



Catalogue no. 11-621-MIE — No. 047

ISSN: 1707-0503

ISBN: 0-662-43965-1

Analytical Paper

Analysis in Brief

Boom Times: Canada's Crude Petroleum Industry

by Miles Ryan Rowat

International Trade Division
9th Floor, Jean Talon Building, Ottawa, K1A 0T6

Telephone: 1-800-263-1136



Statistics
Canada

Statistique
Canada

Canada



Boom Times: Canada's Crude Petroleum Industry

Miles Ryan Rowat

Review Committee: Craig Byrd, Pierre Deprés, John Flanders, Robert Gamson, Russell Kowaluk, Justin Lacroix, Bernard Lupien, Greg Sannes, Marlene Sterparn, Jennifer Winters, Peter Woodard and Diana Wyman

Editor: Christian Houle

Managing Editor: Yvan Gervais

Production: Debi Soucy

September 2006

Catalogue No: 11-621-MIE2006047

ISSN: 1707-0503

ISBN: 0-662-43965-1

Frequency: Occasional

Ottawa

How to obtain more information:

National inquiries line: 1 800 263-1136

E-Mail inquiries: analysisinbrief-analyseenbref@statcan.ca

Published by authority of the Minister responsible for Statistics Canada

© Minister of Industry, 2006

All rights reserved. The content of this electronic publication may be reproduced, in whole or in part, and by any means, without further permission from Statistics Canada, subject to the following conditions: that it be done solely for the purposes of private study, research, criticism, review or newspaper summary, and/or for non-commercial purposes; and that Statistics Canada be fully acknowledged as follows: Source (or "Adapted from", if appropriate): Statistics Canada, year of publication, name of product, catalogue number, volume and issue numbers, reference period and page(s). Otherwise, no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form, by any means—electronic, mechanical or photocopy—or for any purposes without prior written permission of Licensing Services, Client Services Division, Statistics Canada, Ottawa, Ontario, Canada K1A 0T6.

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued cooperation and goodwill.

Boom Times: Canada's Crude Petroleum Industry

Miles Ryan Rowat, International Trade Division

Summary

These are boom times in Canada's oil patch, particularly in Alberta, where the soil abounds in black gold.

Across Canada, crude oil flows from wells in seven provinces, but the biggest player by far is Alberta. High oil prices, coupled with robust global demand for oil during the past several years, have fuelled a huge expansion of the province's oil sands industry.

In total, Canada produced 136.4 million cubic metres of crude petroleum in 2005, about two-thirds of which came from Alberta. The massive oil sands resource accounted for 42% of the province's total production.

Saskatchewan was a distant second, contributing about 18% of total Canadian crude production, while Newfoundland and Labrador's offshore oil rigs accounted for about 13%.

In 2005, as a result of a 30% surge in prices, Canadian oil exporters got \$30 billion for their products, up from \$25 billion the year before, even though there was a slight drop in the volume of crude oil exports.

Canada is both an exporter and an importer of crude oil. Canadian companies exported about 63% of our domestic production, the vast majority of which headed south of the border to a thirsty American economy. In 2005, Canada supplied almost 10% of American crude oil needs.

Domestic crude accounts for only about 45% of Canada's oil consumption. Imports represented the remaining 55%, mostly coming from either North Sea countries or the Middle East. Imported oil feeds refineries mostly in Eastern Canada.

Analysts feel the outlook for domestic crude production is particularly strong. Some sources estimate reserves for Canadian oil slightly over 28 billion cubic meters, second only to Saudi Arabia.

As for markets, Canada will be looking abroad, mainly to the United States. A National Energy Board report published at the beginning of 2006 said the domestic market does not hold tremendous growth opportunities for Alberta's oil sands producers.

For enterprises involved in gas and oil extraction, operating profits soared by 50% last year, going from \$20.7 billion in 2004 to over \$30.3 billion in 2005. Consequently, income tax paid by these enterprises jumped as well. Gas and oil extraction enterprises paid \$7.5 billion in income taxes in 2005 compared with \$4.5 billion in 2004, a 65% increase.

This article will examine trends in crude oil prices, the production and exports of Canada's crude petroleum industry, and Canada's imports of crude petroleum.

First decline in crude production in six years

Canadian companies pumped out 136.4 million cubic metres of crude petroleum in Canada in 2005, down 2.3% from the year before. (One cubic metre is equivalent to 6.292 barrels.)

This was the first annual drop in the past six years. In general, this occurred mostly because of lower output from the conventional sector as well as unplanned interruptions in the non-conventional sector, and in particular because of a fire at a major oil sands processing facility in Alberta.

In Newfoundland and Labrador, production was also down, by 3.1%, the result of a maintenance slowdown at the Terra Nova oil field.

Alberta's conventional oil supplies, in combination with the oil sands, accounted for two-thirds (66.5%) of crude oil production in Canada. About a million barrels a day are coming out of the oil sands alone, which account for 42.0% of the province's total.

Despite expansion in oil production in Newfoundland and Labrador, Saskatchewan's overall oil production still exceeds that of the Atlantic province. Since 2000, crude oil production in Saskatchewan has held steady at roughly 25 million cubic metres a year. In 2005, it accounted for 17.8% of total Canadian production.

The Hibernia oil fields, located 386 kilometres off the southeast coast of Newfoundland and Labrador, produced 3.8 million cubic metres of oil in 1997, the first full year of operation. At that time, the province accounted for only 3.2% of Canada's total crude production. With the addition of the Terra Nova offshore project in 2003, and the White Rose offshore oil platform, which was launched late in 2005, Newfoundland and Labrador now contributes nearly 20 million cubic metres of crude oil a year. This is 13.0% of total Canadian crude production.

Rounding out Canadian production in 2005 were Ontario, Manitoba, British Columbia and the Northwest Territories which produced a combined 3.8 million cubic metres, or 2.8% of total production.

The financial and technological feasibility of mining the oil sands of northern Alberta has been the biggest breakthrough in crude petroleum production in Canada because oil sands production is relatively expensive.

In 2003, the Alberta Energy and Utilities Board estimated the economically viable reserves in Canada at less than 795 million cubic metres. As the outlook remains firm for sustained high oil prices, estimates of crude reserves in Alberta have skyrocketed.

According to this board, at the beginning of 2006, Alberta's remaining established oil reserves amounted to 28 billion cubic metres, or the equivalent of 174 billion barrels. This places Canada second in the world after Saudi Arabia's 42 billion cubic metres.

Table 1 Top ten crude oil reserves in the world

| Rank | Country or region | Estimated crude oil reserves |
|------|----------------------|------------------------------|
| | | billions cubic metres |
| 1 | Saudi Arabia | 42.4 |
| 2 | Canada | 28.4 |
| 3 | Iran | 21.1 |
| 4 | Iraq | 18.3 |
| 5 | Kuwait | 16.5 |
| 6 | United Arab Emirates | 15.5 |
| 7 | Venezuela | 12.7 |
| 8 | Russia | 9.5 |
| 9 | Libya | 6.2 |
| 10 | Nigeria | 5.7 |

Source: PennWell Corporation, *Oil & Gas Journal*, Vol. 103, No. 47 (December 19, 2005).

‘Conventional crude’: What is it?

In Canada, the term 'conventional crude oil' usually refers to light, medium and heavy hydrocarbons and is the traditional source for most Canadian oil production. Conventional crude oil is produced by drilling wells. It is differentiated from non-conventional crude oil by the method used for extraction.

Alberta's non-conventional crude oil known as oil sands deposits is too thick to flow in its natural state and requires special methods to bring it to the surface.

Crude oils are generally differentiated by the size of the hydrogen-rich hydrocarbon molecules they contain. For example, light oil flows easily through wells and pipelines and, when refined, produces a large quantity of transportation fuels such as gasoline, diesel and jet fuel. Heavy oil, by comparison, requires additional pumping or dilution to flow through wells and pipelines; when refined, it produces proportionally more heating oil and a smaller amount of transportation fuels.

Source: Alberta Department of Energy, "What is oil?", www.energy.gov.ab.ca/798.asp (accessed July 13, 2006).

Soaring prices, supply shortages: A quick review of developments

The global price of crude petroleum has skyrocketed since the 2001 low level record. In December 2001, the price of crude oil dropped to US\$15.95 a barrel.¹

However, since then, prices have been on the rise. Just a year later, they had hit US\$26.68. The rapid increase was largely attributed to a production cut by the Organization of the Petroleum Exporting Countries (OPEC), political unrest in Venezuela and military conflict in the Middle East.

A major factor in rising prices has been the emerging economies of India and China, which have created an increase in global demand. In India, oil consumption totalled close to 238,500 cubic metres a day in 1995; only five years later, it had surged to 397,000 cubic metres a day.² Oil consumption in India has grown significantly because of the increased use of automobiles and other vehicles.

In recent years, China's demand for oil to feed its booming industries and soaring numbers of motor vehicles has had a tremendous impact on global oil markets. As Canada's National Energy Board points out, it is now the world's second largest consumer of oil, and the third largest importer.

In 2000, China consumed slightly less than 794,500 cubic metres a day. Since then, its consumption has increased at an annual average rate of 8%. In 2003, China overtook Japan as the second largest consumer of oil, slurping 874,000 cubic metres a day, trailing only the United States. In 2005, China alone accounted for more than one-third of the annual growth in demand for oil worldwide. Its consumption hit 1.1 million cubic metres a day.

In addition to increased world demand, disruptions to supplies have exerted upward pressure on world crude oil prices.

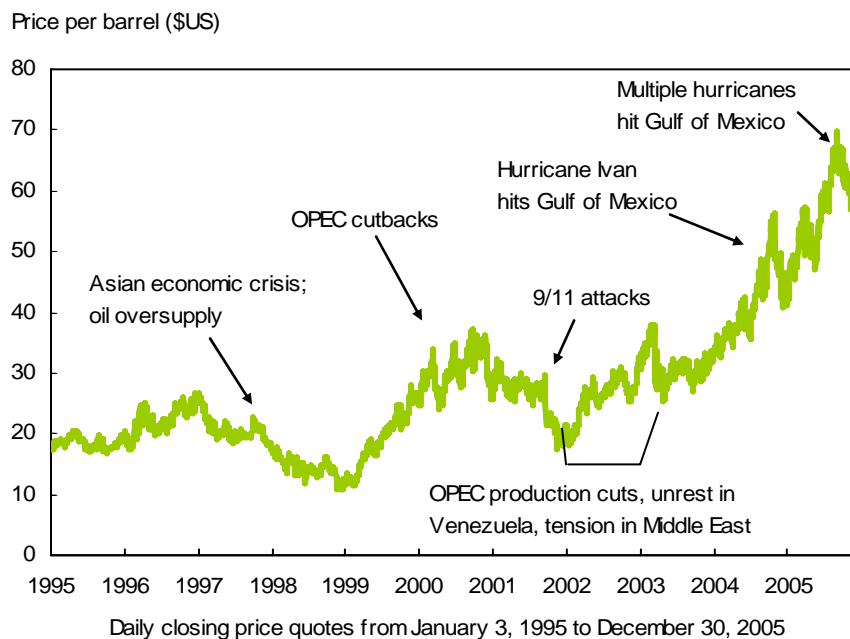
In both 2004 and 2005, hurricanes pounded the Gulf Coast in the United States, disrupting American crude oil production in addition to delaying deliveries. When Hurricane Ivan hit the coast in September 2004, some 3,000 employees were forced to evacuate the offshore platforms. This resulted in a 61% reduction in the Gulf Coast's output of 238,398 cubic metres a day.

In Ivan's aftermath, the price of a barrel of West Texas Intermediate (WTI) reached a then record high of US\$55.17 on the New York Mercantile Exchange. In August 2005, back-to-back hurricanes again hammered the Gulf Coast, resulting in extensive damage to offshore drilling and refineries. By August 31, 2005, the resulting supply shock pushed the price per barrel of WTI to over US\$70.

1. See U.S. Energy Information Administration, "World Oil Price Chronology", www.eia.doe.gov/emeu/CHRONOLOGIES/chron_aug2005.xls (accessed July 13, 2006).

2. Oil includes crude oil, natural gas liquids, condensate, refinery gain, and other liquids. Approximately 98% of oil consists of crude oil.

Chart 1 Crude oil prices on the rise since 2002



Source: United States Department of Energy, West Texas Intermediate.

While prices for WTI are the most often quoted, not all crude oils are created equal. With Canadian companies turning out more and more heavy crude oil in Alberta, it is important to note the differences.

For example, one of the common types of crude oil produced in Canada is that of Lloyd Blend. Since this crude oil is of a heavy sour grade, it requires more time and energy to refine it. As a result, Lloyd Blend has sold at a discount to WTI of between US\$10 and US\$20 a barrel over the past five years.

Exports: Virtually all shipments head south of the border

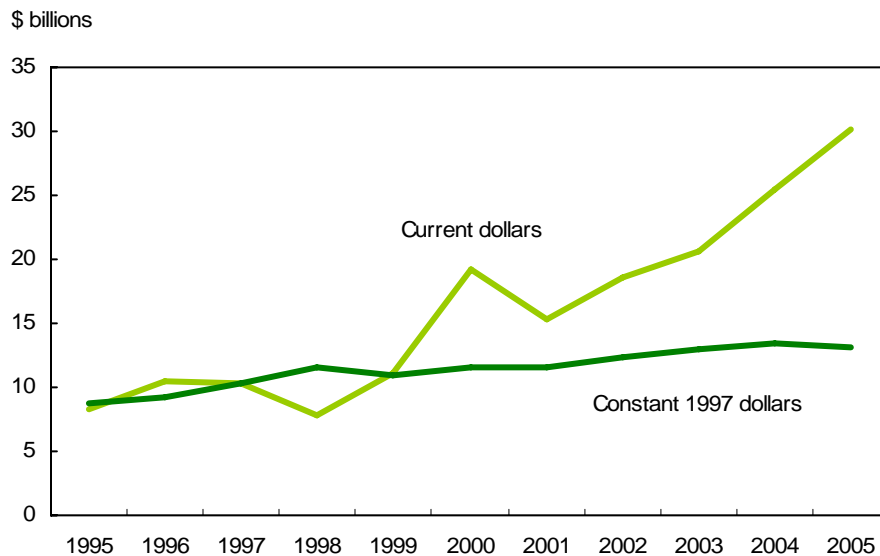
Canadian oil companies derive the majority of their revenues from exports; in 2005, two-thirds (66%) of Canada's crude oil production flowed out of Canada. Since 1995, thirsty Americans have received practically all (99%) of Canadian oil exports.

Between 1995 and 2005, output of crude petroleum in Canada increased an average of 2.6% annually. Stronger foreign demand, almost exclusively from the United States, has driven the additional production, while domestic demand for Canadian crude petroleum has remained fairly stable.

In 2005, Canadian companies exported \$30.2 billion in crude oil, up from \$25.0 billion in 2004, and almost four times the value of \$8.3 billion a decade earlier. The increase in value from 2004 to 2005 was the result of a 30.0% gain in prices, as the volume of crude oil exported declined slightly.

Exports of crude petroleum accounted for 6.7% of total exports in 2005, up from 5.9% in 2004 and more than twice the proportion in 1995.

Chart 2 Prices push exports of crude petroleum to new heights

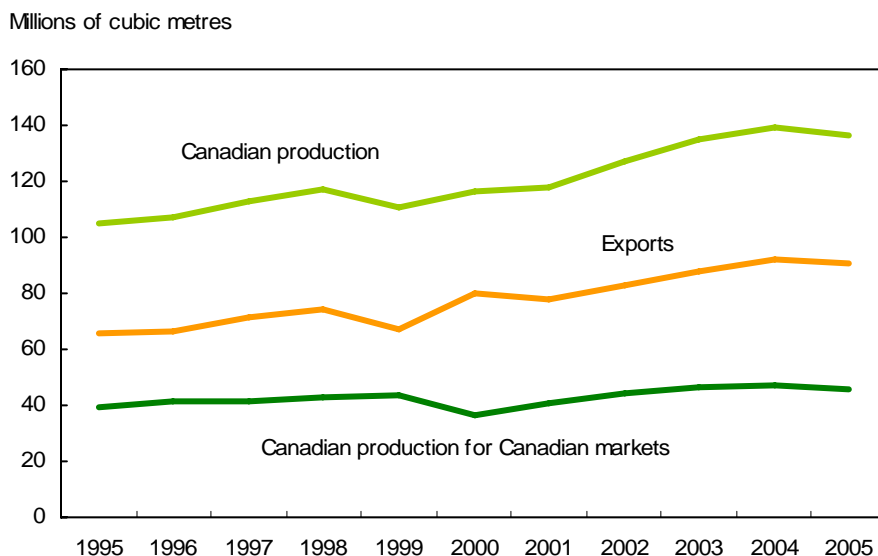


Source: Statistics Canada, International Trade Division.

In terms of volume, Canada's exports have grown by 3.3% on an annual basis since 1995. An 18.3% jump, the largest, occurred in 2000, when the United States imported more than 79.7 million cubic metres of crude oil, up from 67.3 million in 1999. This increase of 12.3 million cubic metres from Canada represented 44% of the total growth in crude oil that the United States imported from the world during 2000.

In addition to their vast imports from Canada, the United States also relies on large quantities imported from countries such as Venezuela, Saudi Arabia and Mexico. Over the past 10 years, Canada's exports to the United States, amounting to 890.0 million cubic metres, have been exceeded by only Saudi Arabia (953.6 million), Venezuela (937.7 million) and Mexico (905.9 million).

Chart 3 In 2005, oil production fell for the first time since 1999



Source: Statistics Canada, CANSIM, table 126-0001.

Alberta oil exports piped entirely into the US

Not surprisingly, Alberta is Canada's top exporting province, shipping \$24.6 billion worth of crude oil in 2005, all of which was destined for the United States. A network of more than 16,000 km of pipeline enables much of the transmission of petroleum within and between Canada and the United States.

The major beneficiary of this pipeline has been the Midwestern states through the Chicago hub, which have a stranglehold on Canadian exports. In 2005, 60.2 million cubic metres of crude oil flowed into states such as Illinois, Minnesota and Oklahoma.

A destination with increasing demand for exports has been the Rocky Mountain region, which includes Wyoming, Colorado and Utah. This region imported more than 15.9 million cubic metres of Canadian crude oil in 2005, more than double 1995 totals.

Canadian refineries approaching capacity

According to the National Energy Board, Canada is a small refining market with only 19 refineries and a capacity of around 320,000 cubic metres a day.³ In 2005, these refineries operated in average at 92% of capacity primarily to meet the needs of the domestic market.⁴

During the last 10 years, Canadian demand for crude petroleum has increased 2.6% per year in average, hitting 102.5 million cubic metres in 2005.

Refineries located in central and eastern Canada import crude oil for their refining needs, and process some eastern and western Canadian output. In 2005, less than half of Ontario's crude oil requirements came from western Canada.

Refineries located in western Canada process western Canadian production exclusively, including crude derived from oil sands.

Refineries transformed more imported petroleum than Canadian sourced

In addition to being an exporter of oil, Canada is also an importer. In fact, more than half of the crude oil refined in Canada comes from a foreign source.

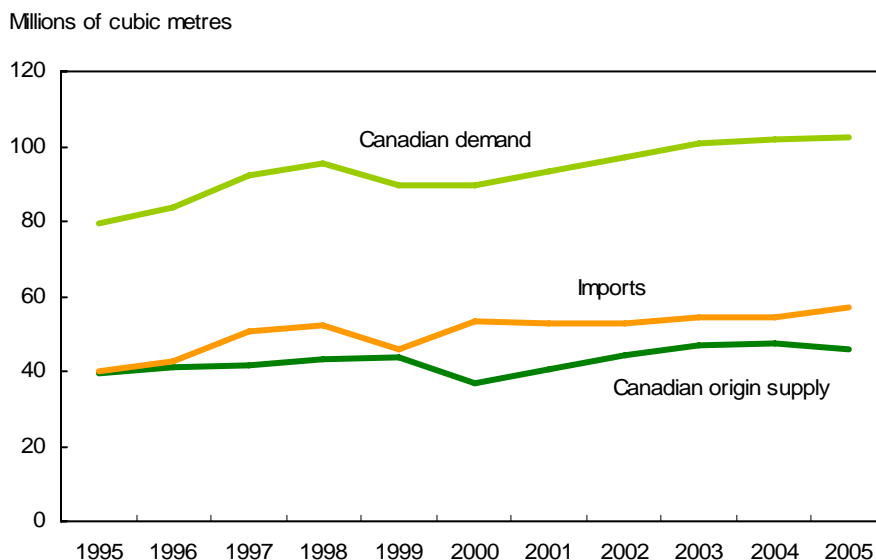
In 2000, nearly 60% of crude petroleum in Canada was imported. By 2005, this proportion stood at just about 55%, as Canadian refineries have increased the use of domestically-produced crude oil.

While the proportion of imports has been declining since the start of the decade, volumes of imports are still on the rise. In 2005, Canadian importers brought in 56.8 million cubic metres, up 7.0% from 2000.

3. See National Energy Board. "Crude Oil and Petroleum Products — The Canadian Industry" www.neb-one.gc.ca/energy/energypricing/industry/CO_e.htm (accessed July 20, 2006).

4. Data available only for petroleum and coal products manufacturing combined. See Statistics Canada, CANSIM, table 028-0002.

Chart 4 More imports than Canadian crude oil to fill domestic demand



Source: Statistics Canada, International Trade Division.

Leading the gain in imports have been shipments from Algeria, which exported 10.1 million cubic metres to Canada in 2005. Algeria's surging exports to Canada, combined with a resurgence of shipments from Saudi Arabia and Venezuela, have pushed the volume of imports from OPEC countries to a record 21.5 million cubic metres. Saudi Arabia provided Canada with 4.4 million cubic metres in 2005, while Venezuela shipped just over 3.0 million.

In 2000, Canada imported 53.1 million cubic metres of crude oil. Of this, 62% came from Europe, traditionally Canada's most important offshore source, while nearly 32% came from OPEC nations.

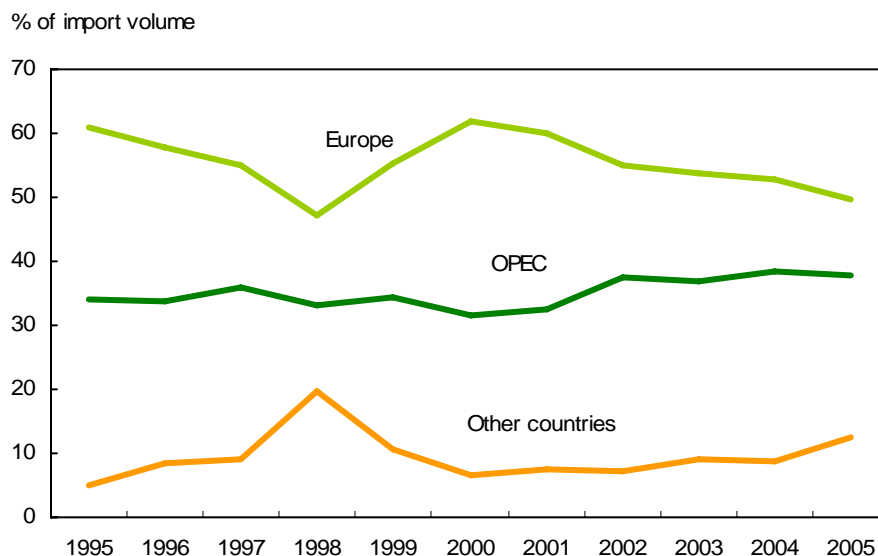
By 2005, the picture had changed somewhat. Of 56.8 million cubic metres of imported oil, Europe accounted for 50%, while the share from OPEC nations had risen to 38%.

Imports from Europe are led by shipments from Norway and the United Kingdom, both of which extract the majority of their crude oil from beneath the North Sea. In 2000, these two countries shipped a combined 32.0 million cubic metres to Canada, a record high. By 2005, Canada's imports from Europe slipped to 28.2 million.

Declining imports from the United Kingdom, which fell 43.2% to 9.5 million cubic metres between 2000 and 2005, were the driving force behind diminishing Europe shipments. This decline was partially compensated by increasing shipments from Russia in the last few years. Imports from Russia totalled 2.9 million cubic metres in 2005.

Canada imports oil from a number of other nations which have made substantial gains recently. Increased imports Equatorial Guinea have led the way. With no significant crude oil production in the African country before 1995, it wasn't until 2000 that Canada received its first shipment from Equatorial Guinea. Imports from this country totalled 1.4 million cubic metres in 2005.

Chart 5 OPEC: a growing source of Canadian crude oil



Source: Statistics Canada, International Trade Division.

Imports from the United States have also been on the rise. As the largest destination of American crude oil, Canada imported 2.3 million cubic metres from south of the border in 2005. Following a downturn that began in 1999, shipments from the United States have risen for three consecutive years. The United States now accounts for 4% of Canada's imports, double the proportion of 2% in 2000.

Canada's trade surplus in crude petroleum with the United States currently sits at 88.4 million cubic metres a year. In dollar terms, with the high price of crude, Canada's trade surplus in oil with the United States hit \$29.1 billion in 2005, nearly four times the level of \$7.8 billion in 1998 when it began widening.

Gas and oil industry in 2005: highest profits, highest taxes, highest investments

For enterprises involved in gas and oil extraction⁵, operating profits reached an historical record in 2005, as well as taxes paid and capital expenditures for construction. Operating profits were 50% higher in 2005 than they were in 2004, going from \$ 20.7 billion to over \$ 30.3 billion. Consequently, income tax increased as well. Gas and oil extraction enterprises paid \$7.5 billion in income taxes in 2005 compared with \$4.5 billion in 2004, a 65% increase.

Increased cash flow may have set the stage for more investments. Between 2004 and 2005, the capital expenditures in the gas and oil extraction industry increased by more than 16% at \$36.7 billion from \$ 31.6 billion.

5. Enterprises involved in crude petroleum industry are often also involved in gas extraction. Data presented in this paper are consolidated at the enterprise level and it is not possible to publish the operating profits and income taxes for petroleum related activities only.

Historical perspective: Alberta's production changing

Prior to the rise of crude oil production in Newfoundland and Labrador, Canada's oil industry was an exclusive club of Alberta and Saskatchewan. Between 1990 and 1997, these two provinces were responsible for more than 94% of Canadian production.

While Alberta still accounts for the lion's share of the production, it has lost some ground to Saskatchewan. Alberta's share in total Canadian production of crude oil decreased from a high of 81% in 1990 to 74% by 1997.

Saskatchewan more than doubled output thanks to incentives provided by various levels of government. In particular, Saskatchewan benefited from government support to construct the NewGrade Upgrader in Regina and the Lloydminster Upgrader, which began production in 1990 and 1992 respectively. The "upgraders" were used to transform heavy crude oil into light crude oil, making it easier to refine.

Between 1990 and 1997, Alberta's crude oil production began to shift its focus from light to synthetic. In 1990, Alberta's light crude oil production was slightly less than half of Canada's total crude production at 42.9 million cubic metres.

However, as Alberta's reserves of light crude oil began to deplete, so did production. By 1997, Alberta's light crude oil production totalled 37.3 million cubic metres and has continue to decline each year since, falling to just over half of its 1990 total at 21.7 million cubic metres in 2005.

Newfoundland and Labrador adds to light crude oil production

In addition to the excitement in Alberta, Newfoundland and Labrador has also been making waves with its production of light crude oil. Beginning in 1997 with the Hibernia oil fields, Newfoundland and Labrador went from producing 3.8 million cubic metres of oil in its first full year of operation to a high of 19.6 million in 2003, with the addition of the Terra Nova oil field.

Since 2003, crude oil production in Newfoundland and Labrador has dropped off, hitting 17.7 million cubic metres in 2005. Production disruptions cause by problems with the gas compression system at the Terra Nova oil field and a maintenance shutdown in early September 2005 were only partly offset by the launch of production at the White Rose oil field.

It is expected that White Rose will be able to ship nearly 16,000 cubic metres per day when it reaches peak production in the first half of 2006.⁶

6. See Husky Energy, "Husky Energy Announces First Oil Production From the White Rose Field", Nov 2005, www.huskyenergy.ca/news/news.asp?pid=106 (accessed July 20, 2006).