First Research®

CANADIAN INDUSTRY PROFILE

Oil & Gas Exploration & Production

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Overview

Canada's oil and gas exploration and production industry includes about 1,500 employer establishments (single-location companies and units of multi-location companies) with combined annual revenue of about $92 billion. Major companies include Canadian Natural Resources, Cenovus Energy, Encana, Husky Energy, and Syncrude Canada.

COMPETITIVE LANDSCAPE

Demand is driven by domestic and foreign applications for fuel, such as transportation, home heating, and industry. Large companies benefit from greater access to capital for investment in exploration, technology, equipment, and acquisitions. Smaller operations compete by building expertise in a focused geographic area. The industry is fragmented. More than 60% of establishments are small, employing four or fewer workers; less than 5% employ 100 or more.

PRODUCTS, OPERATIONS & TECHNOLOGY

Canada's oil and gas industry extracts conventional crude oil (sweet, heavy, and ultra viscous); oil sands (bitumen); natural gas (sweet, sour, ultra sour); natural gas liquids (butane and propane); and coalbed methane.

The nation's oil reserves are estimated to be about 175 billion barrels; production is about 3.8 million barrels per day (bpd). Nearly all of Canada's oil reserves are in the form of oil sands, which is a mixture of sand, water, clay and bitumen. The country has about 5 billion barrels outside of the oil sands. Natural gas reserves measure about 70 trillion cubic feet (tcf), and annual production of natural gas is about 6 billion cubic feet (bcf). Oil and gas resources are found throughout the country.

Canadian oil and gas exploration and production companies operate under some of the world's harshest conditions: subzero Arctic temperatures, high seas, and icebergs, as well as tundra, muskeg (bog), and mountainous terrain. Canadian companies use specialized equipment made to operate under these harsh conditions, including topographical and communication technology and heavy terrain vehicles for moving equipment, labor, and supplies.

The challenges created by Canada's climate and geology have spurred equipment advances in exploration and drilling. Advances include ground-penetrating radar to map the ocean floor through ice; floating platforms with iceberg-detecting radar and rapid-release mooring systems that allow platforms to detach from wells and be moved if an iceberg is on an impact course; rig and equipment transport via amphibious vehicles; ocean ice engineering; and drilling in shallow waters from manmade islands created to withstand ice migrations and prevent equipment damage from passing icebergs and river ice floes.

The formation of ice, frozen airstrips, and the use of specialized equipment and techniques enables Canadian oil and gas companies to operate in desolate areas, despite lack of roads, power, or other infrastructure. Transporting equipment and workers over ice-covered ground reduces the impact of heavy equipment on land and allows for more direct routes to exploration and drilling sites, lowering transportation costs.

FINANCE & REGULATION

Net cash expenditures for Canadian exploration and production companies go toward site development (45%), well and plant operations (42%), exploration (7%), and government royalties (6%). The industry is capital-intensive. Key factors driving investment decisions are energy demand, market prices, and new exploration and extraction technologies.

The industry is subject to environmental (air, water, land, and waste management) and labor safety regulations. Companies are required by law to prepare Environmental Impact Assessments (EIAs) or Cumulative Effects Assessments (CEAs) for all new major developments and facility expansions. Companies may hire environmental specialists to prepare EIAs and CEAs. The industry also works with Canadian air quality and emission engineers, scientists, and dispersion modeling specialists on issues such as air quality assessment, emissions, control technologies, and regulatory permitting, compliance, and reporting.

Additional regulation of the industry comes from Natural Resources Canada, the National Energy Board, NAFTA, the International Energy Agency, the Canada Petroleum Resources Act, and the Indian and Northern Affairs Canada partnership.

REGIONAL & INTERNATIONAL ISSUES

A majority of onshore drilling is in the Western Canadian Sedimentary Basin and the Mackenzie Delta. Alberta produces about 65% of the nation's crude oil, followed by Saskatchewan (23%). Alberta also produces about 80% of the nation's natural gas and 80% of its liquid hydrocarbons. The northern territories hold vast untapped reserves.

Offshore drilling is concentrated in the Atlantic region. Major offshore drilling sites include Hibernia, Terra Nova, White Rose, Hebron, Deep Panuke, and Sable off the coasts of Newfoundland and Labrador and of Nova Scotia.

In terms of dollar value, Canada exports about two-thirds of the oil and gas it produces. The US is Canada's top foreign market, importing almost all of Canada's exported production.

Canadian exploration and production companies operate in various world regions, including fields in the UK, Yemen, India, Ecuador, the Gulf of Mexico, and the Caribbean.

HUMAN RESOURCES

The oil and gas exploration and production industry employs about 60,000 people. Drilling a new well is labor-intensive, requiring about 75 workers. Once a rig is established and production begins, only four to seven workers are needed to operate the equipment.

The industry employs and contracts a variety of skilled workers including engineers, scientists, and well operators. Due to harsh operating conditions on- and off-shore, the industry struggles to attract workers.

Specific Issues and Trends

Opportunity: Production from Oil Sands - Crude production growth in Canada is expected to primarily come from oil sands, which contain more than 95% of Canada's oil reserves. Not only do oil sands contain substantial reserves, but also new technologies have made extraction of those reserves more cost-efficient. However, lower oil prices in recent years have reduced capital spending for oil sands production; between 2014 and 2017 oil sands investments dropped more than 55%. Amid lower prices, forecasts for crude production from Canadian oil sands continue to call for growth, but at slower rates. Canadian oil sands production is forecast to rise from about 2.4 million barrels per day (b/d) in 2016 to 3.6 million b/d in 2030, according to the Canadian Association of Petroleum Producers (CAPP).

Opportunity: New Detection, Extraction Technologies - New technologies to speed discovery of oil and gas reserves and extract resources more efficiently are continuously being researched and developed. Technologies include visualization rooms and 3D glasses that allow engineers to convert computerized geological data to "see" oil and gas deposits in three dimensions. Advances in software and data management, seismic wave generators that detect pockets of oil and gas, and computerized drilling equipment are also increasing productivity and making it cost-effective to develop harder-to-reach deposits.

Opportunity: Shale Investment Rising - Investments in Canada's shale plays are expected to increase in the coming years. Compared to shale oil and gas plays in the US, Canada's shale reserves have seen little investment. However, non-oil sands investments, which include shale, are expected to rise 50% in 2018 compared to 2016 levels, according to the Canadian Association of Petroleum Producers (CAPP). Together, the Duvernay (Alberta) and Montney (Alberta and British Columbia) formations hold 500 trillion cubic feet of natural gas, 20 billion barrels of natural gas liquids, and 4.5 billion barrels of oil, according to Canada's National Energy Board.

Trend: Slowdown in Liquid Natural Gas Projects - Amid reduced demand for natural gas in Asia, energy companies are expected to put investments in Canadian liquid natural gas (LNG) pipelines and coastal terminals on hold. Lower prices for oil, coal, and renewables have hurt demand for natural gas exports, especially to Asia. While the outlook for new liquid natural gas terminals on Canada's west coast was positive just a few years ago, the prospect of investment has since dwindled amid poor pricing and other market conditions. The imbalance between global natural gas supply and demand is not expected to improve before 2022, according to the International Energy Agency (IEA).

Challenge: Transportation of Crude Oil - Efforts to bring more of Western Canada's oil to market have met with several logistical and policy roadblocks. Although President Trump overturned the Obama administration's blocking of the Keystone XL pipeline, the project has met with delays. When complete, the Keystone XL pipeline would transport oil from Alberta to the Texas Gulf Coast. The expansion of the Trans Mountain pipeline and the replacement of the Line 3 pipeline have also been delayed. The proposed TransCanada Energy East pipeline would have brought oil from Alberta to New Brunswick, but was cancelled in 2017 by TransCanada. Without better pipeline infrastructure, Alberta is increasingly reliant on rail to bring oil to market. Rail's higher transportation costs, combined with the lower quality of oil from oil sands, have driven down the overall value of western Canada's production and reduced the country's competitiveness in global oil markets.

Media Links

Canadian Association of Petroleum Producers

Canadian Energy Research Institute

National Energy Board

Natural Resources Canada

Oilweek

Small Explorers and Producers Association of Canada (SEPAC)