

COUNTRY ANALYSIS BRIEFS

Canada

Last Updated: May 2008

Background

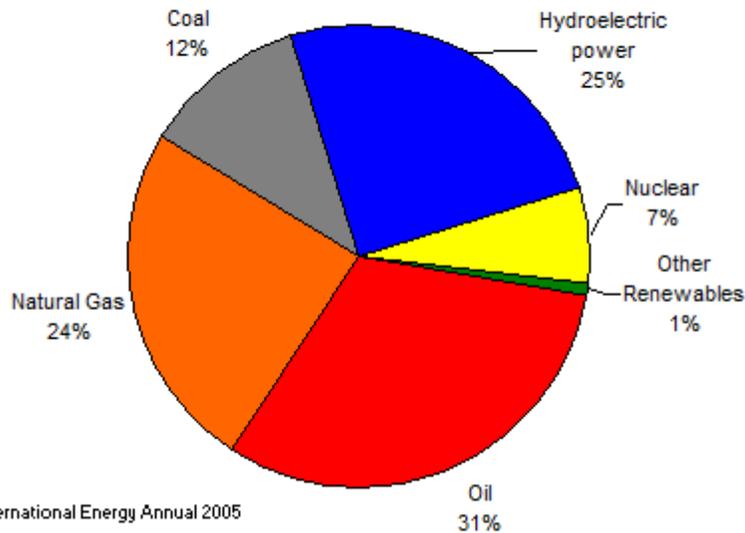
Canada is a net exporter of oil, natural gas, coal, and electricity. It is one of the most important sources for U.S. energy imports.

Canada has considerable natural resources and is one of the world's largest producers and exporters of energy. In 2005, Canada produced 19.1 quadrillion British Thermal Units (Btu) of total energy, the fifth-largest amount in the world. Since 1980, Canada's total energy production has increased by 86 percent, while its total energy consumption has increased by only 48 percent during that period. Almost all of Canada's energy exports go to the United States, making it the largest foreign source of U.S. energy imports: Canada is consistently among the top sources for U.S. oil imports, and it is the largest source of U.S. natural gas and electricity imports. Recognizing the importance of the energy trade between the two countries, both participate in the [North American Energy Working Group](#), which seeks to improve energy integration and cooperation between Canada, the U.S., and Mexico.



In 2005, the largest source of energy consumption in Canada was oil (31 percent), followed by hydroelectricity (25 percent) and natural gas (24 percent). Both coal (12 percent) and nuclear (7 percent) constitute a smaller share of the country's overall energy mix. From 1985-2005, Canada's overall energy mix has remained relatively stable, though hydroelectricity has decreased from 31 percent to 25 percent.

Total Energy Consumption in Canada, by Type (2005)

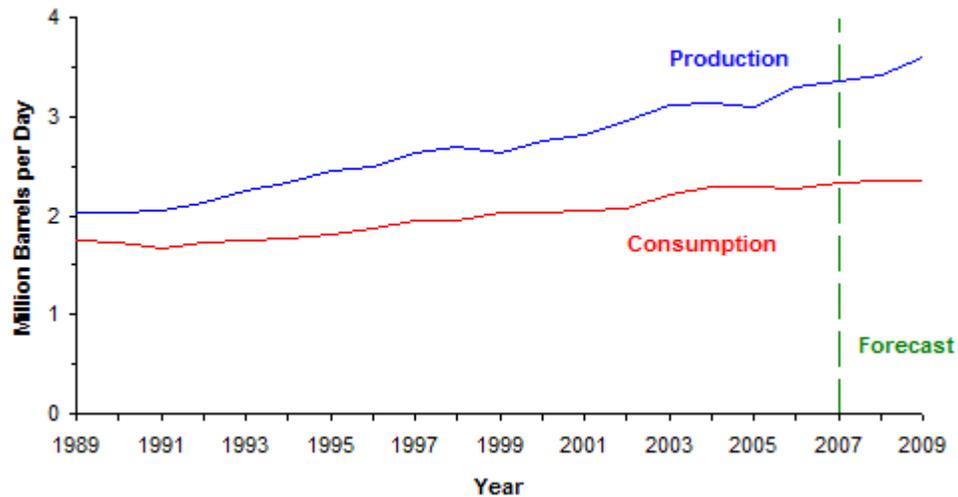


Oil Overview

Canada is consistently the top supplier of oil imports to the United States.

According to *Oil and Gas Journal (OGJ)*, Canada had 179 billion barrels of proven oil reserves as of January 2008, second only to Saudi Arabia. The bulk of these reserves (over 95 percent) are oil sands deposits in Alberta, which are much more difficult to extract and process than conventional crude oil. Canada is a net exporter of oil, with 2007 net exports of 1.0 million bbl/d. Almost all of the country's exports flow to the United States, and it is consistently the top supplier of U.S. oil imports.

Canada's Oil Production and Consumption



Source: EIA International Energy Annual; Short Term Energy Outlook Mar 2007

Canada's total oil production (including all liquids) was 3.36 million bbl/d in 2007. The country's oil production has steadily increased as new oil sands and offshore projects have come on-stream to replace aging fields in the western province. Overall, EIA predicts that oil sands production will increase even further in coming years and more than offset the decline in Canada's conventional crude oil production: according to the May 2008 *Short Term Energy Outlook*, EIA expects Canadian oil production to increase to 3.42 million bbl/d in 2008 and 3.59 million bbl/d in 2009. Canada consumed an estimated 2.34 million bbl/d of oil in 2007. The country sends over 99

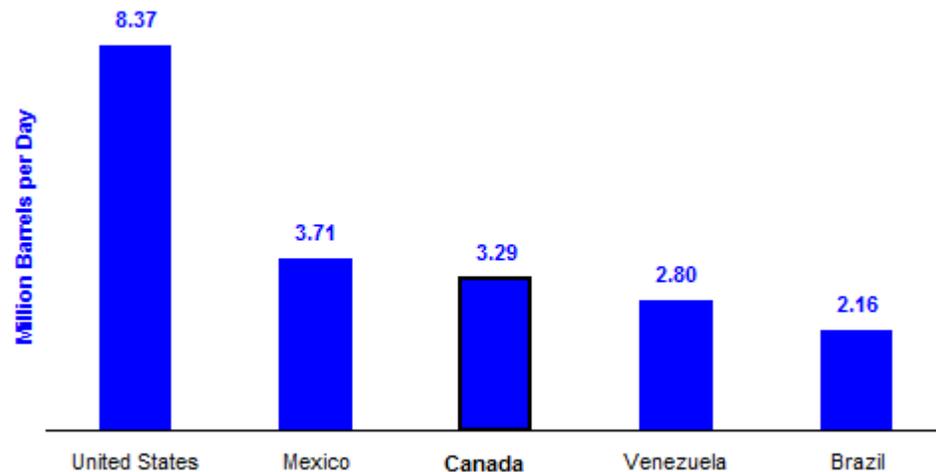
percent of its oil exports to the U.S., and it is consistently one of the top three sources of U.S. oil imports.

Sector Organization

Canada has a privatized oil sector that has witnessed consolidation in recent years. The largest integrated operator in the country is Imperial Oil, majority owned by ExxonMobil. In 2002, Alberta Energy Company and PanCanadian Energy merged to create EnCana, Canada's largest independent upstream operator. Other significant oil producers in Canada include Talisman Energy, Suncor, EOG Resources, Husky Energy, and Apache Canada.

Canada's oil sands producers have attracted increasing attention from Asian oil companies, seeking to satisfy growing demand in their countries and secure equity oil stakes. In July 2006, state-run Korea National Oil Corporation (KNOC) purchased the BlackGold bitumen deposit from Newmont for \$250 million; BlackGold contains an estimated 250 million barrels of crude oil, and KNOC plans to bring 35,000 bbl/d of production onstream at the site by 2010. China's Sinopec earlier purchased a 40 percent stake in the Syneco's Northern Lights oil sands project, which Syneco plans to bring online in 2010 at a production rate of 100,000 bbl/d. In addition, the China National Offshore Oil Corporation (CNOOC) holds a stake in MEG Energy, a subsidiary of EnCana that operates the Christina Lake project. In 2007, the Chinese National Petroleum company (CNPC) won exploration rights for a 260-acre tract in Alberta.

Top Western Hemisphere Oil Producers, 2007



Source: EIA International Petroleum Monthly

Exploration and Production

Canadian oil production comes mainly from three sources: the Western Canada Sedimentary Basin (WCSB); the oil sands deposits of northern Alberta; and offshore fields in the Atlantic Ocean. Alberta contains the largest share of Canada's oil production, as it holds the majority of oil sands deposits and the bulk of the WCSB. According to Statistics Canada, Alberta represented 68 percent of Canada's national oil production in 2007.

Western Canada Sedimentary Basin

The WCSB, underlying most of Alberta and parts of British Columbia, Saskatchewan, Manitoba and the Northwest Territories, has been the main source of Canadian oil production for the past 50 years. The age of many of the fields, though, has led to a steady decline in conventional oil production in the WCSB. Analysts predict that oil sands will supplant conventional sources as the focus of future oil production in western Canada. Conventional crude oil production in the WCSB represents around 38 percent of Canada's total crude oil production, down from 65 percent in 1999.

Oil Sands

Oil sands contain deposits of bitumen, a heavy, viscous oil. There are two methods currently used

to extract bitumen from the ground: open pit mining and *in situ* ("in place"). Open pit mining resembles conventional mining techniques and is effective in extracting oil sands deposits near the surface. However, the bulk of Canada's estimated oil sands deposits (80 percent) are too deep below the surface to use open pit mining. The second method, *in situ*, can reach these deeper deposits. *In situ* extraction involves the use of steam to separate bitumen from the surrounding sands and lift it to collection pools near the surface. To date, Canadian oil sands producers have employed each method almost equally, but future production will likely shift to emphasize *in situ* extraction. Once extracted, oil sands producers must add lighter hydrocarbons to the bitumen to allow it to flow through pipelines. Upgraders then process most of the bitumen into "synthetic crude," which can then be sold to a traditional oil refinery, though some bitumen is also sold in raw form for the production of heavy products like tar and asphalt. Some oil sands projects have integrated upgrading capacity, while others must send their raw bitumen production to another facility.

In 2007, oil sands production represented approximately half of Canada's total crude oil production. The Athabasca oil sands deposit in northern Alberta is one of largest oil sands deposits in the world. There are also sizable oil sands deposits on Melville Island in the Canadian Arctic, and two smaller deposits in northern Alberta near Cold Lake and Peace River.

The largest oil sands projects in the Athabasca area utilize open-pit mining. The Syncrude Project, operated by Canadian Oil Sands Limited, produced 258,000 bbl/d of synthetic crude in 2006. Suncor operates another large open-pit mining project in Alberta, which produced 236,000 bbl/d of crude oil in 2007. Finally, the Athabasca Oil Sands Project (AOSP), operated by Shell Canada, began production in 2002 and currently has a capacity of 155,000 bbl/d. AOSP utilizes a facility adjacent to Shell's Scotford refinery to upgrade raw bitumen produced by the project.

The *in situ* oil sands projects in the Athabasca area are smaller than their mining counterparts. In 2004, Suncor began operations at its Firebag project, which utilizes a relatively new *in situ* technology called steam-assisted gravity drainage (SAGD). Other SAGD projects include Petro-Canada's MacKay River and Dover; EnCana's Foster Creek and Christina Lake; and Nexen's Athabasca and Long Lake. Petro-Canada's Dover facility also contains a demonstration project of a new *in situ* technology called vapor extraction (VAPEX). VAPEX utilizes solvents, such as butane, to extract raw bitumen, rather than steam; VAPEX could allow significant cost savings for *in situ* operators, since the operators can re-use most of the solvents.

Outside of the Athabasca deposit, the largest oil sands project is Imperial Oil's Cold Lake *in situ* facility, with a capacity of 150,000 bbl/d. Also in the Cold Lake area, CNRL operates Primrose, while Husky operates the Tucker project. In the Peace River deposit, Shell Canada operates Cadotte Lake (11,000 bbl/d).

Despite the excitement surrounding the development of Canada's oil sands reserves, there are still several difficulties that could impede the future development of the industry. Analysts predict that the production of synthetic crude from oil sands is only economically viable with relatively high crude oil prices. While further advances in oil sands technology could reduce production costs, it is likely that synthetic oil production will continue to be dependent upon high crude oil prices.

Second, the oil sands industry is heavily reliant upon water and natural gas, which is necessary in both the extraction of bitumen from oil sands and the upgrading of bitumen to synthetic oil. Even though there have been some efforts to reduce this dependence on natural gas, any increase in natural gas prices or sharp reduction in natural gas supply would have critical repercussions for the oil sands industry. Newer technologies could reduce the need for natural gas, such as the aforementioned VAPEX *in situ* process. Another technique in development is called toe-to-heel air injection (THAI), where bitumen is ignited in the ground to warm the reserves, then pumped with horizontal wells. Finally, there has been some discussion of the potential of using nuclear power plants to provide energy for steam generation, though no one has developed any concrete plans to implement this approach. In any event, water or natural gas constraints in the area put downward pressure on any forecast of future oil sands production (see below).

Finally, there are reports that the oil sands boom is creating a labor shortage in Alberta's oil industry, especially in Fort McMurray. This has led to an escalation in labor costs and construction delays due to a lack of available workers. Several companies planning or developing oil sands projects have significantly increased their cost estimates due to rising prices for labor, materials, and support services. In 2005, Shell Canada announced that the planned costs for its proposed 100,000-bbl/d expansion of the AOSP project had increased from C\$4 billion to C\$7 billion; in

2006, Western Oil Sands, a stakeholder in the AOSP project, warned that these costs could rise even further to C\$11 billion. Along with labor issues, oil sands projects must also face the challenges of the generally tight global market for industrial goods and engineering services.

Even considering these concerns, most forecasts of world oil markets estimate that Canadian oil sands will become an increasingly important component of world oil supply. EIA's [International Energy Outlook 2006](#) (IEO) estimates that Canadian oil sands operators will produce 3.6 million bbl/d by 2030.

Offshore

Canada has three oil projects off its Atlantic coastline, all located in the Jeanne d'Arc Basin: Hibernia (135,000 bbl/d, PetroCanada), Terra Nova (116,000 bbl/d, PetroCanada), and White Rose (117,000 bbl/d, Husky). The basin has seen an increase in investment plans in recent years, with both White Rose and Hibernia announcing plans to expand production by incorporating satellite fields. Outside of the Jeanne d'Arc Basin, StatoilHydro announced in 2008 that it would begin a drilling program at the Mizzen field in the Flemish Pass basin. Chevron signed a MOU with the provincial government in 2007 to develop the Hebron-Ben Nevis field, which could hold recoverable reserves of 700 million barrels. Operators at the Atlantic oil fields must contend with harsh natural conditions, including rough seas, seasonal icebergs, and extreme temperatures. These factors increase the difficulty and costs of oil production in the region.

Off the Pacific coast, industry experts believe that there could be sizable oil and natural gas reserves. However, there has been no production to date there, because of a federal ban on offshore oil activities in the Pacific Ocean.

Pipelines

Domestic System

An extensive pipeline system transports western Canadian oil to domestic and U.S. markets. There are two major oil pipeline operators in Canada: Enbridge Pipelines and Kinder Morgan Canada (formerly Terasen). Enbridge operates a 9,000-mile network of pipelines and terminals, delivering oil from Edmonton, Alberta, to eastern Canada and the U.S. Great Lakes region. Kinder Morgan operates the Trans Mountain Pipe Line (TMPL), which delivers oil mainly from Alberta west to refineries and terminals in the Vancouver, British Columbia area. The expansion of Alberta's oil sands industry has necessitated the construction of several new pipelines to transport diluted bitumen and synthetic crude to downstream facilities in the Edmonton area.

Export Pipelines

Canada has extensive oil pipeline connections with the United States. Enbridge maintains connections between major Canadian cities and Chicago, integrating the Canadian and U.S. components of its network. Enbridge also operates Spearhead, a 650-mile pipeline with a capacity of 125,000-bbl/d that links Chicago with Cushing, Oklahoma; originally carrying oil from Cushing to Chicago, Enbridge received regulatory approval in late 2004 to reverse the flow of the pipeline, allowing it to export oil from Canada deeper into the U.S. market.

Kinder Morgan exports oil to the U.S. through an extension of the TMPL that reaches northern Washington. It also operates Express, a 790-mile, 170,000-bbl/d pipeline that links Hardisty, Alberta and Casper, Wyoming; from Casper, the company's 930-mile, 120,000-bbl/d Platte pipeline runs to Wood River, Illinois.

Any increase in oil sands production will require additional pipeline capacity to take that production to world markets. Along with expanding existing trunk lines, Enbridge has proposed a new pipeline linking the Chicago area with the U.S. Gulf Coast, which would allow oil sands producers greater access to the large concentration of refineries there. Enbridge has floated plans for the construction of the 720-mile, 400,000-bbl/d Gateway pipeline from Edmonton to Kitimat, a deepwater port in British Columbia capable of supporting very large crude carriers (VLCC). The Gateway pipeline would facilitate the export of oil sands to Asia and California. Kinder Morgan has discussed plans to build a similar pipeline or upgrade the capacity of the TMPL.

Import Pipelines

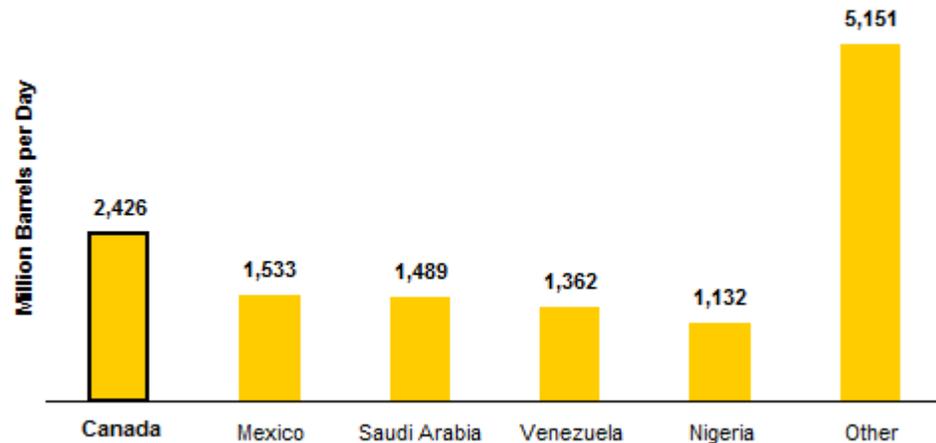
Enbridge has proposed construction of the Southern Lights pipeline, which would transport 180,000 bbl/d of light hydrocarbons from Chicago to Edmonton. Oil sands operators in Alberta rely on these hydrocarbons to dilute bitumen so that it can flow through pipelines. Currently, the largest source of diluents comes from natural gas liquids, however the prospects of declining Canadian

natural gas production mean that Alberta could face a diluents crunch without additional supplies.

Oil Exports and Imports

In 2007, Canada exported 2.4 million bbl/d of crude oil and refined products to the U.S., the single-largest source of U.S. oil imports. The largest share of U.S.-bound Canadian oil exports go to the Midwest (PAD District II), followed by the Rocky Mountains (PAD District IV). The bulk of Canadian exports to the U.S. have traditionally gone to PAD Districts II, because this area is well connected to Alberta by oil pipelines and not well served by coastal import terminals in the U.S.

Sources of U.S. Petroleum Imports,* 2007



Source: EIA International Petroleum Monthly

*Includes oil and refined products

Even though Canada is a net oil exporter, it imports sizable quantities of crude oil and refined products. According to the International Energy Agency (IEA), Canada imported around 1.2 million bbl/d of crude oil and refined products in 2007. Canada's major population centers in the eastern part of the country are not well connected to its principle production facilities in the western interior, meaning that it is often easier to import oil along the coastlines rather than transport it domestically. Most oil imports come from Algeria (crude oil), Norway (crude oil) and the U.S. (refined products).

Refining

OGJ reported that Canada had 1.97 million bbl/d of crude oil refining capacity in January 2008. While Alberta contains most of Canada's crude oil production, a large portion of its refining capacity resides in the more-populated eastern part of the country. Alberta has four refineries, with total capacity of 437,400 bbl/d, whereas Ontario and Quebec have a combined 919,600 bbl/d of refining capacity. According to Natural Resources Canada, the largest single refinery in the country is Irving Oil's 280,000 bbl/d St. John plant in New Brunswick.

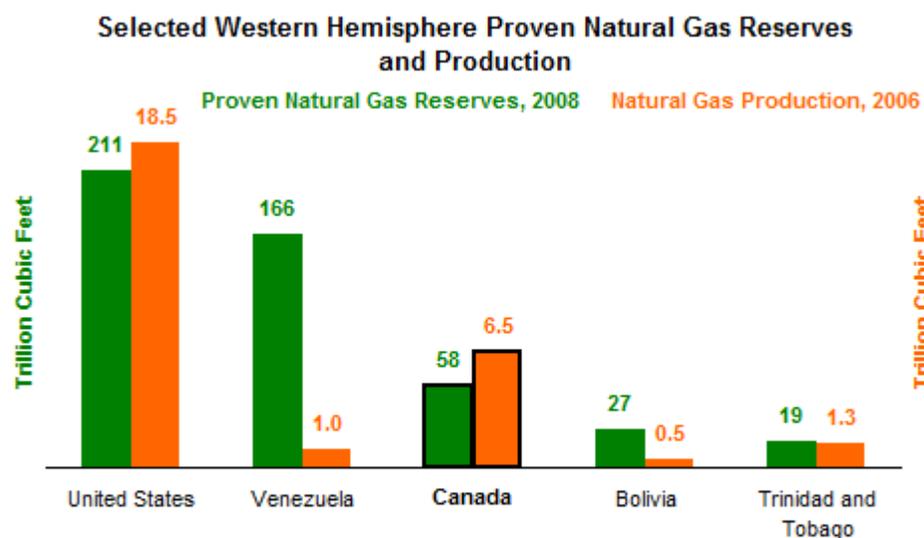
In January 2007, Irving Oil initiated the environmental review process for the construction of the 300,000 bbl/d Eider Rock refinery in Saint John, New Brunswick. The facility would occupy land near the company's existing refinery and under-construction LNG terminal (see Natural Gas section for more information). The project would cost an estimated \$7 billion and supply both the domestic market and potential exports to Boston and New York. If completed, the facility would be the first grassroots refinery in Canada in the last 20 years.

Natural Gas

Oil and Gas Journal (OGJ) reports that Canada had 57.9 trillion cubic feet (Tcf) of proven natural gas reserves in January 2008. The country produced 6.5 Tcf of natural gas in 2006, while consuming 3.3 Tcf. The country is the second largest producer of natural gas in the Western Hemisphere, after the United States. Canada is an important source of the U.S. natural gas supply. In 2006, it exported 3.6 Tcf of natural gas to the United States, representing 86 percent of total U.S. natural gas imports that year. Most Canadian natural gas exports enter the U.S. through

Canada is one of the world's largest natural gas producers and exporters.

pipelines in Idaho, Montana, North Dakota, and Minnesota.



Source: Oil and Gas Journal; EIA International Energy Annual

Exploration and Production

Like the oil industry, Canada's natural gas production is concentrated in the WCSB, particularly in Alberta. Even though there have been some new conventional natural gas finds in the WCSB, many analysts predict that conventional natural gas production in the WCSB has reached its zenith. Future natural gas production could center on coal bed methane (CBM) deposits in the WCSB, Arctic frontier natural gas deposits, the Deep Basin area, and offshore natural gas fields.

Western Canada Sedimentary Basin (WCSB)

The WCSB includes most of Alberta and parts of British Columbia, Saskatchewan, and Manitoba. Natural gas production in the WCSB grew rapidly in the 1990s, increasing over 60 percent during the decade. Alberta contains around 80 percent of Canada's total natural gas production. Additional production in the WCSB has begun to move away from Alberta towards new discoveries in British Columbia. There is also a small amount of natural gas production in the portion of the WCSB in Saskatchewan and Manitoba.

Offshore

The Scotian Basin, off the coast of Nova Scotia, is the center of natural gas production on the Atlantic coast. The Sable Offshore Energy Project (SOEP), led by ExxonMobil and Shell Canada, began production in 1999. SOEP encompasses numerous offshore fields, with the Alma and South Venture fields the latest brought on-line. SOEP has a production capacity of 400 MMcf/d of natural gas and 20,000 bbl/d of natural gas liquids (NGLs).

Offshore oil operators in Newfoundland predict that they could also produce sizable natural gas volumes from their reserves. The Hibernia and White Rose fields contain a combined 4 Tcf in recoverable natural gas reserves. Though there is no current natural gas production at either site, but both ExxonMobil (Hibernia) and Husky Energy (White Rose) have stated that they could commence natural gas production in the future. The offshore basins in British Columbia contain an estimated 43.4 Tcf of total natural gas reserves, though the previously-mentioned federal moratorium on drilling prevents any production activity in the area.

Arctic

The Mackenzie Delta, located in the Northwest Territories, holds an estimated 5-6 Tcf of recoverable natural gas reserves. Natural gas from the region could begin flowing to southern markets, if natural gas companies can complete the Mackenzie Gas Pipeline on schedule (see below). There are three large, proven natural gas fields in the Mackenzie Delta: Imperial Oil's Taglu field (3 Tcf); ConocoPhillips' Parsons Lake field (1.8 Tcf); and the joint Shell Canada-ExxonMobil Niglintgak field (1 Tcf).

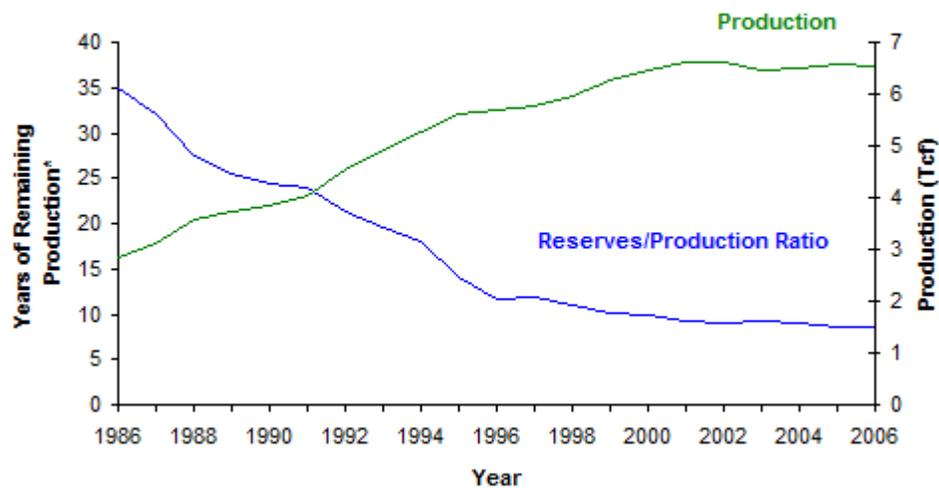
Unconventional Natural Gas Sources

CBM production is still in its infancy in Canada, with the first wells drilled only in 1997. There is a strong belief that CBM production will eventually replace some of the decline in conventional natural gas production. According to the Alberta Geological Service, there could be as much as 500 Tcf of CBM gas in place in Alberta alone. Shale gas is another potential source of unconventional natural gas production in Canada that is still in the early stages of development: according to industry sources, the Montney shale formation in British Columbia could contain 50 Tcf of shale gas.

Outlook

Canada has continued to produce natural gas faster than it replenishes its reserves. Canada's production/reserves ratio (the number of years of proven reserves remaining at existing production levels) has declined from 35 years in 1985 to 9 years in 2006. Along with falling production, demand for natural gas is expected to rise, driven by the oil sands industry and the power sector. According to Ziff Energy Group, natural gas demand by the oil sands industry could rise from 1 Bcf/d in 2007 to 2.8 Bcf/d in 2015. The combination of falling production and rising domestic consumption could impact Canadian natural gas exports to the United States: according to Ziff Energy Group, Canadian natural gas exports to the U.S. could fall to 5 Bcf/d by 2015, versus 9.9 Bcf/d in 2007.

Canada's Natural Gas Production and Reserves/Production Ratio



Source: Canadian Association of Petroleum Producers

*At current year production level

Pipelines

Domestic System

TransCanada Pipelines is the largest operator of natural gas pipelines in Canada. Its 25,600-mile network transports the bulk of Canada's natural gas production. Important parts of the TransCanada network include the 13,900-mile, 10.6-Bcf/d Alberta System, the 120-mile, 0.9-Bcf/d British Columbia System, the 8,900-mile, 7.2-Bcf/d Canadian Mainline, and the 600-mile, 3.0-Bcf/d Foothills System.

Mackenzie Valley Gas Pipeline

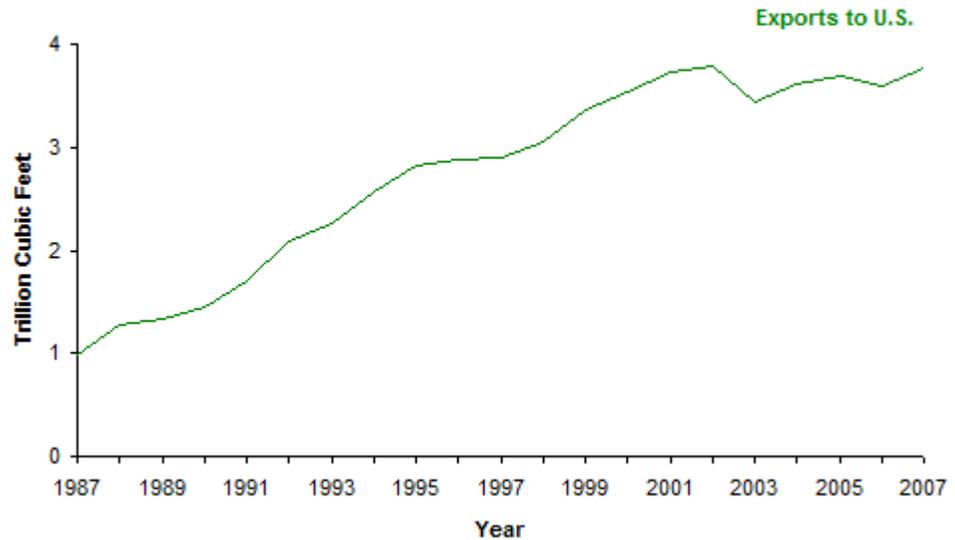
A consortium of natural gas companies, led by Imperial Oil, plan to build the Mackenzie Valley natural gas pipeline. The 760-mile, 1.2-Bcf/d pipeline would carry natural gas from inside the Arctic Circle to northern Alberta, where it would flow into the existing natural gas transportation system; there would also be a parallel pipeline to carry NGLs. Cost estimates have increased to a \$17 billion, with a potential in-service date of 2014.

Export Pipelines

Canada's natural gas pipeline system is highly interconnected with the United States. The 1,300-mile, 1.9-Bcf/d Gas Transmission Northwest pipeline runs from the British Columbia-Idaho border to the Oregon-California border, connecting TransCanada's western Canadian network to the

U.S. domestic market. The 2,000-mile, 2.4-Bcf/d Great Lakes Gas Transmission pipeline runs from Emerson, Manitoba to St. Clair, Ontario, servicing Minnesota, Wisconsin, and Michigan. Running from the New York-Canada border to Long Island, the 400-mile, 0.9-Bcf/d Iroquois Gas Transmission System pipeline serves natural gas distribution networks in New York State. The 280-mile, 0.2-Bcf/d Portland Natural Gas Transmission System distributes natural gas from Quebec to greater New England. The 780-mile, 650-MMcf/d Maritimes and Northeast Pipeline transports natural gas from Canada's Atlantic natural gas fields to Dracut, Massachusetts, where it interfaces with the U.S. domestic network.

Canada's Natural Gas Exports to the U.S.



Source: EIA Natural Gas Annual

Alliance Pipeline Limited, a partnership of Enbridge and the Fort Chicago Energy Partners income fund, operates the 970-mile, 1.3-Bcf/d Alliance pipeline from Gordondale, Alberta to the Saskatchewan-Montana border. Its U.S.-based partner company operates the U.S. portion of the pipeline, which runs 890 miles into Illinois.

Liquefied Natural Gas

To compensate for reduced domestic production, Canadian natural gas companies have begun to explore the construction of liquefied natural gas (LNG) receiving terminals. Natural gas companies either could sell re-gasified LNG on the domestic market or re-export it to the United States. In total, there are seven LNG regasification projects in Canada at various stages of development, including one in Nova Scotia, one in New Brunswick two in British Columbia, and three in Quebec. These projects represent a combined 4.9 Bcf/d of regasification capacity, though the Canaport LNG project is the only one under construction.

Proposed LNG Receiving Terminals in Canada

Name	Location	Status	Initial Capacity
Maple LNG	Nova Scotia	Pending Initial Construction	1.0 Bcf/d
Bear Head LNG	Nova Scotia	Cancelled	1.0 Bcf/d
Canaport LNG	New Brunswick	Under Construction	1.0 Bcf/d
Grassy Point	Newfoundland	Pending Regulatory Review	
Kitimat LNG	British Columbia	Pending Initial Construction	600 MMcf/d
Prince Rupert	British Columbia	Pending Regulatory Review	300 MMcf/d
Gros Cacouna	Quebec	Suspended	500 MMcf/d
Rabaska LNG	Quebec	Pending Initial Construction	500 MMcf/d
Grande-Anse	Quebec	Proposed	1.0 Bcf/d

New Brunswick

In New Brunswick, Canaport LNG, a consortium of Irving Oil and Repsol-YPF, began construction of a 1 Bcf/d LNG terminal at Canaport in September 2005, with estimated costs of the project at \$750 million. The Canaport project will provide natural gas for Irving Oil's refinery in St. John and local power plants. However, the project will also feature a connection to the Maritimes & Northeast Pipeline, facilitating exports to the United States. Canaport LNG estimates the project onstream in late 2008.

Nova Scotia

In 2006, a consortium led by Netherlands-based 4Gas purchased the Maple LNG project, a planned LNG terminal in Nova Scotia. The Maple LNG terminal could feed domestic customers or export natural gas to the United States through the Maritimes & Northeast Pipeline. The project has received environmental approval and is now reportedly seeking suppliers. According to 4Gas, the project could come onstream in 2010, with an initial send-out capacity of 1.0 Bcf/d. Keltic Petrochemicals plans to develop an adjacent petrochemicals plant.

Newfoundland

Newfoundland LNG has proposed to build an LNG receiving terminal at Grassy Point in Placentia Bay. The project is reportedly still in the regulatory process.

British Columbia

WestPac Terminals has proposed the construction of an LNG terminal at Prince Rupert, with initial send-out capacity of 300 MMcf/d. The company has reportedly secured financing for preliminary engineering and environmental review of the project. Galveston LNG received approval from federal and provincial authorities in early 2007 to build its LNG terminal in Kitimat. According to media reports, the company is still searching for LNG suppliers for the project.

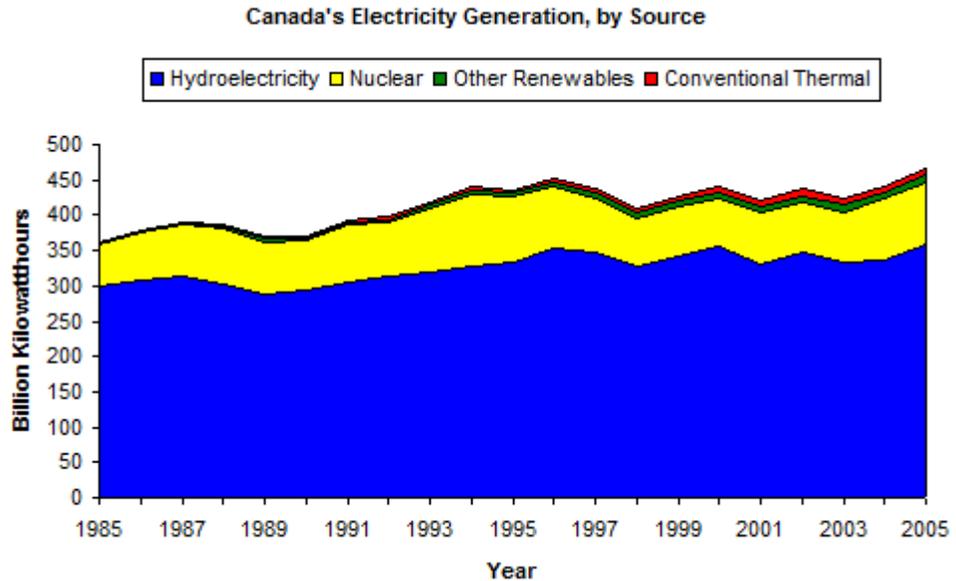
Quebec

Petro-Canada and TransCanada Pipelines proposed to build a 500-MMcf/d LNG receiving terminal at Gros Cacouna, on the St. Lawrence River. According to industry sources, the project has been suspended, due to an inability to secure LNG supplies. A consortium of Enbridge, Gas Metro, and Gaz de France has proposed another project in the province, the Rabaska LNG terminal. Located in Levis, the Rabaska LNG project would have an initial send-out capacity of 500 MMcf/d with a potential in-service date of 2010. This project is now reportedly seeking supply contracts. Finally, Energia Grande-Anse has proposed to build an LNG receiving terminal along the Saguenay River in Quebec. That project is still in the preliminary stages of development.

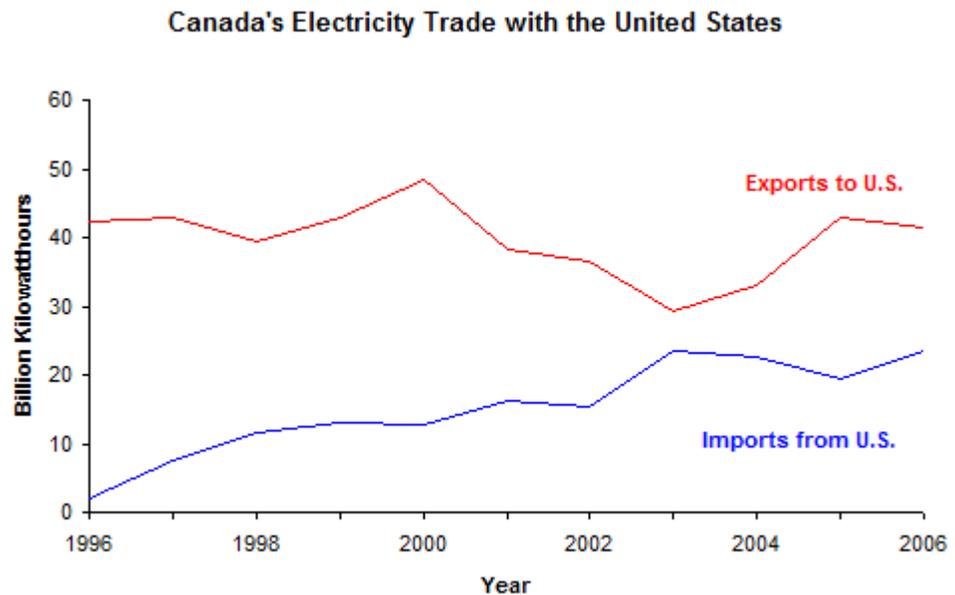
Electricity

Canada is one of the world's largest producers of hydroelectricity.

Canada had 120 gigawatts of installed electricity generating capacity in 2006. The country produced 610 billion kilowatt hours (Bkwh) of electric power in 2006 while consuming 540 Bkwh. Hydroelectricity represents the largest share of Canada's electricity generation, followed by conventional thermal and nuclear.



The electricity networks of Canada and the United States are heavily integrated. In 2006, Canada exported 41.5 Bkwh of electricity to the United States while importing 23.4 Bkwh. Over the past ten years, Canadian imports of electricity from the U.S. have increased ten-fold, while exports have remained relatively constant. Due to the increasing interdependence of the networks in both countries, a dependency made clear during the 2003 Northeast blackout, there have been greater efforts to increase cooperation and coordination between Canada and the U.S. A bilateral commission is planning the formation of the [North American Electric Reliability Organization](#), an intergovernmental organization that would monitor network reliability, settle trans-border disputes, and formulate common industry standards.

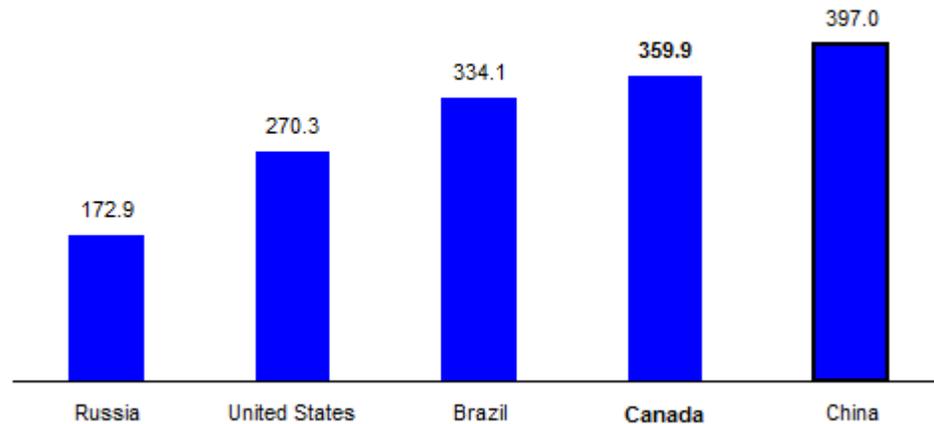


Hydroelectricity

Canada is one of the world's largest producers of hydroelectricity, generating 352 Bkwh from the source in 2006. Canada was once the world's largest hydroelectricity production, but China has overtaken that position in the last few years. Quebec's La Grande plant is one of the world's

largest hydroelectric facilities, with an installed capacity of 15,000 MW. Quebec has the largest share of Canada's hydroelectric production, followed by British Columbia.

World's Top Hydroelectricity Producers, 2006 (Billion kilowatthours)



Source: EIA International Energy Annual

Profile

Energy Overview

Proven Oil Reserves (January 1, 2008E)	178.8 billion barrels
Oil Production (2007E)	3,360 thousand barrels per day
Oil Consumption (2007E)	2,340 thousand barrels per day
Crude Oil Distillation Capacity (2007E)	2,017 thousand barrels per day
Proven Natural Gas Reserves (January 1, 2008E)	57.9 trillion cubic feet
Natural Gas Production (2006E)	6.5 trillion cubic feet
Natural Gas Consumption (2006E)	3.3 trillion cubic feet
Recoverable Coal Reserves (2005E)	7,251 million short tons
Coal Production (2006E)	69.4 million short tons
Coal Consumption (2006E)	62.0 million short tons
Electricity Installed Capacity (2005E)	120.3 gigawatts
Electricity Production (2005E)	609.6 billion kilowatt hours
Electricity Consumption (2005E)	540.2 billion kilowatt hours
Total Energy Consumption (2005E)	14.3 quadrillion Btus*, of which Oil (33%), Natural Gas (25%), Hydroelectricity (25%), Coal (9%), Nuclear (7%), Other Renewables (1%)

Total Per Capita Energy Consumption (2005E)	436 million Btus
Energy Intensity (2004E)	13,825 Btu per \$2000-PPP**

Environmental Overview

Energy-Related Carbon Dioxide Emissions (2005E)	631 million metric tons
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Per-Capita, Energy-Related Carbon Dioxide Emissions (2005E)	19.2 metric tons
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Carbon Dioxide Intensity (2005E)	0.6 Metric tons per thousand \$2000-PPP**
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Environmental Issues air pollution and resulting acid rain severely affecting lakes and damaging forests; metal smelting, coal-burning utilities, and vehicle emissions impacting on agricultural and forest productivity; ocean waters becoming contaminated due to agricultural, industrial, mining, and forestry activities

Major Environmental Agreements party to: Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Persistent Organic Pollutants, Air Pollution-Sulfur 85, Air Pollution-Sulfur 94, Antarctic-Environmental Protocol, Antarctic-Marine Living Resources, Antarctic Seals, Antarctic Treaty, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands

Oil and Gas Industry

Organization	Private sector. Major companies include ExxonMobil (via its Imperial Oil subsidiary), Royal Dutch Shell, Suncor, EnCana, and Talisman Energy
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Major Pipelines Enbridge, Kinder Morgan, TransCanada, Alliance Pipeline Limited, Maritimes and Northeast.

Major Refineries (capacity, bbl/d) Irving Oil St. John (250,000), Valero Energy Levis (215,000), Imperial Oil Edmonton (187,200)

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP figures from OECD estimates based on purchasing power parity (PPP) exchange rates.

Links

U.S. Government

[CIA World Factbook - Canada](#)

[U.S. Department of State Country Background Notes - Canada](#)

[U.S. Embassy in Canada](#)

[U.S. International Trade Administration, Country Commercial Guide - Canada](#)

Associations and Institutions

[Canadian Association of Oilwell Drilling Contractors](#)

[Canadian Association of Petroleum Producers](#)

[Canadian Centre for Energy Information](#)

[Canadian Energy Research Institute](#)

[Canadian Wind Energy Association](#)

[Energy Council of Canada](#)

[Oil Sands Discovery Centre](#)

[The Coal Association of Canada](#)

Foreign Government Agencies

[Alberta Department of Energy](#)

[Alberta Energy and Utilities Board](#)

[British Columbia Ministry of Energy and Mines](#)
[Manitoba Petroleum Division](#)
[National Energy Board of Canada](#)
[Natural Resources Canada, Energy Sector](#)
[New Brunswick Ministry of Energy](#)
[Newfoundland and Labrador Ministry of Mines and Energy](#)
[Newfoundland Offshore Petroleum Board](#)
[Nova Scotia Offshore Petroleum Board](#)
[Ontario Ministry of Energy](#)
[Québec Ministry of Energy](#)
[Saskatchewan Industry and Resources](#)

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