Municipality of Wood Buffalo, *Committee Evidence*, 23 November 2006.

¹⁰⁹ Jim Donihee, National Energy Board, *Committee Evidence*, 24 October 2006.

¹¹⁰ Melissa Blake, Regional Municipality of Wood Buffalo, *Committee Evidence*, 23 November 2006.

can work with the federal government and the Regional Municipality of Wood Buffalo to explore the best means available to them to improve the urban and social infrastructures that will be required in the long term to ensure the development of the oil sands and the well-being of the local populations.

CONCLUSION

The oil sands are an important economic and strategic advantage for Canada. The development of the industry has had positive economic repercussions in Alberta and, indeed, elsewhere in Canada. The rapid expansion of oil sands activities, however, has also given rise to a number of important challenges. Concerns about cost increases, labour shortages, greenhouse gas emissions, the growing use of precious natural gas, water use, cumulative environmental impacts and social impacts, have yet to be adequately addressed by the relevant levels of government.

It is clear to this Committee that stakeholders, including the federal government, must focus their efforts to address these important issues. A “business-as-usual” approach to the development of the oil sands is not sustainable. The time has come to begin the transition towards a clean energy future.

The development of the oil sands is a great Canadian technological and economic achievement. With the right mix of innovative policies and technologies, Canada could harness the energy that the oil sands offer and minimize the social and environmental impacts of oil sands activities, thus making the oil sands part of a clean energy future.

APPENDIX

Major greenhouse gas emitters—2004

Country	Greenhouse gas emissions (CO ₂ equivalent)	Percentage of total emissions
United States	7,068 Mt	23.9%
European Community	4,228 Mt	14.3%
China (1994)	4,057 Mt	13.7%
Russia	2,024 Mt	6.8%
Japan	1,355 Mt	4.6%
India (1994)	1,214 Mt	4.1%
Canada	758 Mt	2.6%
Australia	529 Mt	1.8%
WORLD TOTAL	29,600 Mt	

Source: United Nations Framework Convention on Climate Change (UNFCCC), 2005 and 2006 (http://unfccc.int/ghg_emissions_data/predefined_queries/items/3841.php).

Greenhouse Gas Emissions per Capita—2000

Country/Pays	GHG Emissions (tonnes CO ₂ equivalent)	World Rank
Qatar	67.9	1
United Arab Emirates	36.1	2
Kuwait	31.6	3
Australia	25.6	4
Bahrain	24.8	5
United States	24.5	6
Canada	22.1	7
Brunei	21.7	8
Luxembourg	21.0	9
Trinidad & Tobago	19.3	10
Russia	13.2	22
EU-25	10.5	37
Japan	10.4	39
China	3.9	99
India	1.9	140

Source: Kevin A. Baumert, Timothy Herzog and Jonathan Pershing, *Navigating the Numbers – Greenhouse Gas Data and International Climate Policy*, World Resources Institute, 2005, Chapter 4: Per Capita Emissions.

LIST OF RECOMMENDATIONS

RECOMMENDATION 1: (p. 14)

With respect to the role of governments, the Committee recommends that the federal government, specifically the Department of Natural Resources, base all of its actions in the area of oil sands development on sustainable development and polluter-pays principles.

RECOMMENDATION 2: (p. 14)

The committee also recommends that the federal government recognize the jurisdiction of the provinces with respect to the pace of development in the oil sands, and that it reject any suggestions of nationalizing the oil sands.

RECOMMENDATION 3: (p. 23)

Based on the evidence heard, the Committee recommends that the federal government, in cooperation with the Government of Alberta, renew efforts to fill the shortages of specialized and non-specialized workers in the oil sands sector.

RECOMMENDATION 4: (p. 23)

The Committee recommends that the Department of Natural Resources carry out a study and propose a human resources action plan to retain experts within the Department and mitigate the brain drain to the oil and gas industry. The Committee recommends that the federal government, and Natural Resources Canada in particular, develop and implement measures to ensure that the highly qualified scientific personnel needed to carry out its mission and its various mandates are retained and replaced when they leave.

RECOMMENDATION 5: (p. 28)

Based on the evidence heard, the Committee recommends specifically that Natural Resources Canada, together with its various partners, step up its R&D efforts to stimulate

innovation in the area of replacing natural gas with clean sources as regards greenhouse gases in the extracting and processing of oil.

RECOMMENDATION 6: (p. 28)

The Committee further recommends that the government implement a joint public/private task force to find solutions as quickly as possible to reduce the use of natural gas in oil sands production, thereby conserving this resource for a more valuable use.

RECOMMENDATION 7: (p. 28)

Furthermore, the Committee recommends that no decision be made on using nuclear energy to extract oil from the tar sands until the repercussions of this process are fully known and understood.

RECOMMENDATION 8: (p. 29)

This committee is concerned that the public sector has borne too great a proportion of oil sands research and development in comparison to the private sector. This committee therefore calls upon the industry to increase its commitment to research and development to meet the Canadian industrial average, and further calls upon the federal government to shift its research focus to emerging renewable and sustainable technologies.

RECOMMENDATION 9: (p. 30)

On the basis of the evidence heard, the Committee recommends that Natural Resources Canada acknowledge and follow up on the first two priorities identified in the Report of the National Advisory Panel on Sustainable Energy Science and Technology, that is, gasification technologies and CO₂ capture and storage technologies.

RECOMMENDATION 10: (p. 31)

Moreover, recognizing that the federal government plays a recognized and indisputable role in R&D, the Committee feels that it must maintain its participation as it relates to the various facets of oil sands development.

RECOMMENDATION 11: (p. 33)

In view of the level of development reached in the Wood Buffalo region and the many projects that are either already underway or planned, the Committee recommends that the federal government, working together with the Government of Alberta, undertake a comprehensive assessment of the cumulative impacts of oil sands development projects already underway and planned for the future. The Committee further recommends that the federal government, through in-house resources or through a specific mandate to an organization, conduct a full and detailed assessment of the socio-economic and environmental impacts of oil sands activities, analogous to the macroeconomic analysis conducted by the Canadian Energy Research Institute (CERI) to cover a 20-year period (2000-2020).

RECOMMENDATION 12: (p. 34)

Moreover, this Committee calls upon the Government of Canada to employ existing legislation such as the Canadian Environmental Protection Act (CEPA) and the Canadian Environmental Assessment Act (CEAA) in a more comprehensive way to address such environmental concerns as trans-boundary air pollution, greenhouse gas emissions, and harm to waterways and fisheries. Use of such legislation should, wherever possible, be done in cooperation with the province, and should respect areas of provincial jurisdiction.

RECOMMENDATION 13: (p. 37-38)

The Committee therefore recommends that the Government of Canada continue to fund government, university and industrial research into important carbon sequestration measures such as improved forest management, agricultural and landfill practices, the use of algae, and the use of biomass as fuel.

RECOMMENDATION 14: (p. 38)

In addition, the Committee strongly endorses the goal of the Pembina Institute that the oil sands should become carbon neutral by 2020 through the adoption of new technologies such as carbon capture and sequestration, and/or through the purchase of offsetting carbon credits. Furthermore, this committee believes that being able to sell a “carbon neutral” barrel of oil will help the industry to maintain access to markets where there is concern about greenhouse gas emissions.

RECOMMENDATION 15: (p. 38)

The Committee further recommends that the federal government introduce a regulatory framework that would place constraints requiring the industry to introduce technologies to drastically reduce greenhouse gas emissions, along with mechanisms such as emission credits trading, as incentives for financing these technologies.

RECOMMENDATION 16: (p. 38)

Moreover, the Committee believes that any future expansion of oil sands development should be done in a way that it does not jeopardize Canada’s international Kyoto obligations on GHG emissions and climate change. We call upon the federal government, in keeping with an emissions reduction strategy for large final emitters, to introduce hard emissions caps for the oil sands for 2008 to 2012, 2020 and 2050, based on absolute levels and not based on “intensity.”

RECOMMENDATION 17: (p. 39)

The Committee therefore recommends that the government of Canada eliminate the accelerated capital cost allowance currently applicable to the oil sands industry in order to place it on an equal footing with the broader oil and gas industry.

RECOMMENDATION 18: (p. 42)

The Committee therefore recommends that Natural Resources Canada, through the Geological Survey of Canada, and working together with the province, ramp up and accelerate work on research into aquifers in Alberta, particularly in the current and potential oil sands operations areas.

RECOMMENDATION 19: (p. 44)

Therefore, the Committee recommends that the federal government work together with its partners in the Governments of Alberta, Saskatchewan and the Northwest Territories, universities and industry to step up research in order to:

- determine the true impact of oil sands activity on the Athabasca River ecosystem, as well as on Aboriginal fisheries in the Peace and Athabasca river delta;
- accelerate the treatment of toxic wastewater that has accumulated in the retention ponds so that these waters can be re-used in industrial processes and ultimately returned to the river; and,
- accelerate the introduction of technologies that will radically reduce the use of water in bitumen extraction and treatment processes.

RECOMMENDATION 20: (p. 44)

Therefore, the Committee recommends that the federal government, in partnership with the provincial government, assess the impact of all oil sands development projects on the boreal forest, and that it consider the introduction of compensatory conservation methods for the creation of protected areas in the region surrounding the oil sands, as well as in the broader region of the Mackenzie River watershed.

RECOMMENDATION 21: (p. 46)

While acknowledging the major commitment made by the CANMET Devon Centre to research reclamation issues, the

Committee believes it is incumbent upon the industry itself to take the lead and to accelerate research and action in land reclamation, particularly with respect to the potential toxicity of tailings and water.

RECOMMENDATION 22: (p. 47)

This Committee endorses the plea of Pat Marcel not to forget the aboriginal peoples in the Wood Buffalo region whose traditional lands are impacted by oil sands development. The Committee strongly encourages industry and government to continue and expand consultations with residents, both aboriginal and non-aboriginal, whose communities are affected by these developments. Further, the committee recommends that the federal government take necessary measures to improve living conditions for the aboriginal communities whose way of life has been impacted by extensive oil production on their traditional lands.

LIST OF WITNESSES

Organizations and Individuals	Date	Meeting
Albian Sands Energy Inc.		
Rob Seeley, Vice-President, Sustainability and Regulatory Affairs	2006/11/21	24
Athabasca Chipewyan Tribe		
Pat Marcel, Elder	2006/11/23	25
BIOCAP Canada Foundation		
David Layzell, Chief Executive Officer and Research Director	2006/12/12	29
Bruneau Resources Management Limited		
Angus Bruneau, President and Corporate Director	2006/12/07	28
Canadian Association of Petroleum Producers		
Pierre Alvarez, President	2006/11/02	21
Bruce Friesen, Manager, Land and Environment (Syncrude)	2006/11/28	26
Greg Stringham, Vice President, Markets and Fiscal Policy	2006/11/02	21
Canadian Boreal Initiative		
Matt Carlson, Science Coordinator	2006/11/28	26
Alan Young, Program Manager	2006/11/28	26
Canadian Energy Research Institute		
George Eynon, Vice-President, Business Development & External Relations	2006/10/24	18
Marwan Masri, Vice-President, Research	2006/10/24	18
Canadian Environmental Assessment Agency		
Jean-Claude Bouchard, President	2006/12/05	27
Scott Streiner, Vice-President, Program Delivery	2006/12/05	27
Peter Sylvester, Vice-President, Policy Development	2006/12/05	27
CANMET Energy Technology Centre (CETC) - Devon		
Hassan Hamza, Director General, Department of Natural Resources	2006/10/19	17
Cumulative Environmental Management Association		
John McEachern, Executive Director	2006/12/05	27
Judy Smith, Vice-President	2006/12/05	27

Organizations and Individuals	Date	Meeting
Department of Natural Resources	2006/10/19	17
Howard Brown, Assistant Deputy Minister, Energy policy sector		
Kevin Cliffe, Director, Oil Division	2006/10/19	17
Kim Kasperski, Research Scientist, CANMET Energy Technology Centre (CETC) - Devon	2006/11/09	23
Margaret McCuaig-Johnston, Assistant Deputy Minister, Energy Technology and Programs Sector	2006/11/09	23
Energy Alberta Corporation		
Wayne Henuset	2006/12/07	28
Energy Innovation Network		
Michael Raymont, President and Chief Executive Officer	2006/10/26	19
Fort McMurray Chamber of Commerce		
Mike Allen, President	2006/11/23	25
ICON Group		
Stephen Kaufman, Suncor	2006/12/12	29
Wishart Robson, Nexen Inc.	2006/12/12	29
Mackenzie River Basin Board		
Jim Vollmershausen, Chair, Board Member	2006/11/09	23
Mining Association of Canada		
Gordon Peeling, President and Chief Executive Officer	2006/10/31	20
National Energy Board		
Jim Donihee, Chief Operating Officer	2006/10/24	18
Barry Lynch, Technical Leader, Oil	2006/10/24	18
Bill Wall, Technical Specialist, Oil	2006/10/24	18
Nature Québec / UQCN		
Marylène Dussault, Environmental Analyst	2006/10/31	20
Harvey Mead, President	2006/10/31	20
Pembina Institute		
Mary Griffiths, Senior Policy Analyst	2006/11/09	23
Dan Woynillowicz, Senior Policy Analyst	2006/11/02	21

Organizations and Individuals	Date	Meeting
Polaris Institute Tony Clarke, Director	2006/11/21	24
Regional Municipality of Wood Buffalo Melissa Blake, Mayor	2006/11/23	25
Suncor Energy Inc. Mark Shaw, Vice-President, Oil Sands Sustainability	2006/11/21	24
Syncrude Jim Carter, President and Chief Operating Officer	2006/11/21	24
University of Calgary David Keith, Professor , Department of Chemical and Petroleum Engineering and Department of Economics	2006/12/07	28

LIST OF BRIEFS

Organizations and Individuals

Athabasca Chipewyan Tribe
BIOCAP Canada Foundation
Canadian Association of Petroleum Producers
Canadian Boreal Initiative
Canadian Energy Research Institute
Canadian Environmental Assessment Agency
Department of Natural Resources
Energy Alberta Corporation
Energy Innovation Network
Fort McMurray Chamber of Commerce
ICON Group
Mackenzie River Basin Board
Mining Association of Canada
National Energy Board
Nature Québec / UQCN
Pembina Institute
Polaris Institute
Regional Municipality of Wood Buffalo
Syncrude

REQUEST FOR GOVERNMENT RESPONSE

Pursuant to Standing Order 109, the Committee requests that the government table a comprehensive response to this Report.

A copy of the relevant Minutes of Proceedings ([Meetings Nos.17-21 and 23-39](#)) is tabled.

Respectfully submitted,

Lee Richardson, MP
Chair

DISSENTING REPORT—CONSERVATIVE PARTY OF CANADA THE OIL SANDS: TOWARD SUSTAINABLE DEVELOPMENT

Background:

The members of the Conservative Party of Canada who sit on the Natural Resources Committee were impressed with the evidence provided by the many witnesses who appeared before the Committee during our study of the Oil Sands.

As expected we heard evidence that was very thought-provoking and in some cases posed more questions in the mind of the Committee.

As stated in clause #4 of the report, “Alberta’s oil sands are an enormous economic and strategic advantage for this country. We have only begun to tap into this vast resource.” In addition, Michael Raymont also stressed that “given the scale by which energy is produced and used in the world today and the infrastructure that is in place, fossil fuels are likely to supply most of the world’s energy for the foreseeable future.”

The Conservative Party could not agree more. Canada has tremendous potential to become an energy super-power. Responsible development of the resource will take an approach that balances three key areas; Energy, Environment, and the Economy.

Policies that are focused on only one of these areas will lead to dire consequences in the others. For example, policies that effectively lead to the shut-down of the Oil Sands will compromise our Energy future and damage the Economy.

The committee heard evidence that the value of bitumen and synthetic crude produced over the 2000-2020 period could total over \$500 billion. While the major GDP impact is in Alberta, significant economic benefits also accrue to Ontario, Quebec, and other Provinces and territories. In addition, oils sands production and development activities generate approximately \$123 billion in revenues to government over the course of 2000-2020. of which \$51 billion would accrue to the Federal Government.

Given the potential of this resource to the Canadian economy and the possibility for future development in Saskatchewan, responsible Committee recommendations must reflect this reality. The other reality is that the Federal government must as a fundamental principle work with the Provinces to achieve responsible sustainable development, and respect Provincial jurisdiction.

In total the Committee report titled, “The Oil Sands: Toward Sustainable Development” proposes 22 recommendations. For a large number of these

recommendations there was general agreement by committee members. In fact many carried unanimously.

Unfortunately, there are two key areas where there was not agreement. In the opinion of the Conservative Party members of the committee, recommendations within these two areas that were passed by the committee are in short irresponsible for the Natural Resources Committee to pursue. For this reason, the Conservative Party members voted against these recommendations.

Areas of Dissent:

The two major areas of dissent are:

- Accelerated Capital Cost Allowance (ACCA)
- Environmental approaches that would implement hard caps on emissions

1. Accelerated Capital Cost Allowance (ACCA):

In recommendation #17 of the report, “the Committee therefore recommends that the government of Canada eliminate the accelerated capital cost allowance currently applicable to the oil sands industry in order to place it on an equal footing with the broader oil and gas industry.”

Three arguments can be made against this recommendation.

First, the adoption of this recommendation by a majority of committee members seems to show that they see ACCA as a form of subsidy to the oil sands developers. Capital cost allowance is simply a deferral of tax. It is clearly not a subsidy. ACCA was provided to the Oil Sand companies as a means to encourage investment and development. In addition, the larger scale development in Alberta is done by excavation similar to open pit mining. Hence, the tax treatment is entirely consistent with mining operations such as for coal.

Second, ACCA for the oil sands is different than that for the oil and gas industry in general. ACCA is limited in that:

- It is only applicable to new projects or expansions greater than 5% of total revenue,
- the ACCA deduction can only be applied against that specific asset and not all other assets in a similar pool as in conventional capital cost allowance, to qualify for ACCA,
- companies cannot deduct the development cost until the project is available for use. This means that oil sands companies could spend dollars over five to six years before anything is actually produced, and

- higher oil prices mean capital is deducted earlier which leads to higher income taxes earlier as well - - a project is fully taxable once capital costs are written off.

Third, there is only anecdotal information to suggest that the companies are better off from ACCA. The complexity of analyzing ACCA against conventional capital cost allowance suffers from complexity and a lack of data on the subject making it very difficult at this time to determine with any great level of confidence how a change in tax treatment would impact oil sands development and Federal Government revenues.

Given these factors, the Conservative members of the committee believe that the recommendation of the committee to eliminate the ACCA is not a responsible position and is not supported by sufficient facts.

Recommendation: The Conservative Party members therefore recommend a more responsible position for the committee is for Finance Committee and the Department of Finance to review the current ACCA and its application to the oils sands development. This review should assess the impact of a change in tax practice to companies pursuing future development and if this has a bearing on investment decisions given current oil prices. In addition, the review should also assess the potential impacts any policy change would have on government revenues.

2. Environmental approaches that would implement hard caps on emissions:

In Recommendation number 14, 15, and 16 the Committee voted to endorse the Pembina Institute goal of making the oils sands carbon neutral by 2020, emissions credit trading, and meeting Canada's Kyoto obligations through the introduction of hard emissions caps based on absolute levels and not based on intensity. These caps would be in place for 2008, 2012, 2020 and 2050.

The Conservative members of the committee believe that this recommendation is again irresponsible given the situation faced by Canada who has made no progress towards reducing GHG's during the term of the previous Liberal government and in fact saw emissions rise by 37%.

The Conservative members support a responsible approach to development of the oil sands that respects the Environment and our Energy needs, but also ensures that our economy is not crippled by implementing poorly thought out policies.

As stated in the Commissioner of Environments report in 2006, the previous Liberal government spent over \$6 billion dollars on climate change programs with little regard for measuring progress. Hence we can see why Canada faces the

situation we see today. These recommendations are purely a means to grandstand and an attempt to assign blame for their poor record on the environment.

There are a number of arguments against the Committee on Natural Resources adopting such recommendations.

First, the estimated costs to achieve a carbon neutral oils sands using the Pembina estimates is between \$1.76 and \$13.54 per barrel. The committee only heard evidence from the Pembina Institute on this subject, so we do not have other data points to clearly make an informed recommendation of this magnitude. We certainly support the concepts of carbon sequestration as well as other new technologies to combat green-house gases and government can have a role to play in assisting companies to achieve a carbon-neutral footprint. However, endorsing one special interest group recommendation in the absence of all the facts supporting the cost and timing to meet such an objective is not a responsible position by any committee of parliament.

Second, the recommendations totally ignore the other major determinant of human health and that is emissions that cause smog and poor air quality. The Governments proposed Clean Air Act will attempt to address both the GHG issues we face in Canada as well as the negative health impacts of smog causing emissions. As responsible Parliamentarians we must ensure that we adopt policies that deal with the key issues versus focusing on one issue to the detriment of progress on other topics.

Third, the Conservative party members of the committee believe that recommendations on emissions reduction strategies including intensity based and absolute targets are under the responsibility of the Department of the Environment and hence the Environment Committee. Currently, an all party committee is reviewing the Clean Air Act and will make recommendations that will come back to the House of Commons for debate and vote in the spring. In addition, the Minister of the Environment is working with Industry to implement realistic emissions reduction strategies that will lead to concrete progress on the environmental file. For the Natural Resources committee to adopt a recommendation to achieve Kyoto obligations when nothing has been achieved for the last 13 years flies in the face of common sense. Also, we must remember that our study was focused on the oil sands. Any recommendations must be part and parcel of negotiations with all industry groups that fall under the large final emitter group. The Conservative members of the committee believe that this recommendation is pure politics on behalf of the opposition parties when they know full well the deplorable track record of the Liberals on this file.

Fourth, it is instructive to note as reported in the March 1st edition of the Globe & Mail that the Liberal and NDP MP's, along with the leader of the Green Party are considering embracing the concept of a carbon tax. This \$100 billion proposal to meet the 2012 Kyoto requirements would raise \$20 billion per year over 5 years

through new carbon taxes on industry and consumers. “On the consumer side, taxes such as a 10-cent increase in gas prices would be used to fund incentives such as tax breaks for the purchase of hybrid cars.” Such a Kyoto plan would cost every Canadian in the order of \$25/week or in excess of \$1,300 per year or over \$5,000 for a family of four. Cost aside this also seems to hint of another National Energy Program.

Fifth, the Conservative government is the first to undertake regulating greenhouse gas emissions and air pollutants in every single sector including the oil and gas sector. We also want to transform the way energy is produced and used in Canada by committing to programs such as the ecoENERGY Technology Initiative to clean up conventional energy.

Recommendation: The Conservative Party members therefore suggest a more responsible position for the committee by replacing the current recommendation numbers 14, 15, and 16 with: The committee recommends that any future expansion of the oil sands reflect a balance of the Environment, Energy and the Economy. We encourage the Minister of the Environment to negotiate emissions reduction strategies with large final emitters including companies involved in oil sands development, in order to achieve immediate intensity targets and also ensure that large final emitters achieve absolute reductions in line with Federal targets and future International commitments. We also encourage industry and government to pursue strategies that will allow for the oil sands to become carbon neutral by developing technologies such as carbon sequestration.

BLOC QUÉBÉCOIS COMPLEMENTARY OPINION

Natural Resources Committee: Oil Sands Study

The oil sands development is a complex issue that raises many questions, primarily environmental questions, but economic and social questions as well.

The Bloc Québécois wishes first of all to acknowledge the Committee's efforts to integrate the principle of sustainable development into the oil sands sector, specifically that:

- The Committee believes that any future expansion of oil sands development should be done in a way that does not jeopardize Canada's international Kyoto obligations on GHG emissions and climate change. We call upon the federal government to introduce hard emissions caps for the oil sands for 2012, 2020 and 2050 based on absolute levels and not based on "intensity."
- The Committee recommends that the federal government introduce a regulatory framework in order to establish constraints that would lead the industry to introduce technology to drastically reduce greenhouse gas emissions and mechanisms, such as trading emission credits, as incentives to fund it.
- The Committee strongly endorses the goal of the Pembina Institute that the oil sands should become carbon neutral by 2020 through the adoption of new technologies such as carbon capture and sequestration, and/or through the purchase of offsetting carbon credits. Furthermore, this committee believes that being able to sell a "carbon neutral" barrel of oil will help the industry to maintain access to markets where there is concern about GHG emissions.
- The Committee recommends that the federal government, and specifically the Department of Natural Resources, base all its actions in connection with oil sands development on the principles of sustainable development and polluter pays.
- The Committee recommends that the Government of Canada eliminate the accelerated capital cost allowance that the oil sands industry currently enjoys in order to put that industry on an equal footing with the oil and gas industry.
- The Committee recommends that no decision be made about using nuclear energy to extract oil from the oils sands until the implications are clearly demonstrated and understood.

- The Committee recommends that the government set up a joint public/private task force to, as quickly as possible, find ways to reduce the consumption of natural gas in the production of oil from the oil sands and thus put this resource to better use.

The Bloc Québécois wishes to specify that it is not opposed to economic development or to the judicious use of natural resources. The Bloc Québécois also wants to point out that the report was not prepared specifically with a view to limiting oil sands development, but that great attention was paid to the environmental consequences. That is why the Bloc Québécois wanted the concepts of sustainable development and “polluter pays” to be among those incorporated into the report.

Above all, the Bloc Québécois feels that certain elements that were not raised should have been studied in order to give the Committee a more accurate view of the situation. The Bloc Québécois thus deplores the refusal of the departments of the Environment and Natural Resources and of the former Liberal ministers of the Environment and Natural Resources to come testify before the Committee in order to describe the circumstances that led to the discussions of the Oil Sands Experts Group and the government’s follow-up on the recommendations published after the January 2006 meeting.

This report was developed based on the premise that the production of oil from the oil sands would increase by a factor of, at the most, three. Successive federal governments, and the Oil Sands Experts Group, are advancing as a scenario an increase of four to five times from the current level. The Bloc Québécois therefore feels that recommendations 14 and 16 are essential so that, whatever the increase in production, oil sands development does not adversely affect our ability to attain the objectives of the Kyoto Protocol and of Quebec, which, already possessing its own GHG reduction plans, is and will be affected by the effects of global warming if Canada does not respect its reduction objectives.

We respected the economic aspect of the concept of sustainable development as defined and unanimously adopted by the members of the Natural Resources Committee on October 31, 2006, but we are demanding the incorporation of two other elements of sustainable development, environmental protection and social equity.

The Bloc Québécois also feels that certain recommendations regarding the federal government must have a very limited application. More specifically, we feel that the social dimension (working conditions, living conditions, health, labour force, etc) is constitutionally a provincial jurisdiction and that the federal government should not get involved except through the regular programs already in place.

However, the Bloc Québécois recognizes not only the federal government's role regarding the First Nations, but also the urgency of its intervening here in order, firstly, to limit as much as possible oil sands development's negative effects on their culture and way of life and, secondly, to involve them in the economic development of the lands from which they draw sustenance.

Environmental protection was the most difficult aspect of sustainable development to integrate into the Committee's report during the adoption of the recommendations, and that is essentially why the Bloc Québécois felt the need to annex this complementary opinion in order to clarify its positions.

The Bloc Québécois thus wishes to reiterate the importance of the federal government's integrating the principle of sustainable development into all its actions regarding oil sands development, as well as the importance of respecting the Kyoto Protocol.

Thus, the Bloc Québécois proposed:

- 1) That the government recognize the principle of "polluter pays;"
- 2) That GHG reduction objectives be established for territories, and not sectors (territorial approach);
- 3) That the reduction objectives comply with the requirements of the Kyoto Protocol;
- 4) That the reduction targets be absolute targets and not intensity targets, thus allowing the establishment of a carbon exchange in Montréal, as an incentive to reduce GHG in the production of oil sands oil;
- 5) That the federal government, within its jurisdictions, monitor the maintenance and protection of pipelines by the oil industries;
- 6) That the federal government eliminate the accelerated capital cost allowance that the oil sands industry currently enjoys more quickly than it has proposed in its budget.

Finally, given that oil sands development is a topical issue that changes from day to day, it is important to remember that this report is intended to be a point of departure for consideration of this matter rather than a conclusion.

NDP SUPPLEMENTARY OPINION TO OIL SANDS REPORT

Overall the Natural Resources Committee report titled **Oil Sands: Toward Sustainable Development** seems fairly comprehensive. The Natural Resources Committee's goal was to examine the impacts of oil sands development on the economy, the environment and on social structures.

While the New Democratic Party supports many of the recommendations in the report, and respects the province of Alberta's jurisdiction over the development of its natural resources, we also believe that the Federal Government has a role to play in environmental protection, housing and post secondary education and training, as well as other sectors that the committee touched on.

While the committee was in Fort McMurray we spent all of our time with the oil companies, we were escorted around in buses and helicopters. This was a good way to see the project and ask the Chief Executive Officers and their representatives a lot of questions, but I feel that we missed an opportunity and left out a whole segment of society who are also impacted.

The Natural Resources Committee interviewed many witnesses, primarily those involved with the direct development of the resource. A few environmental non-governmental organizations were interviewed but on the social impacts side, we didn't go far enough. We interviewed the Mayor of Wood Buffalo and one First Nations Elder from one Band. If this is to be a real balanced report it is incumbent on the committee to interview social service agencies in the area, workers, (especially those whose families live in other provinces), and First Nations representatives from other Bands in the area.

I have heard indirectly, many heart wrenching stories of families separated for many months because of the inability to access adequate housing, but it would have been good for the committee to hear those stories first hand. Some may argue that housing is not a federal government responsibility but the NDP has been calling for a national housing strategy for many years. The federal government has a role to play in providing funding as it has done in the past through the Canada Mortgage and Housing Corporation to cover the full range of housing needs, including social housing, co-operative housing and affordable home ownership.

Labour shortages are having an impact not only in the oil sands but across Canada. Therefore the federal government must also address the skilled labour shortage across the country, including Alberta with a coordinated labour force strategy that addresses labour and skills shortages first by making the most efficient use of human resources at our disposal; increasing opportunities by investing in the skills development and credential recognition of our current population. The federal government must also commit to funding for post-secondary education aimed at affordability and accessibility for students with particular emphasis on college programs to relieve the skilled trades

shortage and establish quotas for apprenticeships and journeymen certification, with a targeted percentage for women and First Nations.

The committee made recommendations that the government undertake a comprehensive assessment of the cumulative impact of the oil sands development project already underway, and a full and detailed assessment of the socio-economic and environmental impacts of oil sands activities, but it is our belief that education, housing and social structures will most likely be left out of the equation in that context.

Alberta is the largest greenhouse gas emitter in Canada at the rate of 40% of our total emissions. With a looming expansion of this development expected to increase by at least five times in the next 10 to 20 years, many Canadians are concerned about the sustainability and the advisability of expanding the project due to ever increasing pollution. The NDP calls on the government to work with Alberta to establish a moratorium on new oil sands development and expansion until environmental concerns about the production of massive amounts of carbon emissions are addressed.

The NDP agrees that cleaner ways to power oil sands production need to be encouraged, however we believe that Nuclear power is not the answer for several reasons. The amount of energy needed for the project would require more reactors than are currently operating in Canada, the problem of nuclear waste has not been solved, and there would be a considerable impact on the already depleted water supply.

The NDP feels that the issue of water consumption and pollution are having a negative effect on fish and fish habitat, as well as migratory birds and other wildlife. Given that the committee heard testimony that the Government of Canada has not to date been involved in an environmental assessment process looking at all the impacts associated with oil sands projects, we would further recommend that an immediate environmental assessment be done with particular emphasis on examining the impacts of water consumption and pollution.

Respectfully submitted,
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Vancouver Island North