

A background image showing an oil worker in a white hard hat and safety glasses looking up at a large white oil tanker car in an industrial setting. The scene is dimly lit, suggesting dusk or dawn, with yellow industrial structures visible in the background.

Alberta Oil & Gas 101

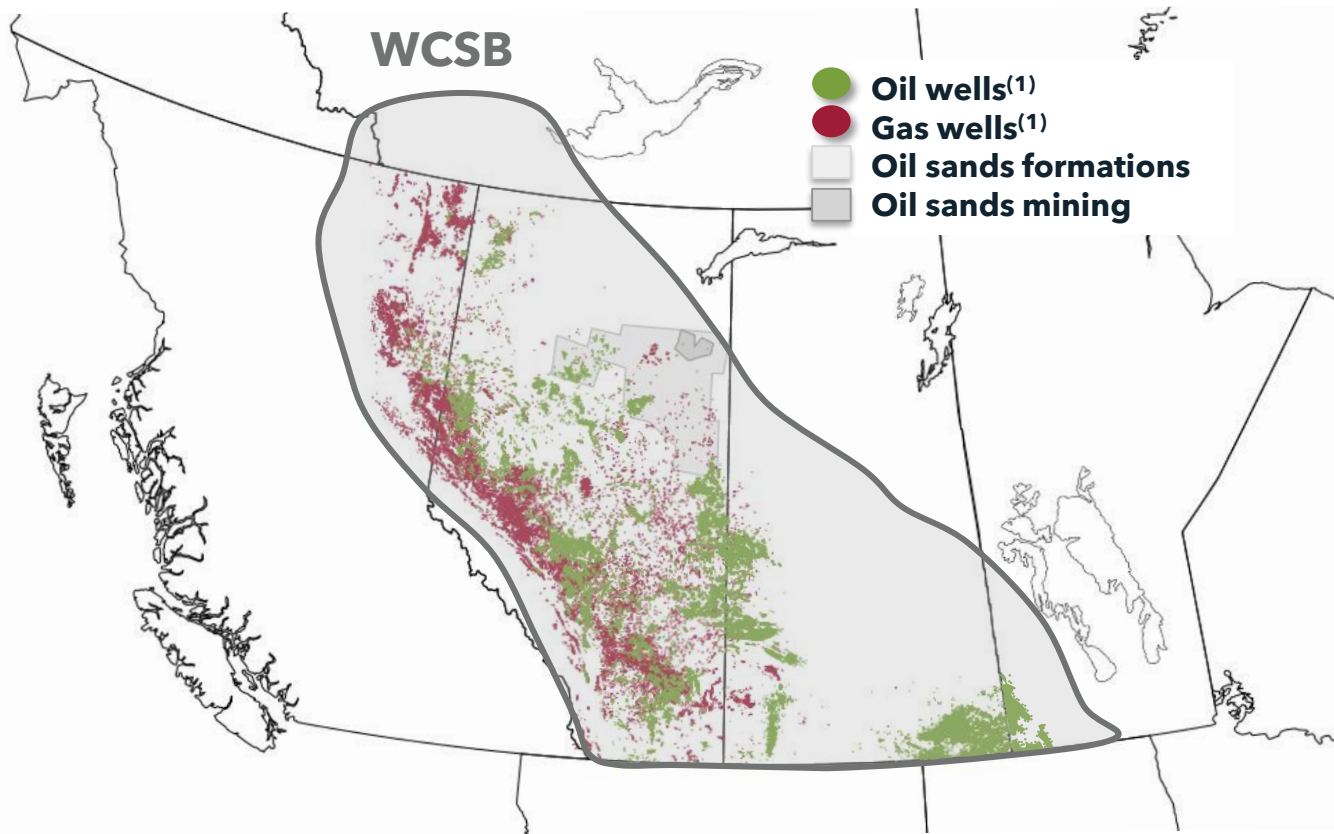
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Oil & Gas in Canada

A brief overview

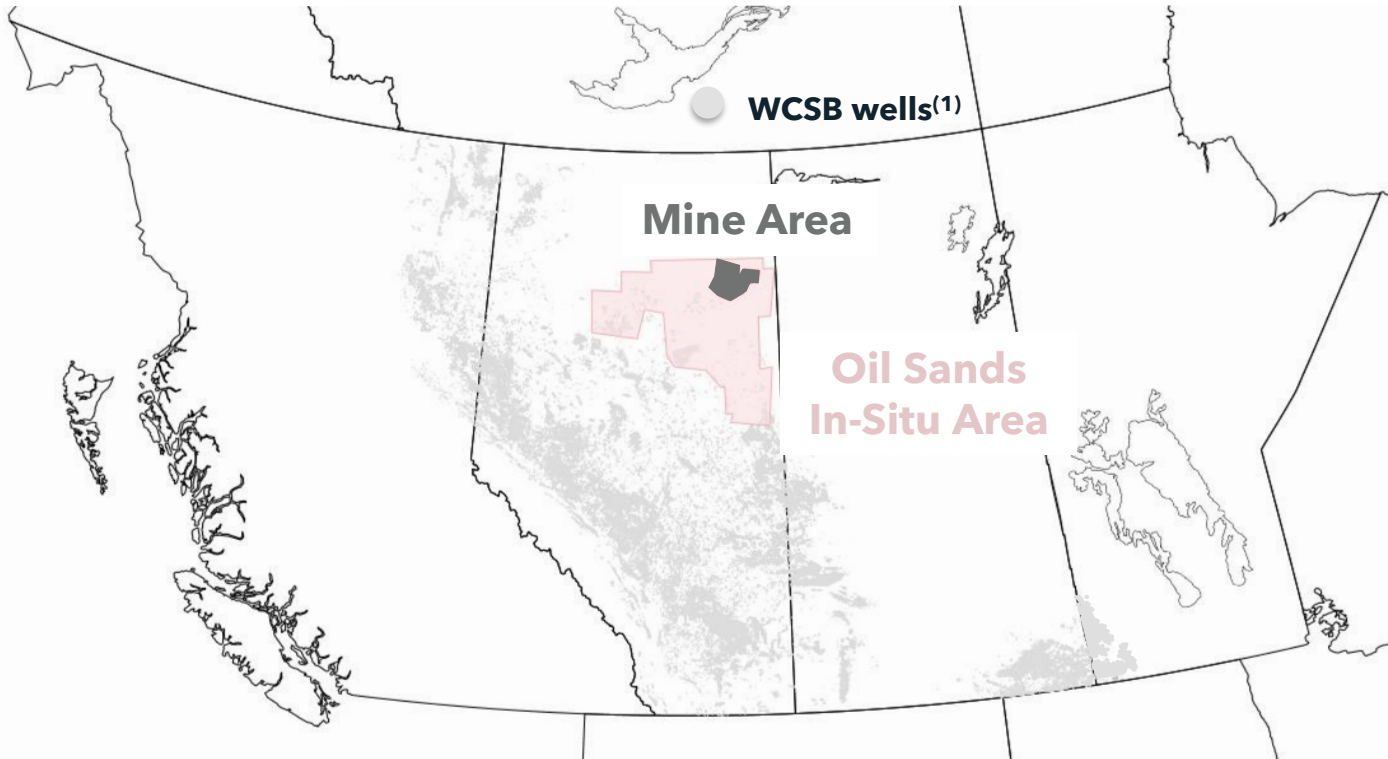
The Western Canada Sedimentary Basin (WCSB)



- 95% of Canada's oil production and all its marketable gas is produced in the WCSB.
- The WCSB is a large, well-explored basin with 100+ years of history, underlying a significant portion of Western Canada.
- The WCSB has over 850,000 wells drilled (oil & gas) since 1901, creating a wealth of data on the basin.
- The total area is ~1.4 million km², about two times larger than the state of Texas⁽²⁾.

The Western Canada Sedimentary Basin (WCSB)

Oil Sands



- Oil sands reserves are estimated at 159 billion barrels, ranking fourth largest after Venezuela, Saudi Arabia, and Iran.⁽²⁾
- The oil sands region covers 142,000 km², equivalent in size to the state of New York.⁽³⁾
- Oil sands consist of a naturally formed blend of sand, clay, various minerals, water, and bitumen - a dense, highly viscous form of crude oil. Bitumen is extracted via surface mining or in-situ with the use of steam.
- For context, 1,100 km² of the 142,000 km² oil sands deposits in Northern Alberta are currently undergoing surface mining activity⁽¹⁾, which equates to about 0.8% of the total oil sands surface area.

(1) Includes all non-cancelled wells in B.C., AB, SK, and MB (~850,000 wells)

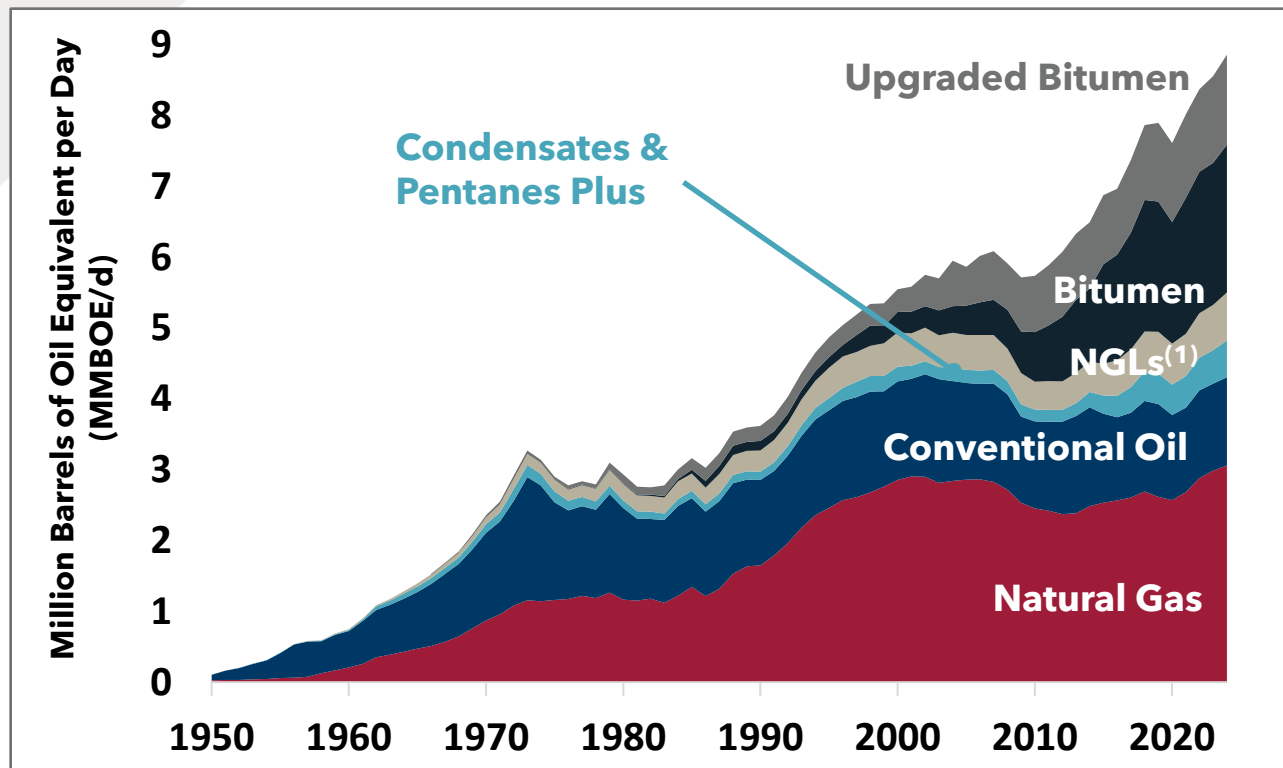
(2) [Natural Resources Canada - Energy Fact Book 2024-2025](#)

(3) [WorldAtlas - New York](#)

(4) [Government of Alberta - Oil Sands Mine Reclamation and Disturbance Tracking by Year](#)

Canadian Total Hydrocarbon Production by Type

Annual | 1950 to 2024



- The Canadian oil and natural gas industry is unique in that, on top of conventional oil & gas, much of the country's production is bitumen from the oil sands.
- Bitumen accounts for 40% of Canada's oil and natural gas production on a BOE basis – split between surface mining and in-situ production.
- Conventional production constitutes the remaining hydrocarbon types in Canada. Conventional production has grown by the adoption of new technologies and production methods to compete globally.
- In 2024, Canada's total oil & gas production averaged almost 8.9 MMBOE/d.

Canada is the Fourth-Largest Producer of Oil

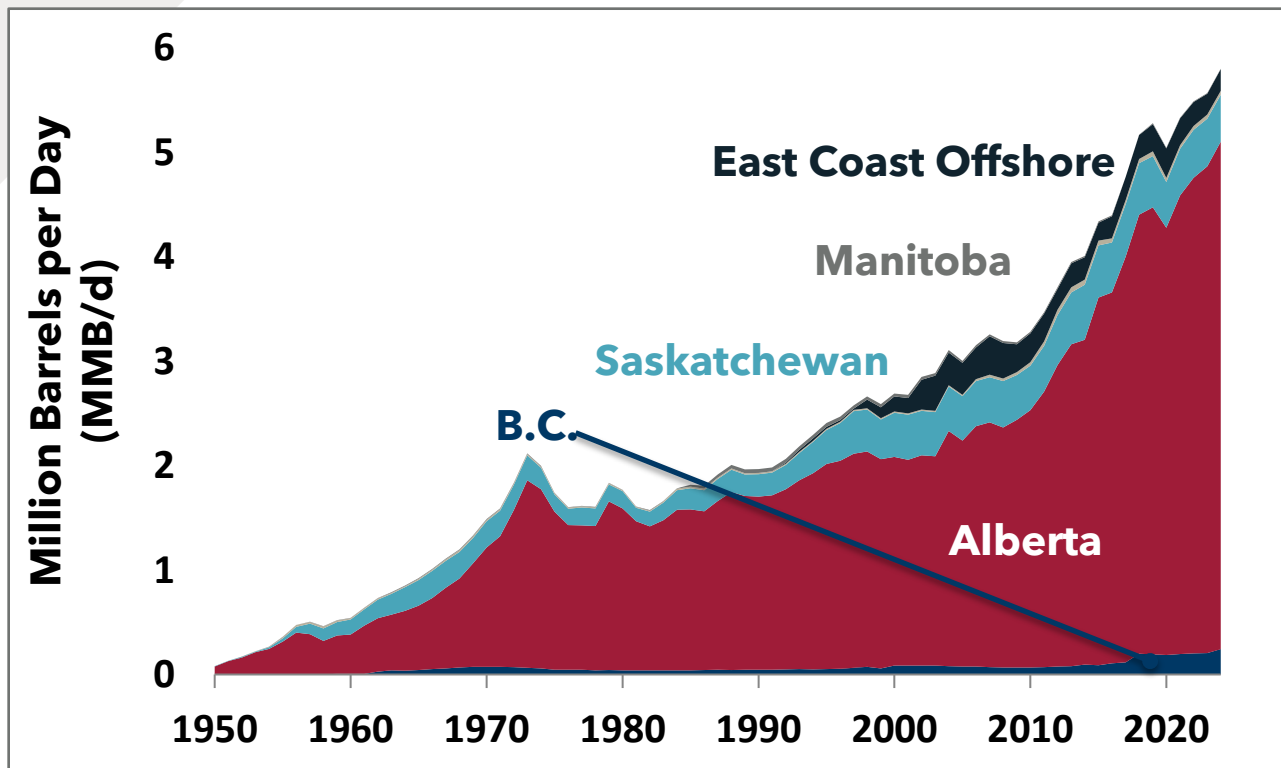
Annual | 2024

Rank		Oil Production (MMB/d)	Percent Contribution to World Demand
1	U.S.	19.4	19%
2	Saudi Arabia	11.4	11%
3	Russian Federation	11.1	11%
4	Canada	5.7	6%
5	Iran	4.7	5%
6	Iraq	4.4	4%
7	China	4.2	4%
8	United Arab Emirates	3.9	4%
9	Brazil	3.5	3%
10	Kuwait	2.9	3%

- Canada is one of the world's largest producers of secure and reliable oil, supplying 6% of global demand.
- North American oil production and energy security have been boosted by the growth in Canada, but also the U.S. The surge of U.S. tight oil over the past decade has made the U.S. the largest oil producer in the world.
- While not listed, Mexico produced 2.0 MMB/d of oil in 2023, making it the eleventh-largest producer behind Kuwait.

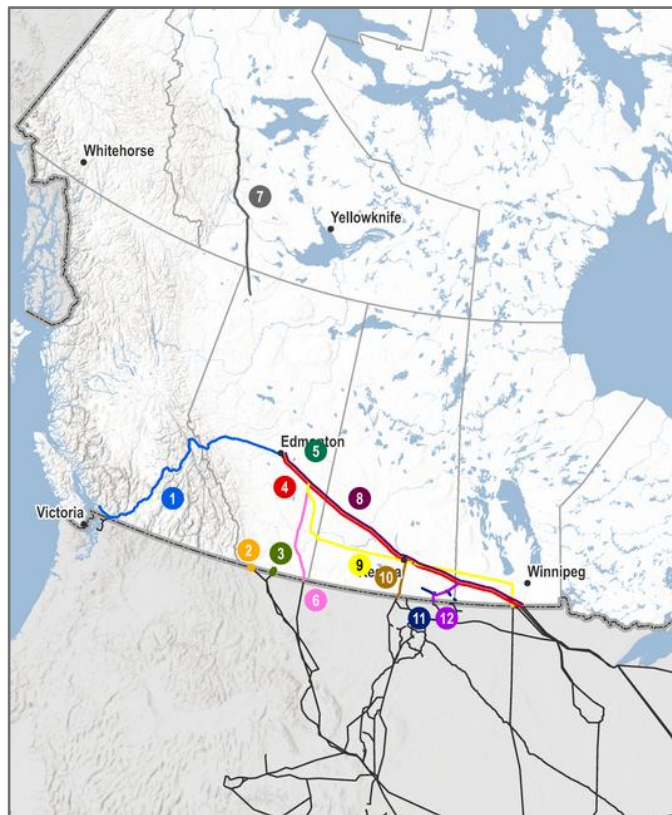
Annual Oil Production by Province

Annual | 1950 to 2024



- As of 2024, over 90% of Canada's oil comes from Alberta.
- Since 2005, oil sands production has tripled to 3.4 MMB/d. Growth moderated after 2018, with production relatively stable in 2021 and 2022. Growth picked back up in 2023.
- Saskatchewan is the second-largest producer of oil in Canada, accounting for just under 0.5 MMB/d in 2024.
- Offshore Canada is the third-largest, accounting for roughly 0.2 MMB/d in 2024.

WCSB Crude Oil Export Infrastructure



- In 2024, ~4.6 MMB/d of crude oil and NGLs was exported to the U.S. and Eastern Canada from the Western Canada Sedimentary Basin (WCSB) via six major export pipelines, as measured by pipeline throughput data.
- With ~3.1 MMB/d of throughput in 2024, the Enbridge Mainline is the largest export pipeline in Western Canada, transporting crude oil and NGLs to Eastern Canada and the U.S..
- Five other major export pipelines out of Western Canada account for the remaining crude oil and NGL flows.

Export Pipelines		
Pipeline	Average Annual Throughput - 2024 ('000s B/d)	Destination
1 Trans Mountain	515	Marine Exports, B.C.
2 3 Rangeland / Milk River ⁽¹⁾	127	U.S. Exports
4 Enbridge Mainline ⁽²⁾	3,060	U.S. Exports, Eastern Canada
6 Enbridge Express ⁽¹⁾	276	U.S. Exports
9 South Bow Keystone	624	U.S. Exports
Total	4,602	

(1) Express/Rangeland/Milk River throughput assumed equal to capacity

(2) Ex-Gretna

Note: The above list is comprised of crude oil export pipelines only

Canada is the Fifth-Largest Producer of Natural Gas

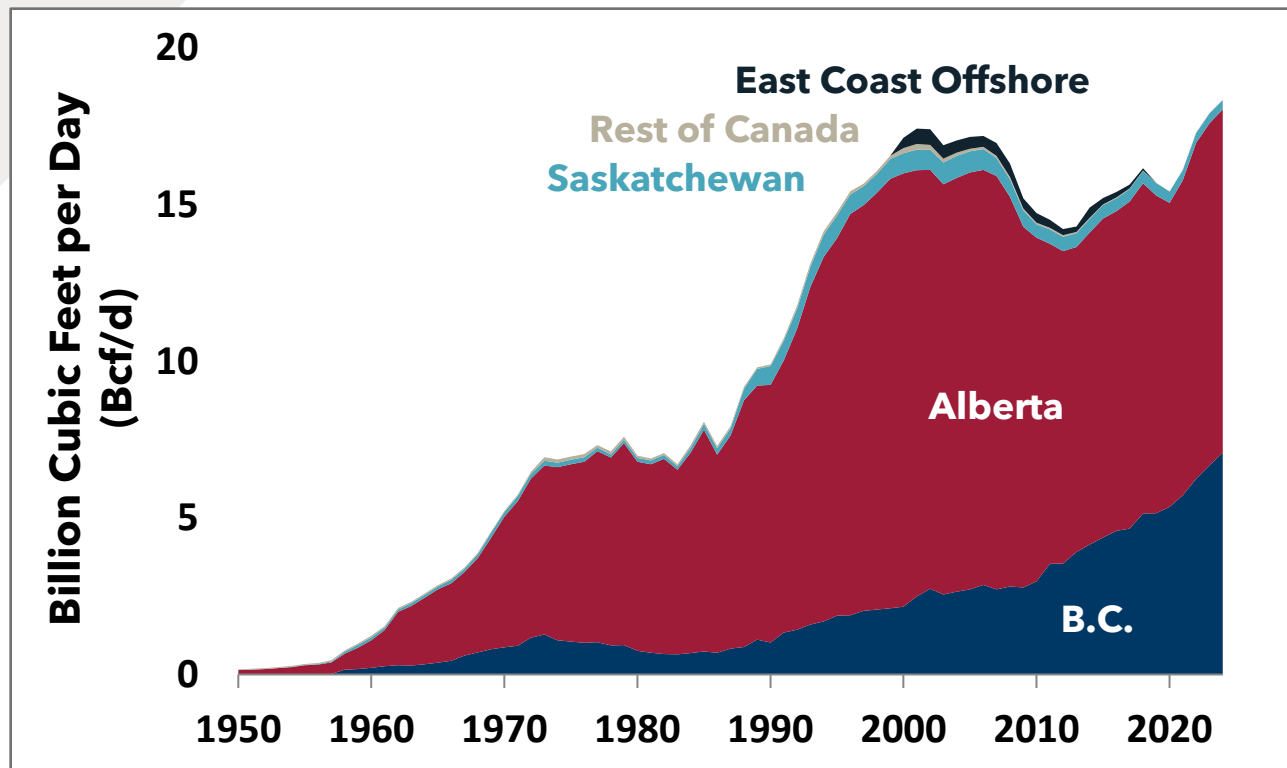
Annual | 2024

Rank		Gas Production (Bcf/d)	Percent Contribution to World Demand
1	U.S.	100.2	26%
2	Russia	56.7	15%
3	Iran	24.4	6%
4	China	22.7	6%
5	Canada	18.4	5%
6	Qatar	17.5	5%
7	Australia	14.7	4%
8	Norway	11.3	3%
9	Saudi Arabia	11.0	3%
10	Algeria	9.8	3%

- In 2023, Canadian natural gas production accounted for 5% of global demand.
- The surge of U.S. shale gas resulted in the U.S. surpassing Russia in 2011 to become the world's largest natural gas producer.
- Together, the U.S. and Russia make up 40% of the world's natural gas production.

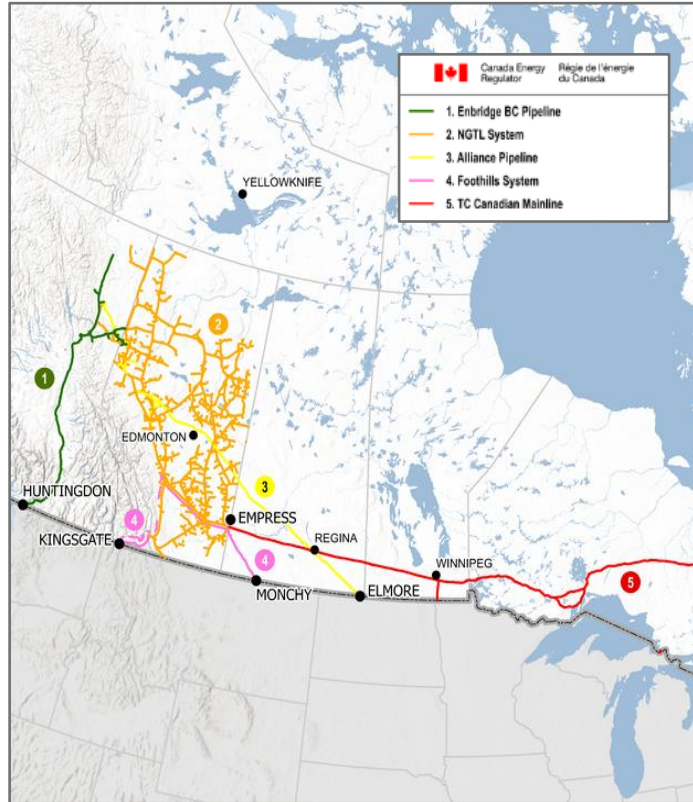
Annual Marketable Natural Gas Production

Annual | 1950 to 2024



- ▶ With the proliferation of shale gas production in B.C., Alberta's gas production as a percentage of total Canadian natural gas production decreased from 80% in 2000 to 60% in 2024.
- ▶ Meanwhile, B.C.'s share of Canadian natural gas production increased from 13% in 2000 to 39% in 2024, more than doubling production since 2010.
- ▶ The discovery of shale gas boosted both B.C. and Alberta's production.
- ▶ There is minimal natural gas produced in Canada outside of B.C. and Alberta.

WCSB Natural Gas Export Infrastructure



- The Western Canada Sedimentary Basin (WCSB) has a large network of natural gas gathering and export infrastructure. In 2024, 9.9 Bcf/d of natural gas left the basin via four main export systems, traveling to markets in Canada and the U.S.
- TC Energy's NGTL System is the main gas gathering system for Alberta. While it does not export gas directly, it connects with other export lines.
- Although export pipelines have enough overall capacity, a geographic shift in natural gas production has created a mismatch. Natural gas is now produced upstream of the NGTL system where pipeline access is limited, thereby constraining movement to export markets. NGTL expansions have lagged natural gas supply growth, contributing to bottlenecks.

CER Regulated Natural Gas Export Pipelines and Gathering Infrastructure

Pipeline	Avg Annual Capacity - 2024* (Bcf/d)	Avg Annual Throughput - 2024* (Bcf/d)	Destination
① Enbridge B.C. Pipeline	1.7	1.2	U.S. Exports, Western-Canada
② TC Energy NGTL System**	-	-	Local Use and Other Pipelines
③ Alliance Pipeline	1.6	1.6	U.S. Exports
④ Foothills System	5.3	2.9	U.S. Exports
⑤ TC Energy Mainline	6.2	4.3	U.S. Exports, Eastern-Canada
Total	14.8	9.9	

*WCSB export volumes only. Capacity based on average daily available capacity, not nameplate

**The NGTL System does not export directly from the WCSB, but interconnects with other export pipelines: Foothills System & TC Energy Mainline via West Gate and East Gate

Oil & Gas in Alberta

Alberta Oil & Gas Industry Overview

Alberta Oil & Gas Production

- ▶ In 2024, Alberta's total oil & gas production averaged approximately 6.7 MMBOE/d, equivalent to 75% of Canada's total production on a barrels of oil equivalent (BOE) basis. Bitumen comprised the largest share of Alberta's total hydrocarbon production in 2024 at 50%, followed by natural gas.
- ▶ From 1950 to 2024, total hydrocarbon production in Alberta has grown by roughly 6% per year, on average.
- ▶ In addition to being the largest producer of oil & gas in Canada, Alberta is also the largest exporter. In 2024, Alberta exported approximately 4.7 MMBOE/d of oil & gas, equating to \$133 billion and representing over 70% of the province's total exports.

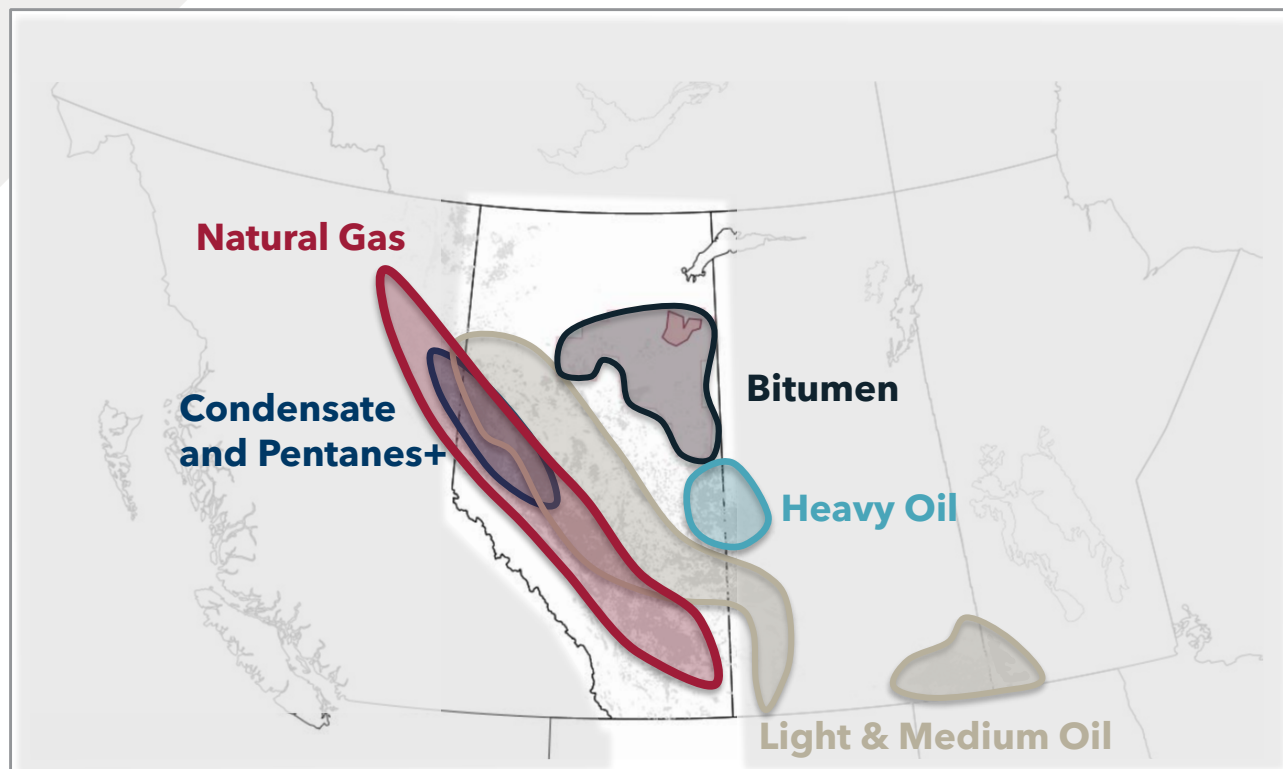
Major Oil & Gas Plays in Alberta

- ▶ Given its geography, Alberta has a wide mix of all hydrocarbon types, including conventional oil (light, medium and heavy), bitumen, natural gas liquids (NGLs), condensate and pentanes+, and natural gas.
- ▶ The oil sands (i.e., bitumen) have been the primary source of oil production growth in Alberta since 2008. Other major plays that have been attracting investment include the Montney and Duvernay, which are shale plays that use horizontal wells and hydraulic fracturing to liberate the gas and light oil, and the Clearwater, a heavy oil play located in northeastern Alberta, a large portion of which underlies the oil sands region.

Economic & Fiscal Impact

- ▶ The oil & gas industry⁽¹⁾ is the largest contributor to Alberta's economy, accounting for roughly \$88 billion of GDP in 2024, equivalent to 25% of the province's total GDP.
- ▶ In 2024, the oil & industry⁽¹⁾ accounted for over 200,000 direct jobs, equating to 8% of Alberta's total direct jobs. According to Natural Resources Canada's Energy Fact Book 2024-2025, there were roughly 1.5 indirect jobs for every direct job in the oil & gas industry in 2023⁽²⁾. Using this metric implies there were approximately 500,000 jobs (direct & indirect) related to Alberta's oil & gas industry⁽¹⁾ in 2024.
- ▶ Cumulatively, over \$315 billion in royalties has been paid by the oil & gas industry in Alberta since 1974.

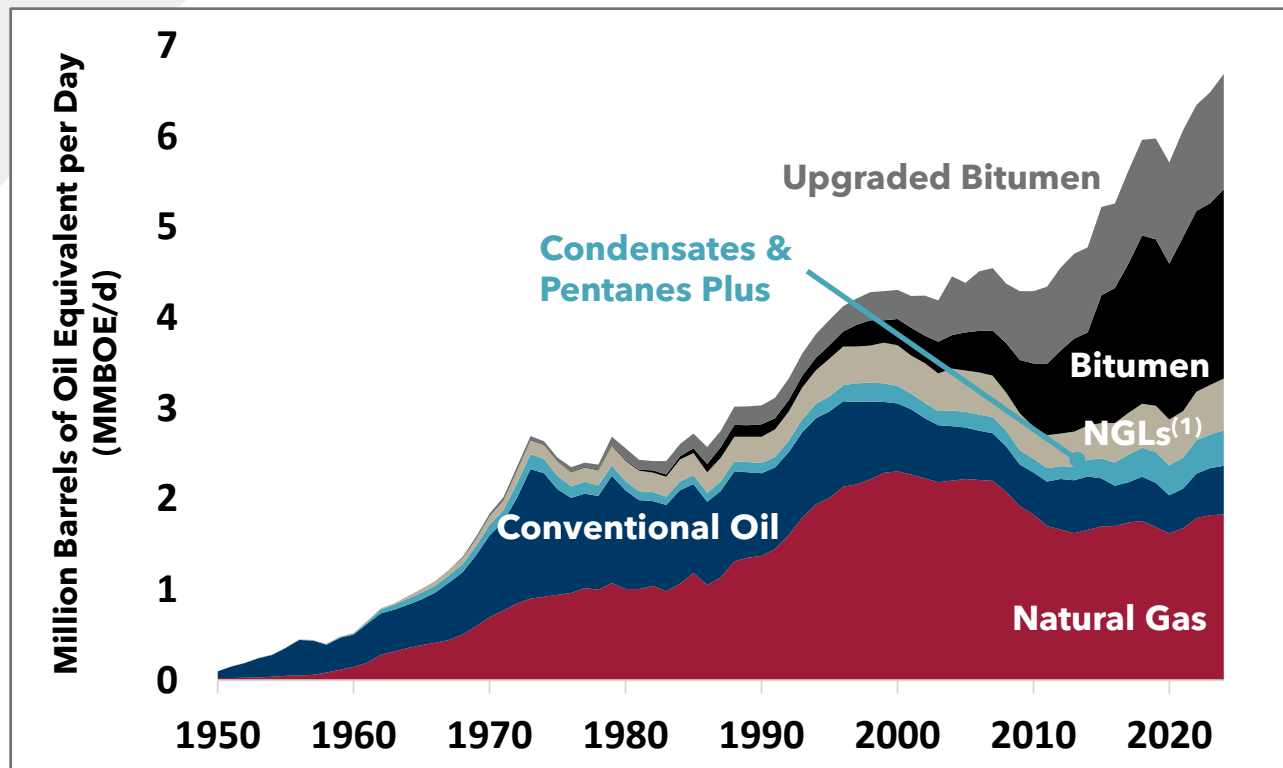
WCSB Production Locations by Hydrocarbon Type



- The Western Canada Sedimentary Basin (WCSB) is host to a range of hydrocarbons ranging from natural gas to bitumen.
- Generally, natural gas is found in the deeper reservoirs to the southwest of the basin, while crude oils are found in shallower formations.
- Oil sands consist of a naturally formed blend of sand, clay, various minerals, water, and bitumen - a dense, highly viscous form of crude oil.
- Alberta, given its central location in the WCSB, produces all hydrocarbon types: crude oil (light, medium and heavy), bitumen, NGLs⁽¹⁾, condensate and pentanes+, and natural gas.

Alberta Total Hydrocarbon Production by Type

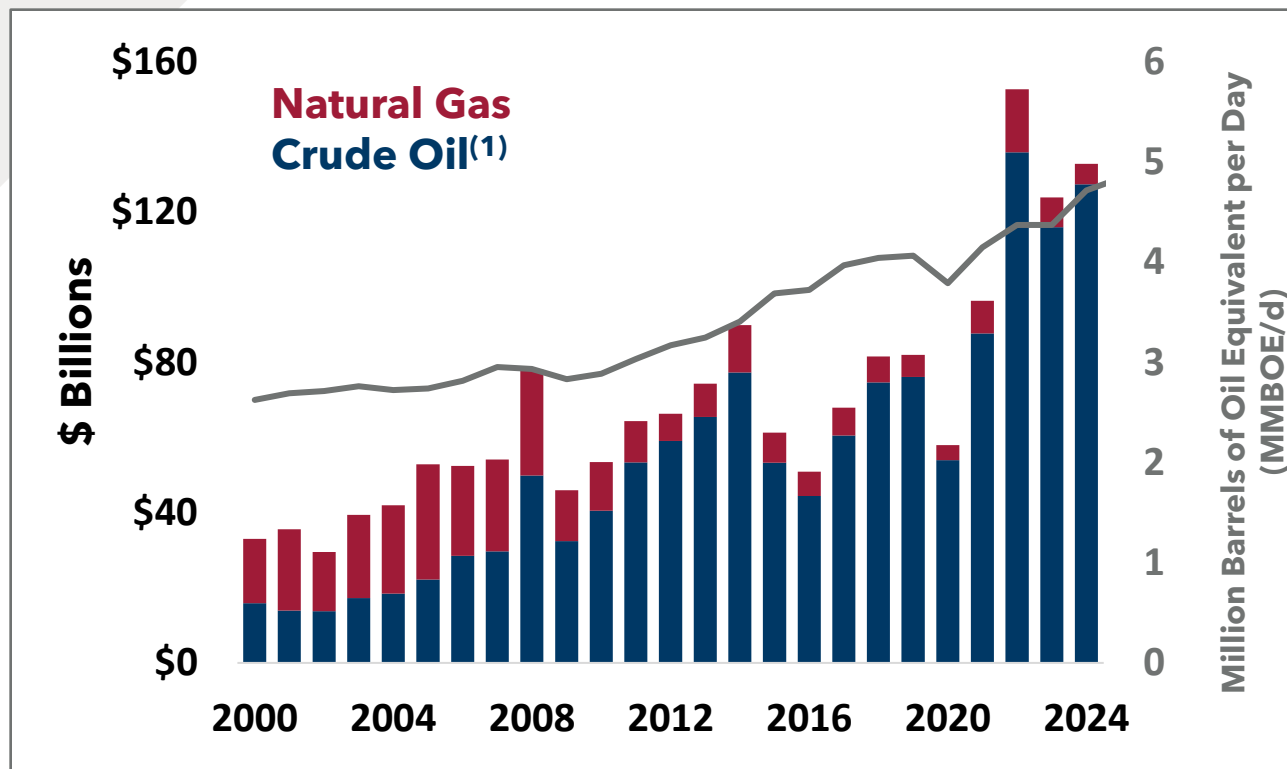
Annual | 1950-2024



- ▶ Alberta is the largest producer both oil & gas in Canada.
- ▶ In 2024, Alberta's total oil & gas production averaged approximately 6.7 MMBOE/d, up over 50% (+2.3 MMBOE/d) from 2010 levels. From 1950 to 2024, total hydrocarbon production in Alberta has grown by roughly 6% per year, on average.
- ▶ The oil sands (i.e., bitumen and upgraded bitumen) have been the primary engine of hydrocarbon growth in Alberta since the 2000's. Bitumen comprised the largest share of Alberta's total hydrocarbon production in 2024 at 50%, followed by natural gas.

Alberta Oil & Gas Exports

By Value and Volume | Annual | 2000-2024



- In addition to being the largest producer of oil & gas in Canada, Alberta is also the largest exporter.
- The Alberta economy benefits greatly from its oil & gas exports.
- In 2024, Alberta exported approximately 4.7 MMBOE/d of oil & gas, the majority of which was crude oil.⁽¹⁾
- On a dollar basis, this equated to \$133 billion in 2024, representing over 70% of the province's total exports.

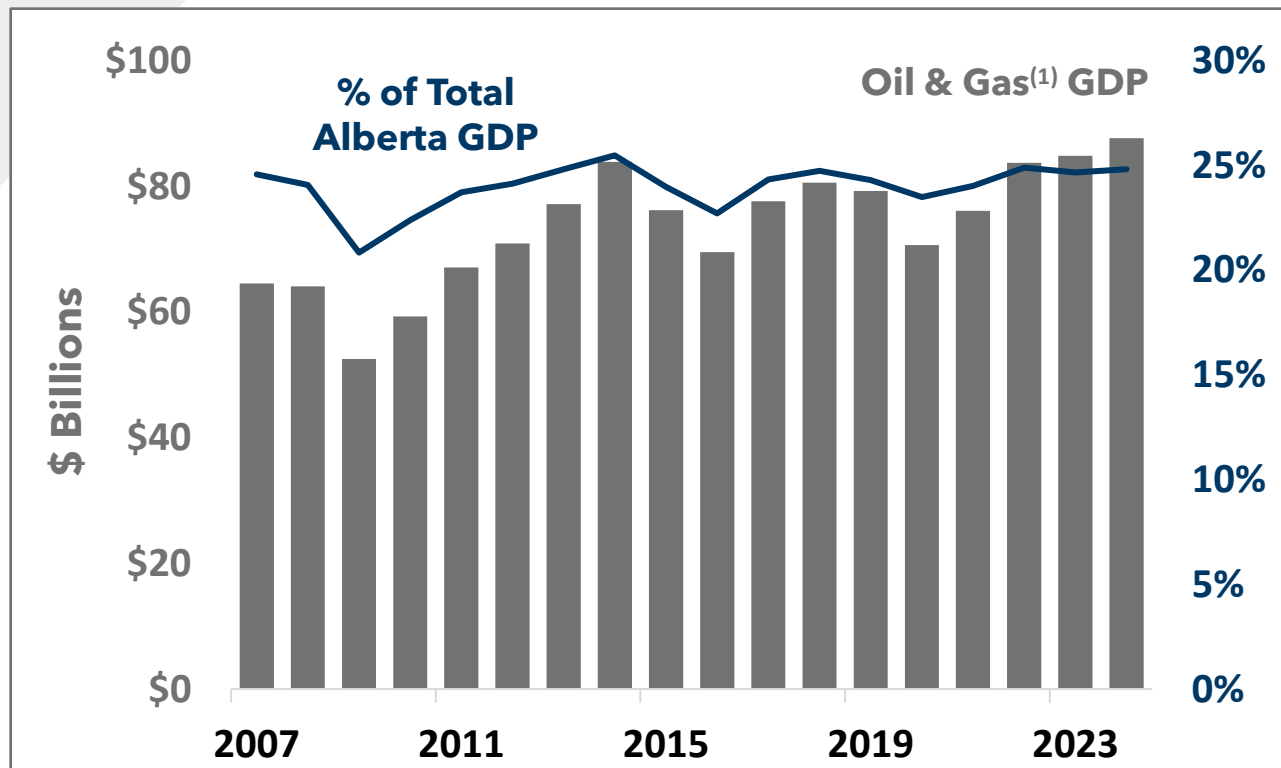
Major Oil & Gas Plays in Alberta



- ▶ Bitumen from the oil sands is either mined and produced by wells (in-situ). The minable area is a relatively small part. The oil sands have been the primary source of oil production growth in Alberta since 2008. There are currently eight active oil sands mining projects, 22 actively producing commercial steam-assisted gravity drainage (SAGD) projects, and three actively producing commercial cyclic steam stimulation (CSS) projects in Alberta.
- ▶ Since the early 2010s, the Montney and Duvernay have become important plays that are attracting new investment. They are shale plays that use horizontal wells and hydraulic fracturing to liberate the gas and light oil.
- ▶ The Clearwater is a major emerging heavy oil play. A large portion of this play underlies the Oil Sands region.

Alberta Gross Domestic Product (GDP)

Oil & Gas Industry⁽¹⁾ | Annual | 2007⁽²⁾-2024



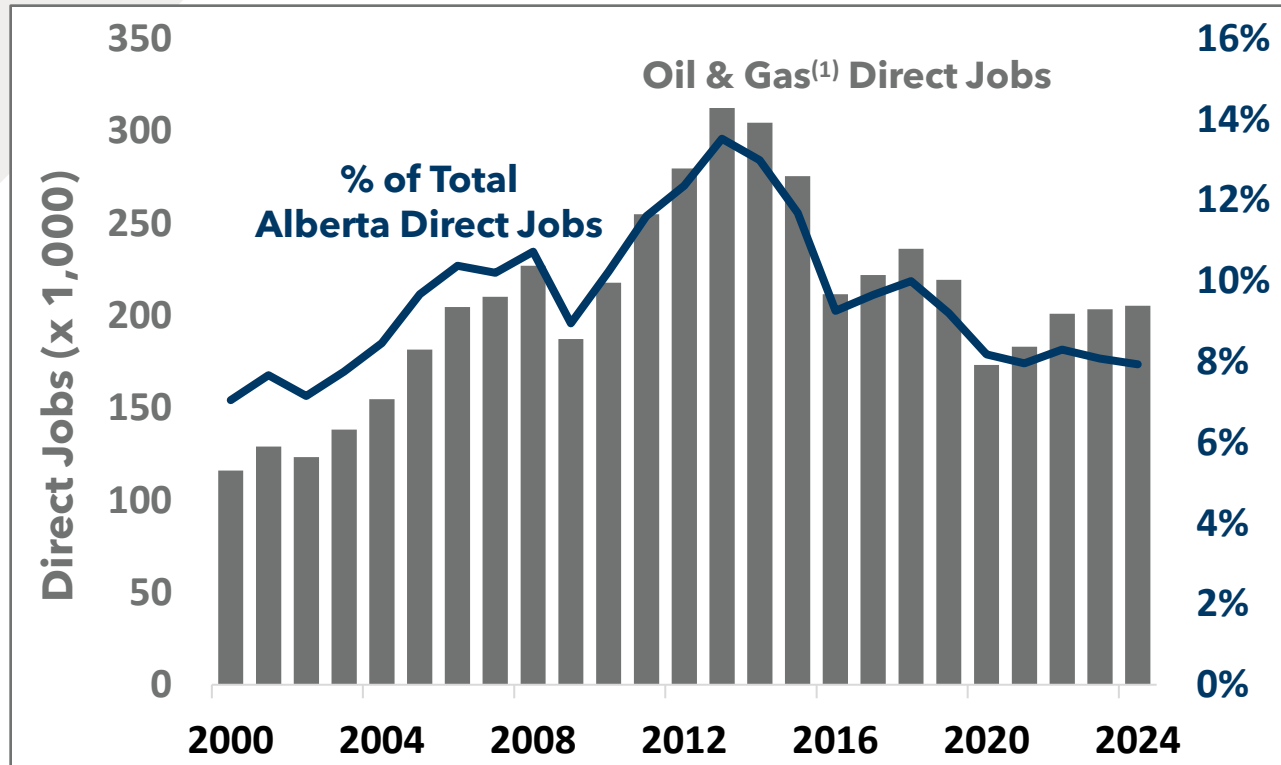
➤ The oil & gas industry⁽¹⁾ is the largest contributor to Alberta's economy, accounting for roughly \$88 billion of GDP in 2024, equivalent to 25% of the province's total GDP.

➤ Since 2007, as a percentage of total GDP in Alberta, the oil & gas industry⁽¹⁾ has ranged from 20-24%.

➤ GDP from the oil & gas industry⁽¹⁾ has mostly increased since 2007. In 2024, GDP was up 1.4× relative to 2007 levels.

Alberta Direct Jobs

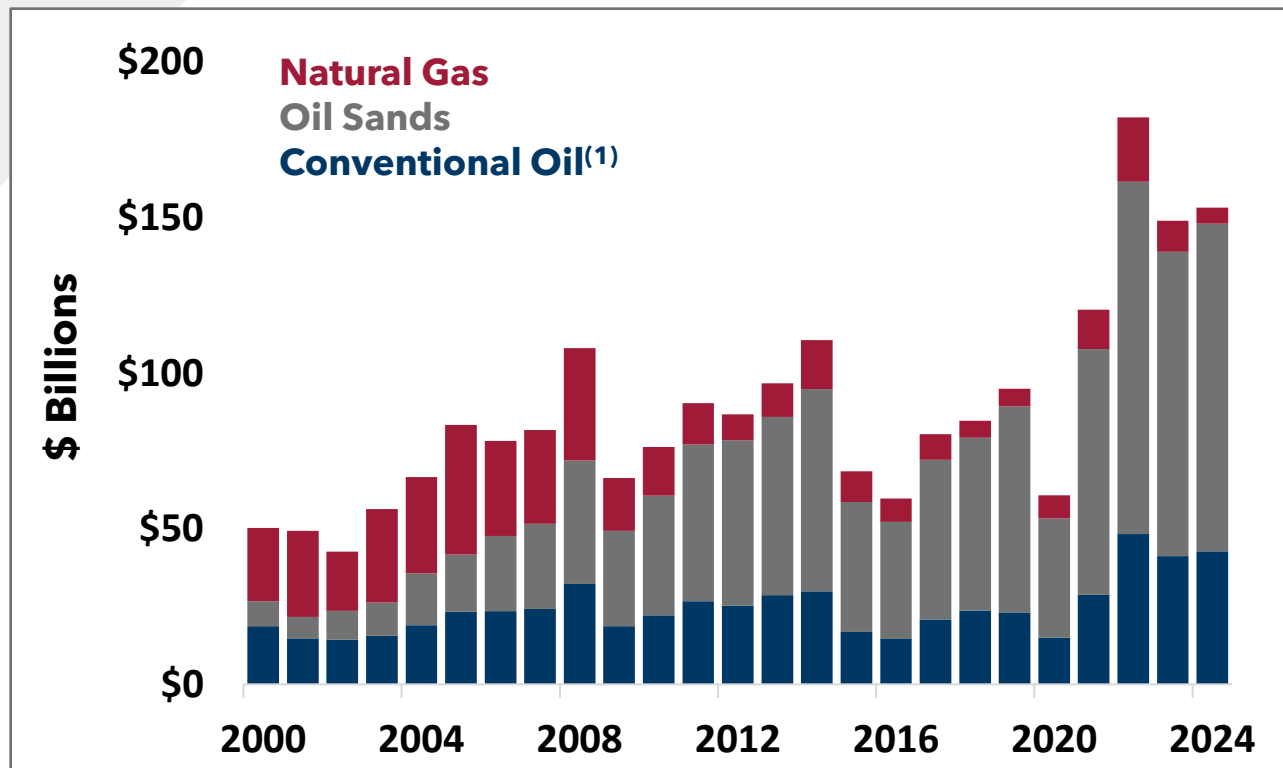
Oil & Gas Industry⁽¹⁾ | 2000-2024



- The oil & gas industry⁽¹⁾ is a major employer for the Alberta economy.
- In 2024, the oil & gas industry⁽¹⁾ accounted for over 200,000 direct jobs, equating to 8% of the province's total jobs. Direct jobs in the oil & gas industry⁽¹⁾ in Alberta peaked in 2013 at roughly 312,000 (14% of all direct jobs).
- When including indirect jobs, the oil & gas industry is accountable for a higher share of jobs in the province. According to Natural Resources Canada's Energy Fact Book 2024-2025, there were roughly 1.5 indirect jobs for every direct job in the oil & gas industry in 2023⁽²⁾. Using this metric implies there were over 500,000 jobs (direct & indirect) related to Alberta's oil & gas industry⁽¹⁾ in 2024.

Alberta Oil & Gas Revenue

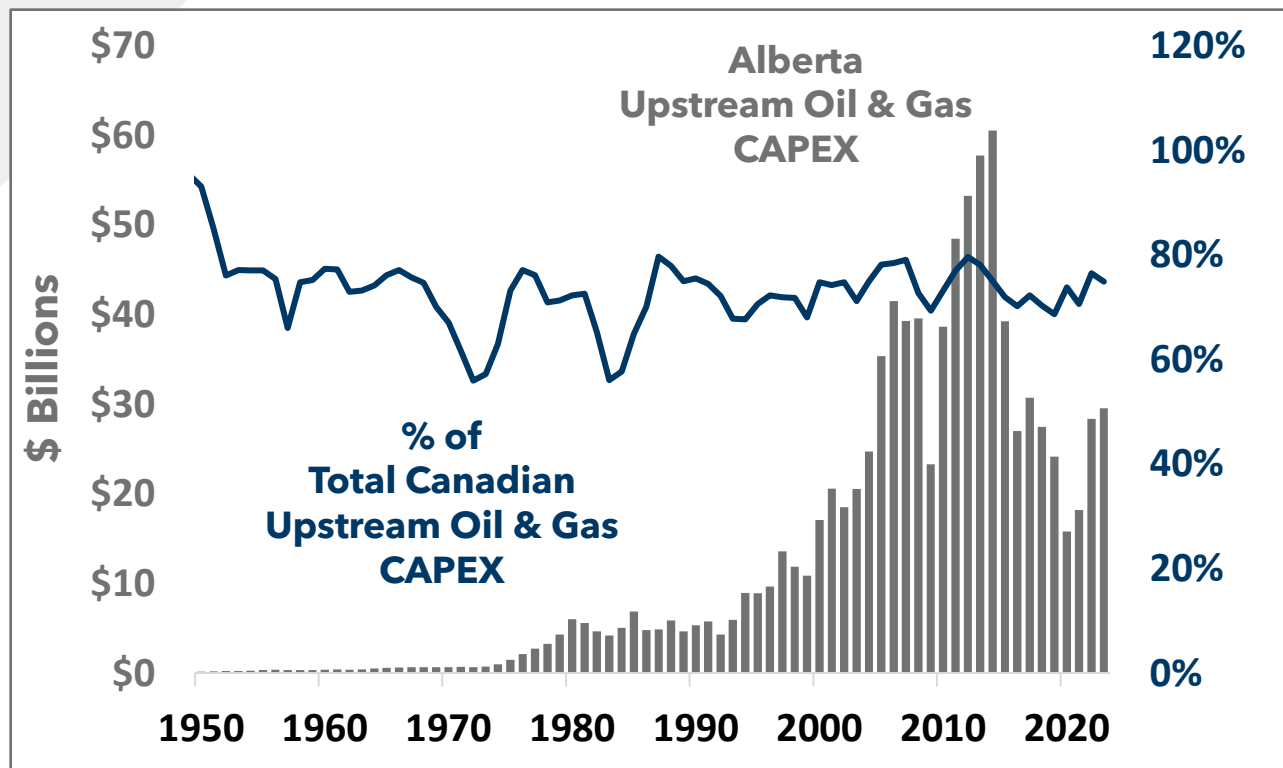
Annual | 2000-2024



- ▶ Total revenue from oil & gas production in Alberta peaked at over \$182 billion in 2022.
- ▶ Oil sands (i.e., bitumen) accounted for the largest share of revenue in 2024 at 69% (\$105 B), up from 16% (\$8 B) in 2000.
- ▶ In 2024, conventional oil⁽¹⁾ and natural gas made up the balance of total revenue at 28% (\$43 B) and 3% (\$5 B), respectively,
- ▶ From 2000 to 2024, total hydrocarbon revenue in Alberta has grown by approximately 9% year, on average. Oil & gas revenue is highly influenced by both production amount and commodity prices.

Alberta Upstream Oil & Gas Capital Expenditures (CAPEX)

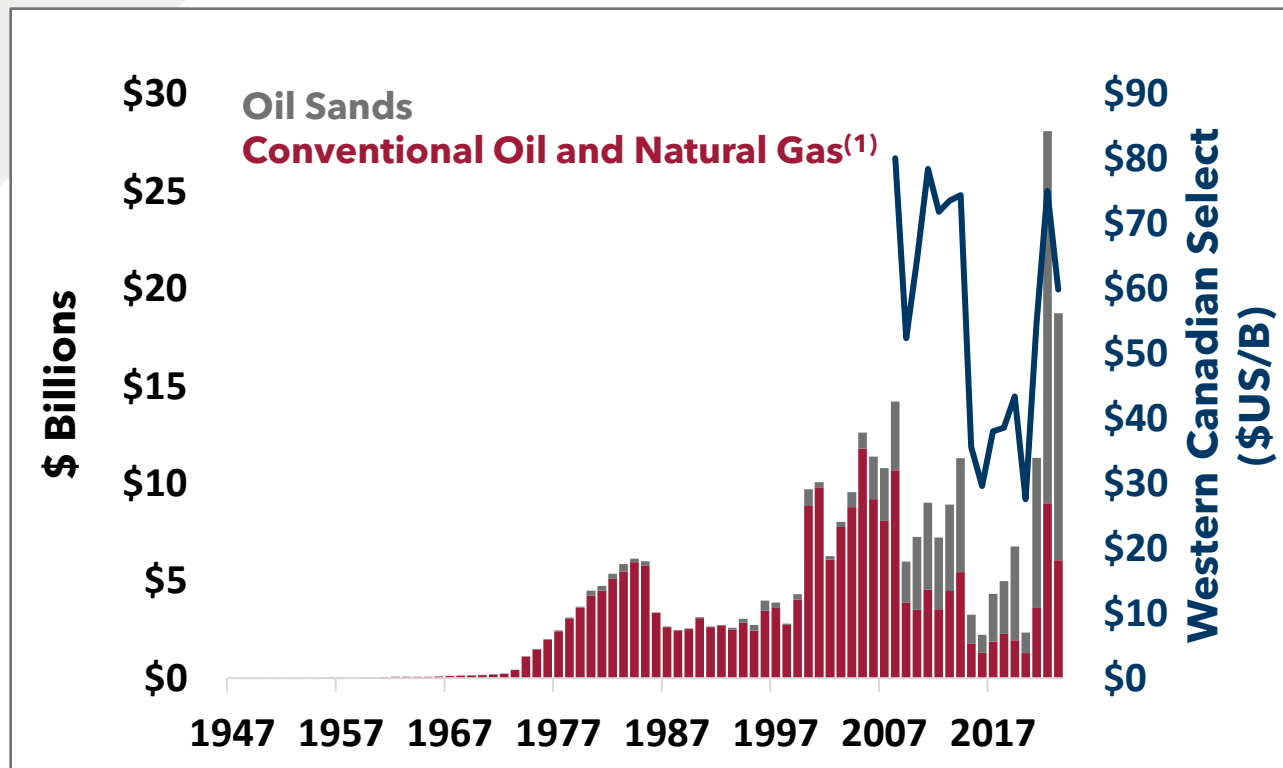
Annual | 1950-2023



- ▶ Alberta's upstream oil & gas capital expenditures (CAPEX) reached nearly \$30 billion in 2023, up slightly from \$29 billion in 2022.
- ▶ Alberta accounted for 75% of Canada's upstream oil & gas CAPEX in 2023.
- ▶ From 2005-2014, CAPEX surged due to oil sands development, which slowed post-2014 due to policy uncertainty and a generally weak price environment.
- ▶ About 159 billion barrels (95%) of Canada's proved oil reserves are in the oil sands⁽¹⁾, highlighting its significant development potential.
- ▶ Lower oil & gas CAPEX can temper near-term growth, employment, and fiscal inflows.

Alberta Oil & Gas Royalties

Annual | 1947-2023



- Cumulatively, over \$315 billion in royalties has been paid by the oil & gas industry in Alberta since 1947.
- Oil & gas royalties peaked at over \$28 billion in the fiscal year in 2022, driven primarily by a strong commodity price environment and many oil sands projects reaching post-payout status, leading to higher royalty rates.
- The oil & gas industry provides other financial contributions through provincial taxes (\$2.9 billion paid in 2024-25) and municipal taxes (\$1.7 billion paid in 2024).
- This revenue provides funding for important government programs like healthcare, education, and social programs.
- The Government of Alberta has announced plans to grow its Heritage Fund to at least \$250 billion by 2050.⁽²⁾ Non-renewable resource revenue will be critical to meeting this goal.

Acronyms and Abbreviations

B/d - Barrels/day

Bcf - Billion Cubic Feet

BOE - Barrel of Oil Equivalent

CAPEX - Capital Expenditures

CER - Canada Energy Regulator

CSS - Cyclic Steam Stimulation

GDP - Gross Domestic Product

MM - Million

MMcf - Million Cubic Feet

NGL - Natural Gas Liquids

SAGD - Steam-Assisted Gravity Drainage

WCSB - Western Canada Sedimentary Basin