



U.S. House Subcommittee on  
Energy and Air Quality

**Alberta's Dramatic Crude Oil Growth in an  
Environment of Conventional Crude Oil Decline**

Peak Oil Hearing  
Wednesday, December 7, 2005

Submission  
By  
**Alberta Office in Washington, D.C.  
Government of Alberta, Canada**

501 Pennsylvania Avenue N.W.  
Washington, D.C.

## **Peak Oil Hearing: "Alberta's Dramatic Crude Oil Growth in an Environment of Conventional Crude Oil Decline"**

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### **Overview**

The Government of Alberta, Canada, is pleased to provide this submission on the Alberta Oil Sands to the U.S. House Subcommittee on Energy and Air Quality.

Included is a brief description of the Province of Alberta; our role in North American energy security; the extent of oil sands resources in Alberta, including reserves based on currently available extraction technologies; the role the Government of Alberta plays in bringing these valuable resources to market; and, the direct effect this has had on investment, production and development-including new technologies. Production of crude oil from Alberta's oil sands will continue to ensure Canada remains the primary supplier of energy to the U.S. The major points to be made through this submission are listed below:

- The Government of Alberta does not have an official opinion regarding the theory of "Peak Oil."
- Conventional oil production from the Western Canadian Sedimentary Basin (WCSB) peaked in 1997; Alberta conventional oil production "peaked" in 1973 at 1.3 million barrels per day. Today Alberta produces just over 2 million barrels a day and will grow to 2.5 million in three to four years and about 3 million barrels per day before 2015.
- Alberta is recognized as the home of the second largest oil reserves in the world. From initial reserves in place of 1.7 trillion barrels of oil, there are currently 174.5 billion barrels of oil in established reserves and 315 billion barrels believed to be ultimately recoverable.
- Alberta crude oil production from oil sands is currently in excess of 1 million barrels per day (bbl/d). Production is anticipated to reach 3 million bbl/d by 2015, and 5 million bbl/d by 2030.
- Alberta is a significant contributor to the energy security of the United States, currently supplying 12% of U.S. crude oil imports and 12% of U.S. natural gas consumption.
- The people of Alberta own the province's natural resources, which are administered, managed and regulated on their behalf by the Government of Alberta.
- Currently a significant amount of conventional oil and gas is being left in the ground. With technological improvement it is believed that additional reserves of 5 billion barrels of conventional oil, 25 trillion cubic feet (Tcf) of conventional natural gas and 100 Tcf of unconventional natural gas, can be produced in Alberta.
- Alberta will continue to be a significant energy producer through ongoing production of conventional oil and natural gas, oil production from oil sands, the development of "unconventional" natural gas resources, and the development of clean-coal technologies. There remains significant scope for additional refining capacity within the province.

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Included is a brief description of the Province of Alberta; our role in North American energy security; the extent of oil sands resources in Alberta, including reserves based on currently available extraction technologies; the role the Government of Alberta plays in bringing these valuable resources to market; and, the direct effect this has had on investment, production and development-including new technologies. Production of crude oil from Alberta's oil sands will continue to ensure Canada remains the primary supplier of energy to the U.S.

### **The Province of Alberta**

Albertans are a breed apart. They are driven by the pioneering spirit that first settled the land. They hold dear the ethics of hard work and personal responsibility. They cherish the ideals of family and community that built the province.

Our policies focus on free trade and competitive markets as the best way to allocate scarce resources. Provincial law prevents the government from subsidizing any commercial business entity. The Province has no sales tax, a 10% flat personal income tax, and no debt – something that has not been achieved anywhere else in Canada, and something of which Albertans are justifiably proud.

Year after year, Alberta's economic growth leads Canada, averaging 3.7% annually over the past 10 years. We lead the nation in job creation, and our unemployment rate is consistently among the lowest in Canada. Alberta's per capita disposable income and standard of living are the highest in Canada. Not surprisingly, we continue to experience the strongest population growth in Canada, with people from all over Canada and around the world migrating to our province to experience the Alberta Advantage for themselves and their families.

### **North American Energy Security**

Alberta is rich in hydrocarbon resources – producing almost 2 million barrels per day of crude oil, and 13.8 billion cubic feet per day of natural gas. The province also produces 30.9 million tons of coal per year, from a proven reserve base of 37.5 billion tons. Alberta government and industry remain hopeful that significant Natural Gas from Coal (NGC) and clean coal developments will ultimately compose a significant portion of the province's energy mix.

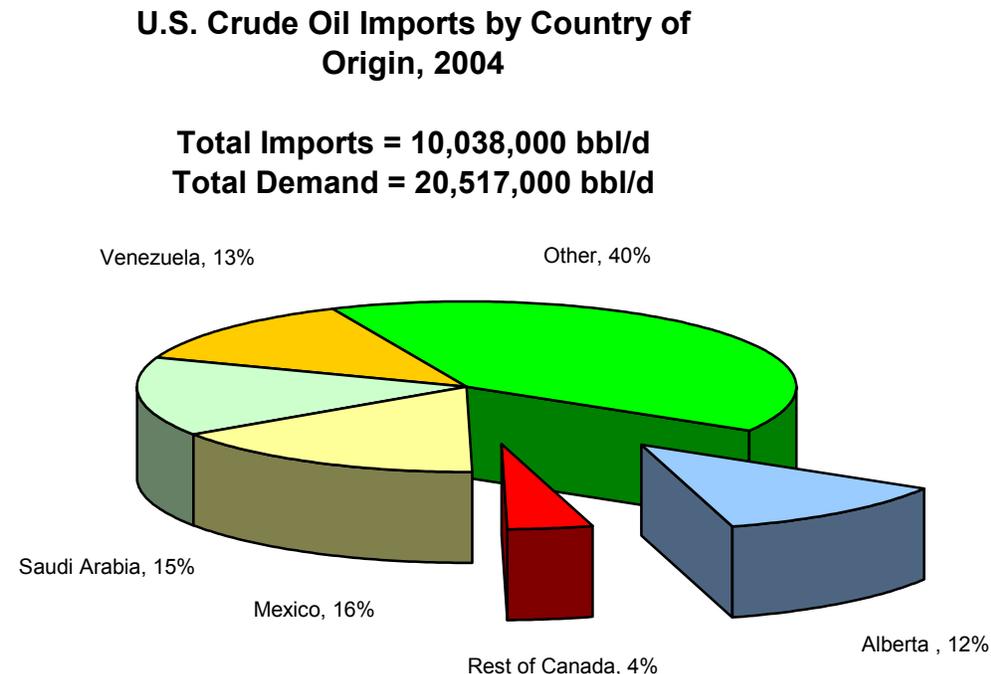
Alberta is vital to the energy security of the United States – we are reliable, secure and, importantly, stable suppliers of energy to the US. In 2004, for the sixth year running, the US Energy Information Administration recognized Canada as the largest supplier of oil (crude and refined) to the US, with the bulk of this coming from Alberta.

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Approximately 12% of US crude oil imports and 12% of its natural gas consumption come from Alberta alone.

**Figure 1: USA 2004 Crude Oil Imports by Country of Origin**



### ***Alberta's Oil & Gas Industry and the Province's first 'Peak'***

Oil was first discovered in Alberta in 1914 at Turner Valley, southwest of Calgary; however, it was the 1947 oil discovery at Leduc that radically transformed the province from a primarily rural and agricultural province, to the center of Canada's oil and gas industry and a recognized world leader in oil and gas technology development and innovation.

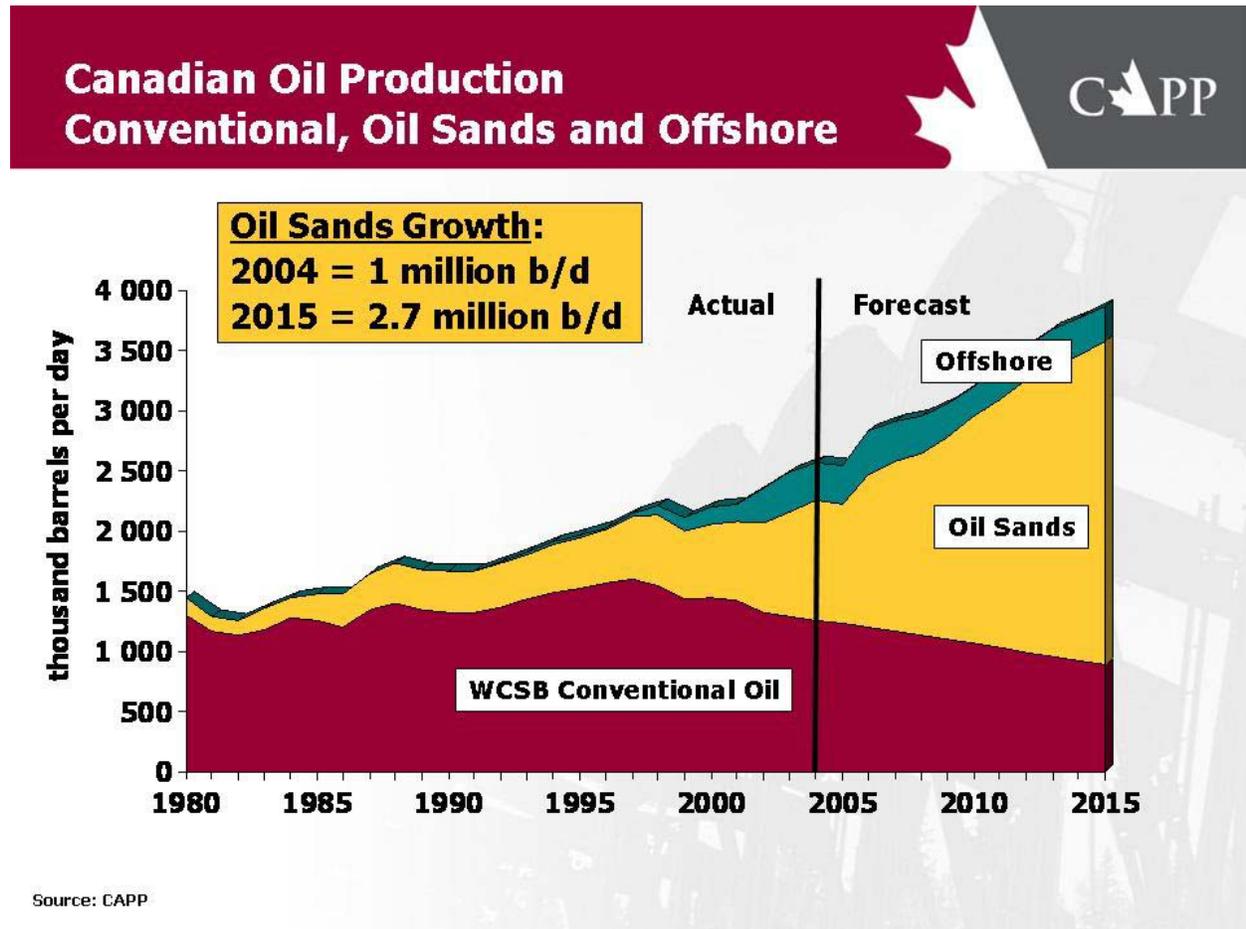
Conventional oil production, combined light and heavy crude, peaked in the Western Canadian Sedimentary Basin (WCSB) in 1997 and has been steadily, albeit slowly, declining ever since. Conventional crude oil production in Alberta actually peaked in 1973, with daily production of 1.3 million bbl/d. Despite this "peak" in conventional oil production, total Alberta production of crude oil has been steadily increasing and is projected to make significant gains over the course of the next several decades. The reason for this overall increase in oil production has been the remarkable success of oil sands development. In 2001, crude production from oil sands exceeded conventional crude production in the province and currently over one-half of Alberta's oil production is derived from oil sands. Within the next decade it is anticipated that crude production from oil sands will provide upwards of seventy-five percent of Alberta's total production. Annual oil sands production is

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growing steadily by about 200,000 -250,000 barrels per day (bbl/d) per year, as the industry matures.

**Figure 2: Canadian Oil Production, 1980 - 2015**



### What are *oil sands*?

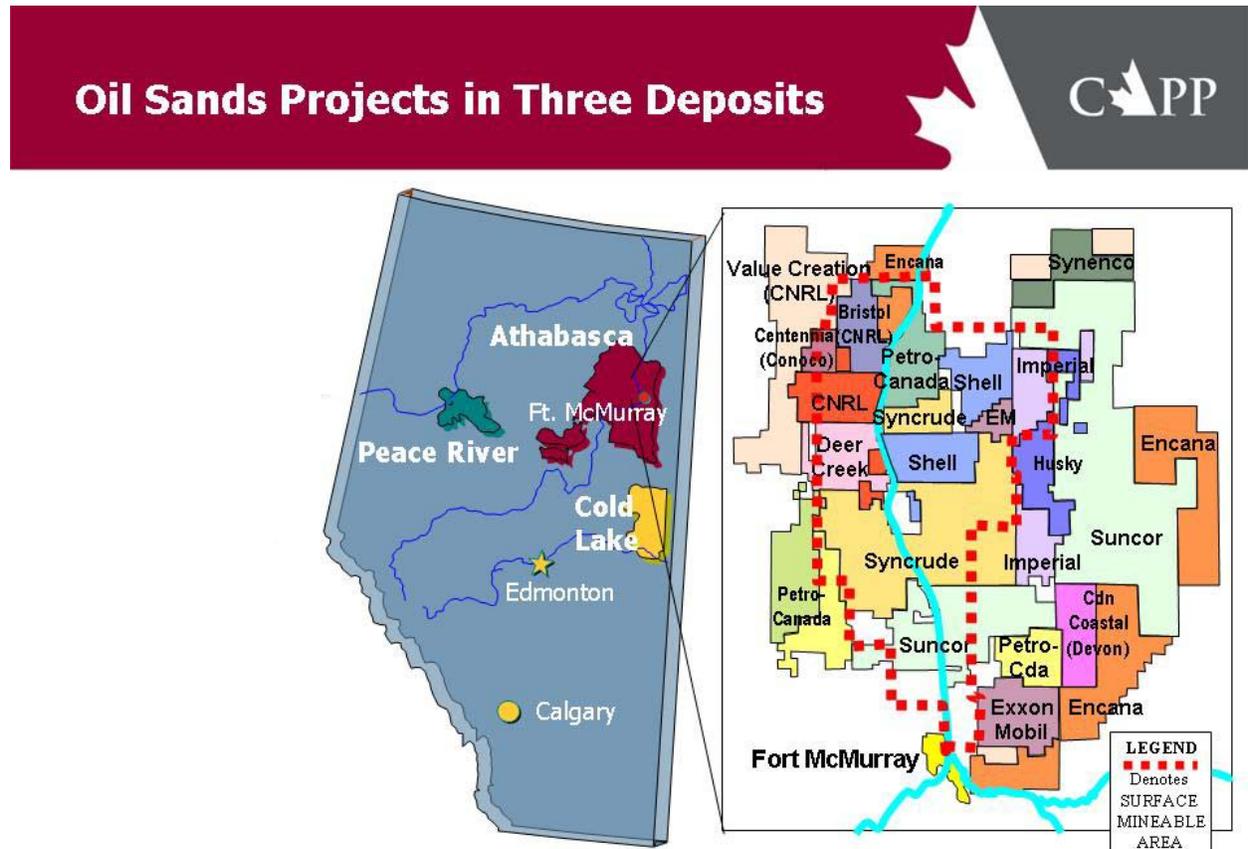
Oil sands are deposits of bitumen, a molasses-like viscous oil that requires heating or dilution with lighter hydrocarbons in order to flow. Second only to the Saudi Arabian reserves, Alberta's oil sands deposits have been described by *Time Magazine* as "Canada's greatest buried energy treasure," which "could satisfy the world's demand for petroleum for the next century."

Deposits are found in three major areas in northeastern Alberta: Peace River, Athabasca (Fort McMurray area), and Cold Lake (north of Lloydminster), totaling approximately 54,400 square miles – an area larger than the state of **Florida**.

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**Figure 3: Alberta Hydrocarbon Resources**



Source: Canadian Association of Petroleum Producers

**Size of Alberta Oil Sands Reserves**

Alberta is home to the largest oil sands reserves in the world with established reserves of 174.5 billion barrels.

<b>Established Reserves</b>	174.5 billion barrels
<b>Ultimate Potential Reserves</b>	315 billion barrels
<b>Initial In-Place Reserves</b>	1.7 trillion barrels

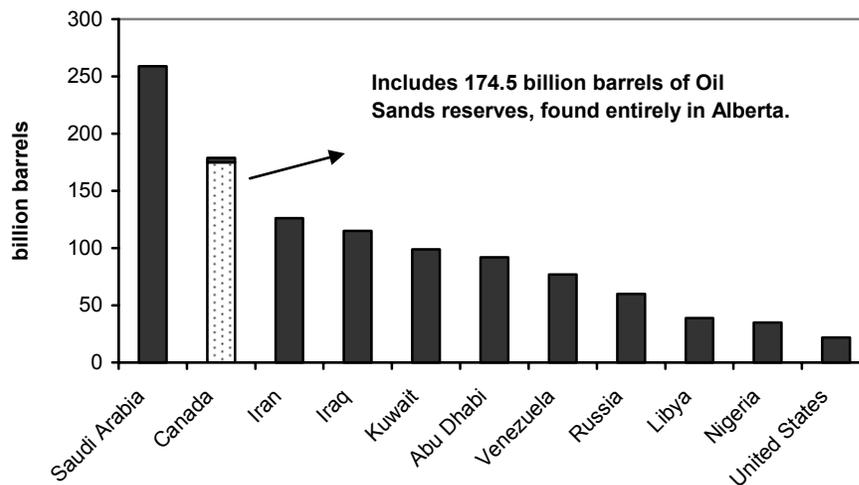
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This data is on the public record and confirmed by the Alberta Energy & Utilities Board (AEUB), an arms-length regulatory agency. Over 56,000 wells and 6,000 cores were the basis of the analysis.

In December 2002, these figures were recognized by the *Oil & Gas Journal*, followed by the **US Energy Information Administration** in 2003.

**Figure 4: Proven World Reserves (Oil & Gas Journal, Dec 2004)**



### Production Methods: Mining and *In-Situ*

There are two methods of oil sands production methods: mining and *in-situ*. Oil sands mining involves open pit operations. Oil sands are moved by trucks and shovels to a cleaning facility where the material is mixed with warm water to remove the bitumen from the sand. Today, all operating oil sands mines are linked with upgraders that convert the bitumen to synthetic crude oil.

For oil sands reservoirs too deep to support economic surface mining operations, some form of an *in-situ* or "in place" recovery is required to produce bitumen. *In-situ* oil sands production is similar to that of conventional oil production where oil is recovered through wells. Present operating costs, not including capital recovery, vary between \$10-15/per barrel.

The AEUB estimates that 80% of the total bitumen ultimately recoverable will be with *in-situ* techniques. In general, the heavy, viscous nature of the bitumen means that it will not flow under normal conditions. Numerous *in-situ* technologies have been developed that apply thermal energy to heat the bitumen and allow it to flow to the well bore. These include thermal (steam) injection through vertical or horizontal wells such as cyclic steam stimulation (CSS), pressure cyclic steam drive (PCSD) and steam assisted gravity drainage (SAGD). Other technologies are

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emerging such as pulse technology, vapor recovery extraction (VAPEX) and toe-to-heel air injection (THAI).

In general, oil sands mines operations are found in central Athabasca deposits (around Fort McMurray). *In-situ* production is used in the Cold Lake, south Athabasca and Peace River deposits.

### **Government Framework**

The mineral rights in approximately 97% of Alberta's 54,000 square miles of oil sands area are owned by the Government of Alberta (i.e., state-level) and managed by the Alberta Department of Energy. The remaining 3% of the oil sands mineral rights in the province are held by the federal Government of Canada (i.e., federal-level) within First Nation reserves, by successors in title to the Hudson's Bay Company, by the national railway companies and by the descendants of original homesteaders through rights granted by the Government of Canada before 1887. These rights are referred to as "freehold rights".

The Alberta government departments of Environment and Sustainable Resource Development administer complementary environmental policies. The Alberta Energy & Utilities Board (AEUB) regulates oil and gas activities in the province.

The Alberta Department of Energy is responsible for administering the legislation that governs the ownership, royalty and administration of Alberta's oil, gas, oil sands, coal, metallic and other mineral resources. The Department's main objective is to manage these non-renewable resources to ensure their efficient development for the greatest possible benefit to the province and its people.

### **Oil Sands Royalty Structure**

In 1996, Alberta announced a new generic royalty regime for oil sands based on recommendations from a joint industry/government National Oil Sands Task Force (NOSTF). This regime is defined in the Mines and Minerals Act and the Oil Sands Royalty Regulation 1997, as amended (OSRR 97). Royalty is calculated using a revenue-less-cost calculation.

In early project years before capital investment and other costs are recovered, the royalty rate is lower than the rate that is applied after costs are recovered. This helps project cash flows in early years. Once costs are recovered, the Province shares in project profits.

- In the pre-payout period (before the project has recovered all of its costs), projects pay royalty tied to 1% of gross revenue;

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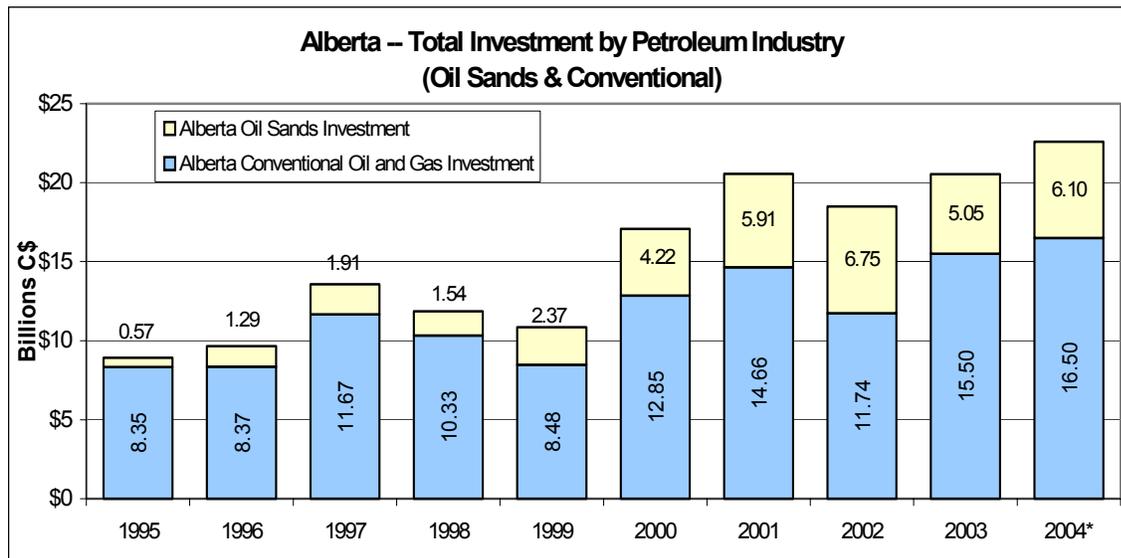
- In the post-payout period (after the project has recovered all of its costs), projects pay royalty tied to the greater of 1% of gross revenue or 25% of net revenue.

Since 1990, oil sands royalties have totaled over \$2.5 billion.

### Announced Investment

Since 1996, when the generic royalty regime was introduced, there has been an estimated \$35 billion of investment in the oil sands. It is expected that new capital investment in the oil sands could range from \$2.5 - \$4 billion per year. Looking forward, the oil sands industry will command a far greater share of investment compared to the conventional oil and gas sector. An inventory of major projects (valued at \$2 million or greater) compiled by the province shows oil sands investments underway or announced exceed \$70 billion, while conventional oil and gas investments are valued at just over \$4 billion.

**Figure 5: Total Investment in Petroleum Industry in Alberta**



\*Estimate as of June 2005. Source: Canadian Association of Petroleum Producers.

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**Figure 6: Oil Sands Projects Planned and Under Construction, by Company / Consortium as of September 2005**

<b>SPONSORS</b>	<b>COST (US\$)</b>
Albian Sands Energy Inc.	4,500 million
BA Energy Inc.	800 million
Blackrock Ventures Inc.	340 million
Canadian Natural Resources Ltd.	10,750 million
Connacher Oil and Gas	150 million
ConocoPhillips / TotalFinaElf / Devon Energy	1,400 million
Devon Canada Corporation	950 million
EnCana Corporation	1,859 million
ExxonMobil Canada	1,500 million
Husky Energy Inc.	3,200 million
Imperial Oil Ltd.	850 million
Imperial Oil Resources	650 million
Imperial Oil Resources / ExxonMobil Canada	5,000 million
Japan Canada Oil Sands Ltd.	450 million
North West Upgrading Inc.	1,300 million
OPTI Canada Inc. / Nexen	3,482 million
Pacific Energy Partners	4 million
Petro-Canada / UTS Energy Corporation	37 million
Petro-Canada / UTS Energy Corporation / Teck Camino	2,000 million
Petro-Canada	1,600 million
Petro-Canada / Nexen	800 million
Suncor Energy Inc.	11,050 million
Syncrude Canada Ltd.	12,300 million
SynEnCo Energy Inc. / SinoCanada	4,500 million
Total Canada Ltd.	1,678 million
Whitesands In Situ Ltd.	44.7 million
<b>TOTAL</b>	<b>71,194.7 million</b>

Source: [www.alberta-canada.com](http://www.alberta-canada.com) Major Projects Inventory.

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### The Way Forward

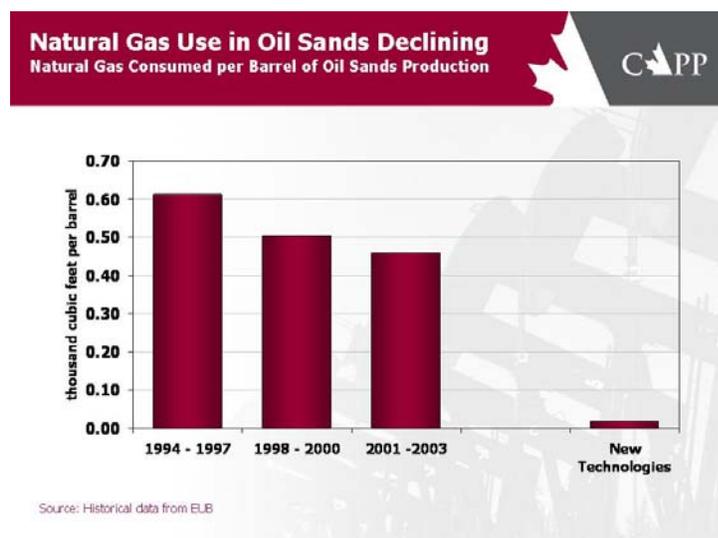
To date, only about 2% of the established oil sands resource has been produced. Alberta's oil sands industry is the result of multi-billion-dollar investments in infrastructure and technology required to develop the non-conventional resource. In the last five years alone, industry has allocated an estimated \$28 billion towards oil sands development, and the Government of Alberta invested over \$700 million over a 20-year period.

Alberta encourages the responsible development of these extensive deposits through planning and liaison among government, industry and communities to ensure a competitive royalty regime that is attractive to investors, appropriate regulations and environmental protection and the management of the Province of Alberta's rights to oil sands while taking into account some of the barriers - higher technological risk and higher capital costs - faced by oil sands developers.

In 2004 Alberta's oil sands were the source of over half of the province's total crude oil and equivalent production and over one third of all crude oil and equivalent produced in Canada. Over the last three fiscal years, through to 2003/2004, oil sands development returned \$565 million to Albertans in the form of royalties paid to the Provincial government.

Continuing technology improvements will lead to greater energy efficiency and a reduction in natural gas as a fuel input source. As the future unfolds, the only impediment to oil sands production could be shortages of skilled labour to complete the projects. Oil sands projects will compete for the same skilled workforce as the Mackenzie and Alaska natural gas pipelines.

**Figure 7: Natural Gas Consumed per Barrel of Oil Produced (CAPP Chart based on data from the EUB)**



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Development of Alberta's oil sands resources represents a triumph of technological innovation. Over the years, government and industry have worked together to find innovative and economic ways to extract and process the oil sands and energy research is more important today than ever before. Working through the Alberta Energy Research Institute, the Alberta government is committed to a collaborative approach with counterparts in Canada and the United States to spur new technology and innovation programs that will reduce the impact of greenhouse gases and other emissions, and reduce the consumption of water and gas.

### **Reversing the Peak**

In addition to the significant gains being realized by the oil sands, there is an opportunity, through improved technology, to increase the ultimate recoverable conventional oil and natural gas in the WCSB. The Alberta Energy Research Institute (AERI) estimates that roughly three quarters of the conventional oil and slightly less than half of the natural gas in the province is currently being **left in the ground**. (Report: *Spudding Innovation Accelerating Technology Development in Natural Gas and Conventional Oil* <http://www.ptac.org/techinnp.html>) There is consensus that an ample supply of petroleum remains in Alberta: 47 billion barrels of conventional oil, 147 trillion cubic feet (Tcf) of conventional natural gas and as much as 1,000 Tcf of unconventional gas. AERI estimates that through the deployment of advanced enhanced recovery technologies 5 billion additional barrels of conventional oil, 25 Tcf of additional conventional natural gas, and 100 Tcf of unconventional gas can be produced and brought to market in the coming decades.

It is also believed that much of the increase in conventional production can be facilitated through ongoing developments in the oil sands sector. One means of increasing conventional oil production is achieved by injecting carbon dioxide (CO<sub>2</sub>) into a well in order to displace additional hydrocarbons. There is currently an industry-led plan in development to capture CO<sub>2</sub> emissions from the oil sands, transport it via pipeline to Alberta's conventional oil fields and inject it into existing reservoirs to increase production. Of added benefit to this plan will be the reduction in CO<sub>2</sub> released into the atmosphere.

It is understood that as crude oil production in Alberta grows, so too will opportunities for additional value-added activities, including scope for growth in the province's refining capacity. Over the past two years the Hydrocarbon Upgrading Task Force (HUTF), consisting of 30 private sector companies and Alberta's ministries of Energy and Economic Development, has developed Vision 2020. This vision assumes increased bitumen production from the current 1 million bbl/d, to 3 million bbl/d by 2020, and 5 million bbl/d by 2030, and that the value of this output can be greatly increased by upgrading or refining a large portion of this production in the province.

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### APPENDIX 1

#### Murray D. Smith Minister-Counsellor, Government of Alberta Embassy of Canada, Washington DC



Murray Smith was appointed in January, 2005, as the Official Representative of the Province of Alberta to the United States of America. He leads the newly established Alberta Office in Washington, D.C, co-located in the Canadian Embassy.

Prior to his diplomatic posting, Murray served for twelve years as a Member of the Legislative Assembly in the Province of Alberta, Canada (winning three consecutive elections in Calgary, Alberta). Premier Ralph Klein (the provincial leader) appointed him to four different Cabinet portfolios – Energy, Gaming, Labour, and Economic Development.

As Minister of Energy (2001 to 2004), Murray was responsible for gaining international recognition of Alberta's 176 billion barrels of established oil reserves -- including 174 billion barrels of *oil sands* reserve. During his tenure, Alberta annual oil and gas royalty revenue rose to over \$9 billion, a record number of wells were drilled (over 20,000), and over \$60 billion in investment was committed to Alberta oil sands projects. Murray was also responsible for Alberta's electricity sector, guiding the \$5 billion market move to competitive wholesale generation. Increased investment added over 5000MW in new generation, and Alberta became the top wind generation province in Canada.

Murray also served as Minister of Gaming (1999 to 2001) and Minister for Labour (1996 to 1999). And in his first Cabinet-level post, as Minister of Economic Development (1994 to 1996), he initiated the largest industrial tax reduction in the province's history. He was a member of the Cabinet Committee Treasury Board and a main contributor to the province's Debt Retirement Plan, which led the province to become the first **debt-free** jurisdiction in Canada.

Before serving Albertans as an elected Member of the Alberta Legislature in 1993, Murray was an independent businessman. He owned and started a number of Alberta-based energy and retail companies.

Murray is a contributor to many community organizations as well as to the University of Calgary, where an endowment has been established in his name. He is the recipient of numerous awards and is a past Director of the Calgary Stampede Board.

He is a graduate of the London Business School's Senior Executive Program. He also holds a B.A. (Economics & Political Science) from the University of Calgary, and he is a graduate of Notre Dame College in Wilcox, Saskatchewan and a past President of the College's Alumni Association.

Murray has been married to Barbara Smith for 35 years and has two daughters. He is an avid, though unskilled, golfer and a lifetime member of the Riley Park Cricket Club.