

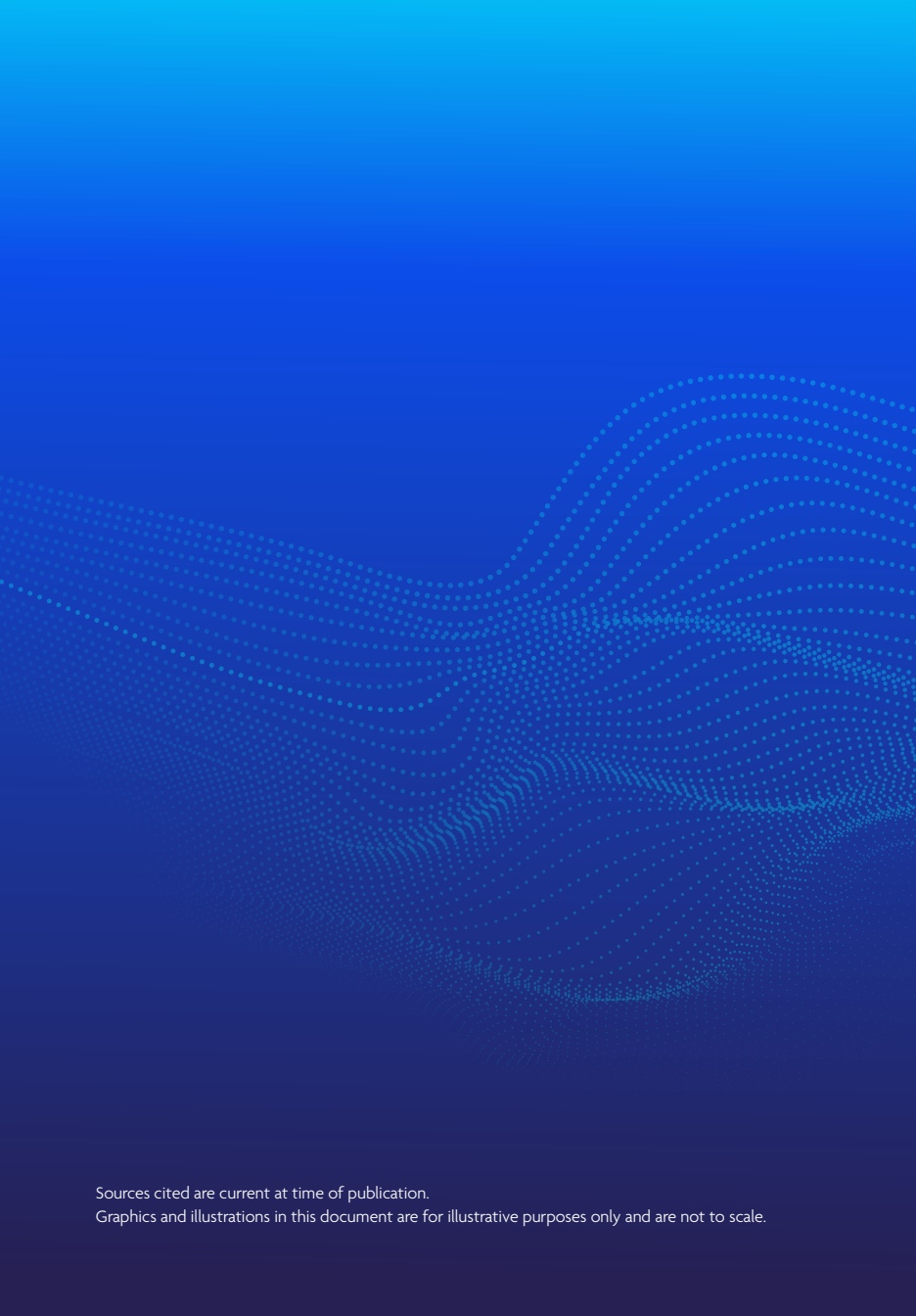
Canada's Oil Sands

A Story of Innovation

APRIL 2026



**Oil Sands
Alliance**



The oil sands industry exists because of ingenuity, collaboration and persistence — that spirit still drives us. This is the story of our origin and the role we've come to play in the world. It's also the story of how we're advancing to meet the future.

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“The world needs secure energy, and Alberta has an opportunity to meet that need. We have the resources, the skills and a strong track record of innovation.”

—Kendall Dilling, President of Oil Sands Alliance

Who we are

Oil Sands Alliance is made up of Canadian Natural, Cenovus, ConocoPhillips Canada, Imperial and Suncor, five of Canada's largest oil sands producers.

Canada has long benefited from a healthy energy sector. It helps strengthen Canada's economy, generating critical taxes and revenue for governments that support essential services and infrastructure, while creating thousands of jobs.

Alberta's oil sands are a critical part of Canada's energy sector. We want to ensure our industry can continue to provide benefits to Canadians for decades to come. That's why we're focused on advancing environmental innovation.





Land acknowledgement

We acknowledge that what we call Alberta is on the traditional lands of Treaties 6, 7 and 8. We acknowledge the many First Nations, Métis and Inuit who have stewarded these lands through generations. We are grateful for the traditional Knowledge Keepers and Elders who are still with us today and those who have gone before us. We make this acknowledgment as an act of gratitude.



Oil fuels our modern lives

Oil fuels transportation, but it has
many other uses in modern life.

Creating products and materials

There are more than a thousand applications for oil, like providing lubricants, greases, waxes and asphalt. It's also the source for petrochemical products, like pharmaceuticals and plastics we use in our daily lives.

Petroleum products



Fuel



Tires



House paint



Rain boots



Refrigerators



Toothpaste



Fertilizers



Aspirin



Golf balls



Detergents



Electronics



Diapers



Life jackets



Prosthetics



Roofing



Insecticides



Bitumen Beyond Combustion

Bitumen, the heavy oil that's found in the oil sands, is an excellent source of combustible energy. It also has potential to become a growing source for manufactured products. In 2016, Alberta Innovates, a provincial agency focused on finding new technologies and innovations with a potential benefit to the province, began researching Bitumen Beyond Combustion (BBC).

The program encourages the development of technologies that can use bitumen, without burning it, to create new materials and products. BBC products could include carbon fibres, high-quality asphalts, activated carbon, carbon nanotubes, graphene, polyurethanes, polycarbonates and controlled-release fertilizers.

Several Oil Sands Alliance members have participated in BBC research projects with Alberta Innovates as well as the Clean Resource Innovation Network (CRIN), a Canadian network focused on enabling cleaner energy development.

Helping to drive the economy

\$1 trillion
contributed by the oil sands industry to the Canadian economy over the past 25 years.¹

\$35.1B
paid in royalties and taxes to governments in 2024 by the oil and gas industry.

\$157.4B
of Canada's exports came from the oil and gas industry in 2024.



500,000+

Canadians directly or indirectly employed by the oil and gas industry.²



\$153.2B

From 2018–2024 the oil and gas sector contributed \$153.2 billion to federal and provincial governments. The contributions of the industry help to fund roads, bridges, schools and more.



4th largest

proven oil reserve in the world.³

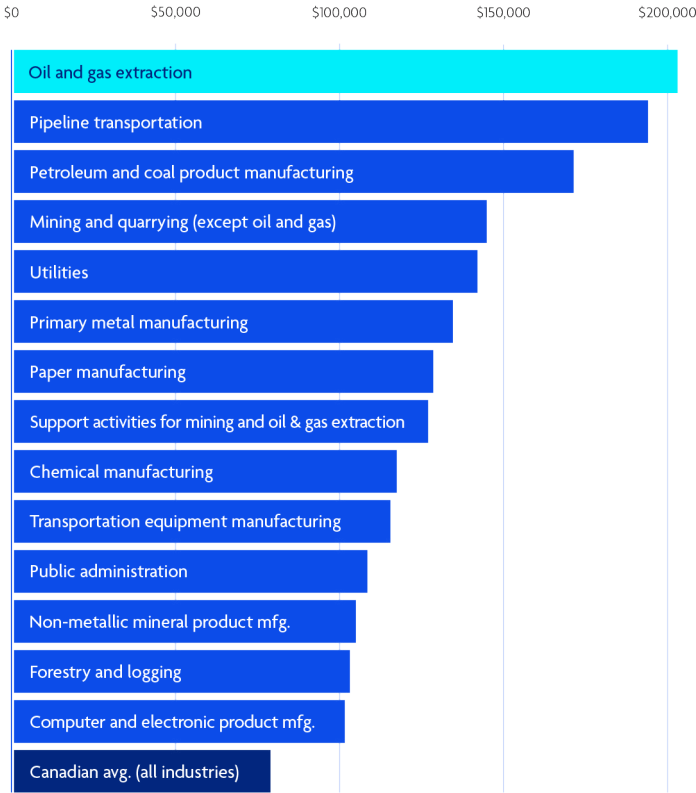
84% of Canadians

say oil and gas is important to Canada's current economy, according to a 2025 public opinion survey conducted by Nanos Research for University of Ottawa's Positive Energy Program.



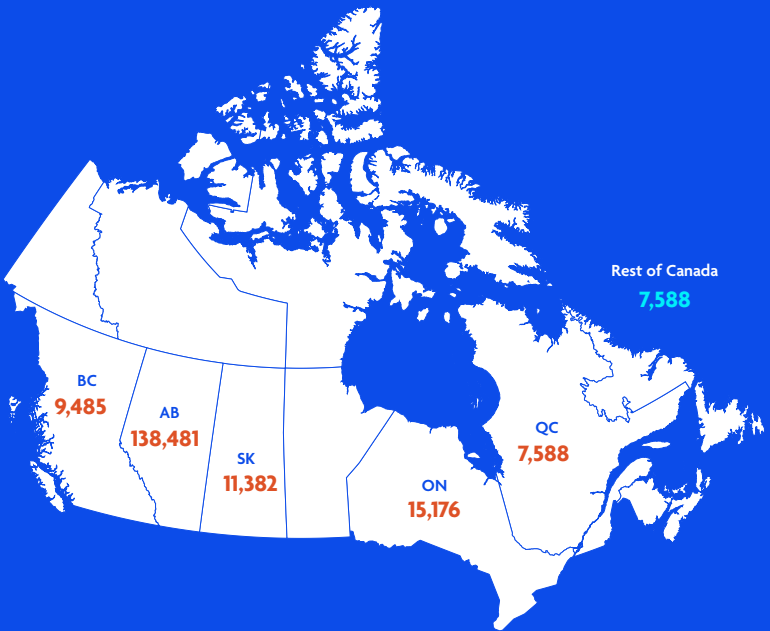
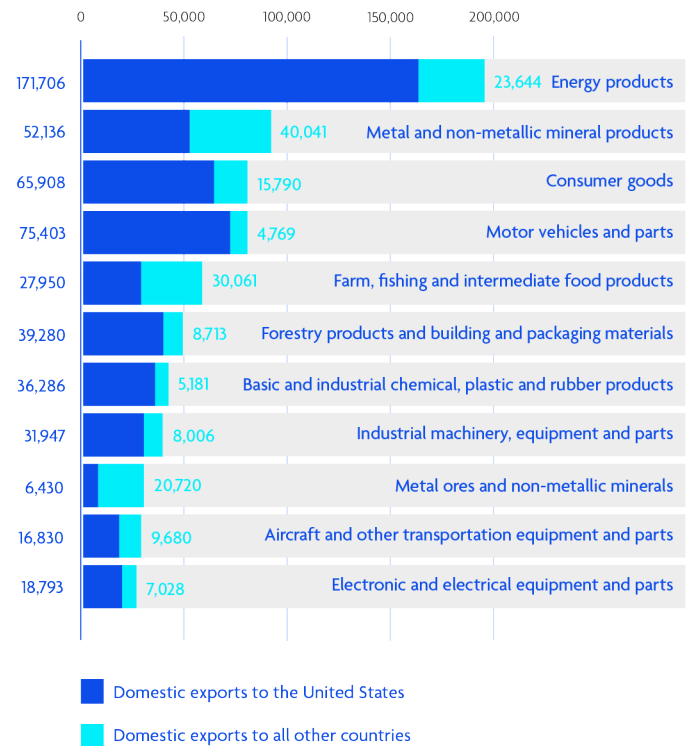
The average direct oil and gas worker's total compensation is roughly two times higher than the Canadian average for goods-producing industries.⁴

Average total compensation in Canada by industry (2024)



Note: Unless otherwise specified, stats on pp. 14–16 are sourced from Statistics Canada, 2023.

2024 Canadian domestic exports (millions of dollars)



~500,000+ people

directly and indirectly employed in the Canadian petroleum sector in 2024.

~313,400 indirect jobs in the supply chain.
~11,300 Indigenous people were employed in the oil and gas sector in 2024.

Direct and indirect jobs

Alberta.....	56%
B.C.....	9%
Saskatchewan.....	5%
Ontario	18%
Quebec.....	5%
Rest of Canada	7%

Source: "Energy Fact Book 2025–2026."
Natural Resources Canada, 2025.

Note: Percentages shown are rounded and may not be exact



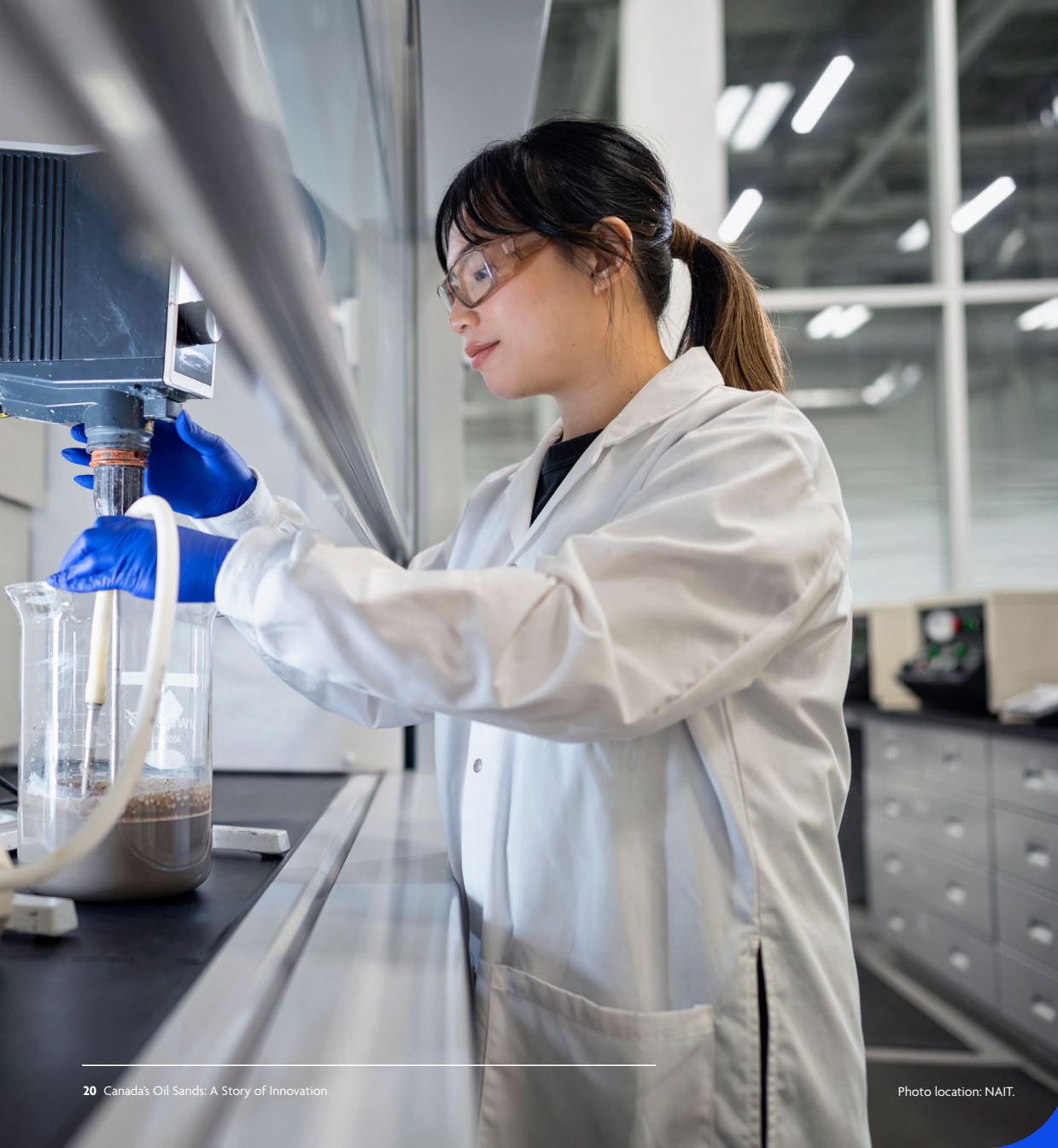
A Careers in Energy labour market report projects the energy sector will need to hire between 110,300 and 116,000⁵ additional workers between 2022 and 2035 to fill openings created by growth and retirements.

Support for skills training

Oil Sands Alliance and its members are committing more than \$1 million over the next year to a dozen programs to increase the number of skilled workers in the country.

“We’ve invested in targeted training programs to help address urgent labour shortages and strengthen Canada’s industrial growth and competitiveness. These programs help remove barriers for apprentices, expand training capacity and modernize facilities to ensure industry-ready graduates. Some of these apprentices go on to well-paying jobs in the oil sands, which strengthen our industry too.”

—Navjeet Sidhu, Oil Sands Alliance Director of Strategic Engagement



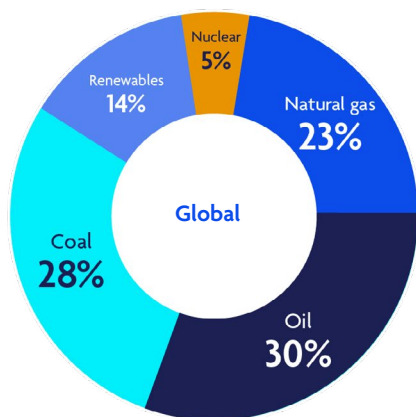
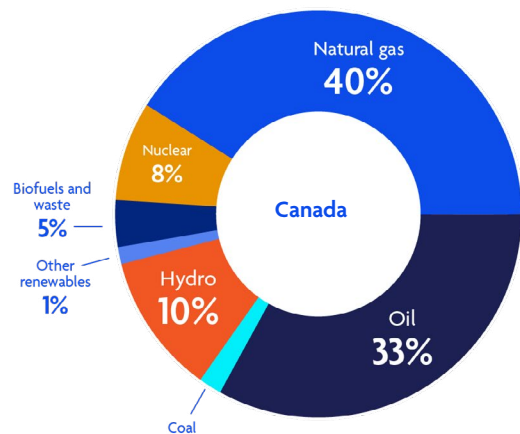
The role of Canada's oil sands

Our country's contribution to global energy supply is possible because of the oil sands.

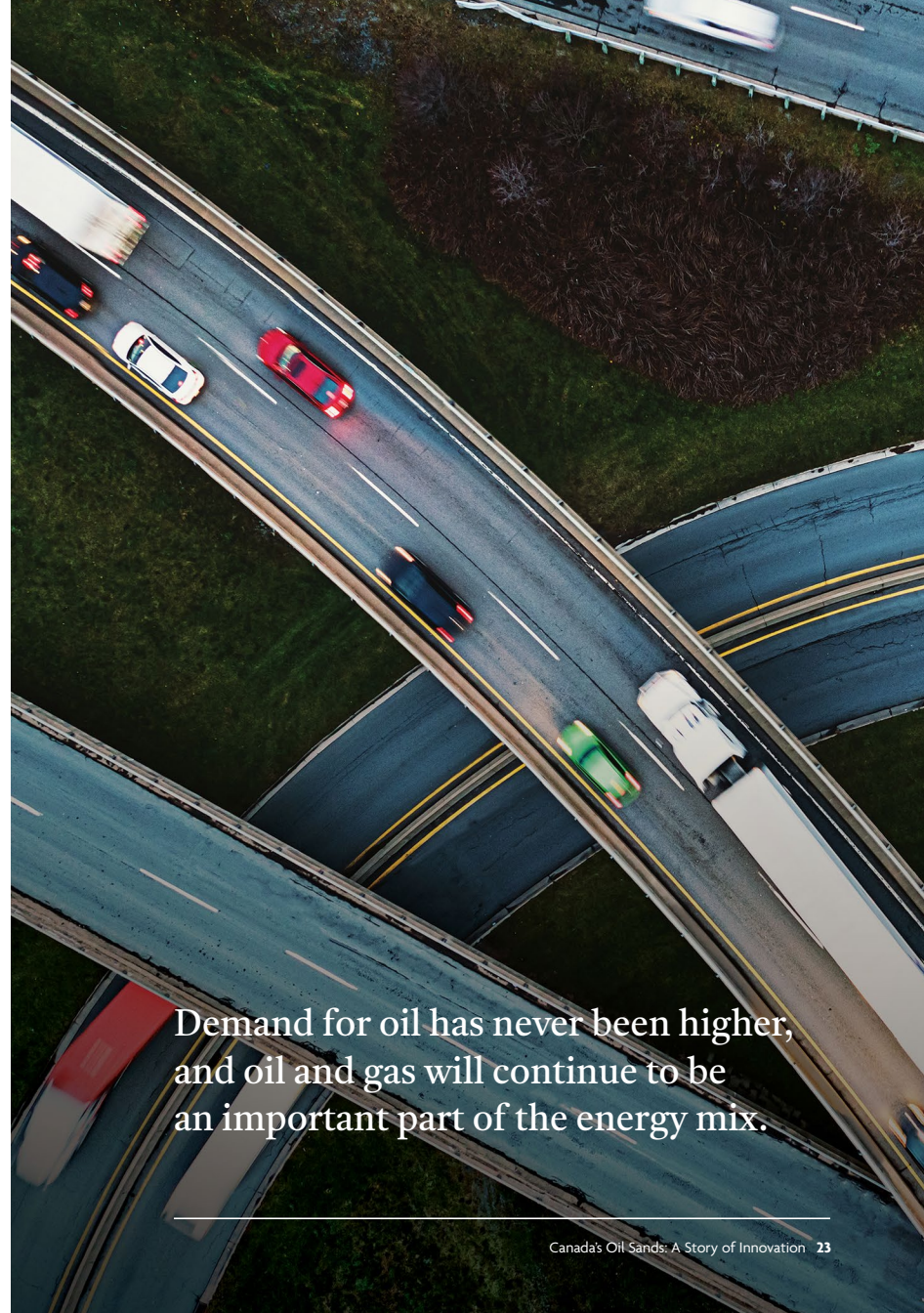
In 2025, Canada's oil sands produced 3.5 million barrels per day.⁶ Today, the oil sands remain an immense economic driver for Canada and Alberta and a secure source of energy for the world.

Total energy supply by source (2023)

Source: "Energy Fact Book 2025–2026." Natural Resources Canada, 2025.



Note: Percentages shown are rounded and may not be exact.



Demand for oil has never been higher, and oil and gas will continue to be an important part of the energy mix.

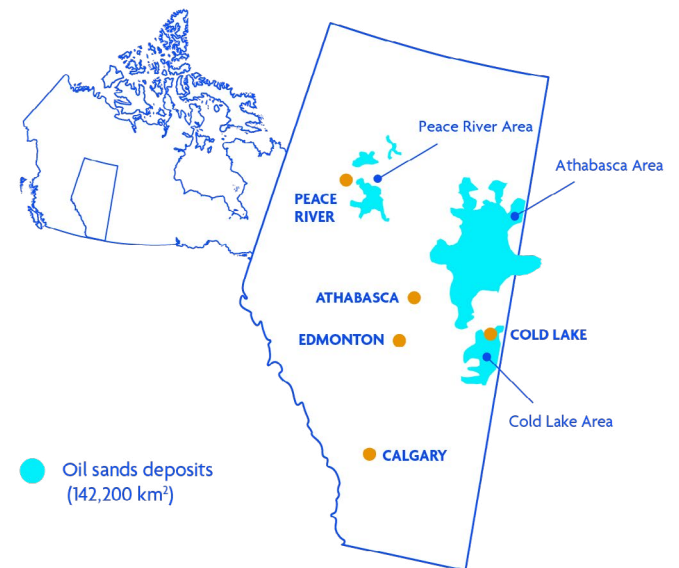


What are oil sands?

Oil sands are a naturally occurring mixture of sand, clay, water and bitumen (also called heavy oil). Oil sands can also refer to an area where oil sands exist, e.g., the Alberta oil sands.

Where are Canada's oil sands?

Canada's oil sands are found in three deposits in Alberta and Saskatchewan: the Athabasca, Peace River and Cold Lake deposits.





Oil sands: a timeline

Archeological evidence suggests that the relationship between humans and bitumen began thousands of years ago. Sometimes used as an adhesive or a waterproofing material, this substance has long been a valuable tool — and getting it from the ground to the market has been a fascinating challenge.

1700s First written recording of the oil sands. The substance was described by a Chipewyan woman as “gum” or “black pitch” and found along the banks of the Athabasca River.

1800s Canada’s federal government begins expeditions to map out oil sands resources.

1913 Engineer Sidney Ells concludes that bitumen can be extracted using hot water, and he identifies road paving as its most promising commercial application.



1920s Bitumount, an industrial site on the east bank of the Athabasca River, becomes an important place to demonstrate oil sands separation technologies.

1926 Oil expert Jacob Absher experiments with in-situ extraction methods. His efforts are unsuccessful, but they attract the attention of others.

1929 Dr. Karl Clark of the University of Alberta patents a hot water separation technique for extracting bitumen from oil sands.



1960s Imperial begins an experimental program to extract bitumen from the oil sands in Cold Lake, Alberta.

1967 Great Canadian Oil Sands (a precursor to Suncor) starts the first large-scale oil sands mine and upgrader. This would eventually become Suncor’s Base Plant.

1978 Syncrude’s Mildred Lake facility begins production in the Fort McMurray area, becoming the largest commercial oil sands operation in Alberta.

1978 Chemical engineer Dr. Roger Butler develops the concept of steam-assisted gravity drainage (SAGD) for in-situ bitumen recovery.



1985 Imperial commercializes the first cyclic steam stimulation (CSS) thermal project in Cold Lake.

1987 The Alberta government opens the Underground Test Facility (UTF), a site for testing underground oil sands extraction methods like SAGD.

1996 The Declaration of Opportunity is signed. This was a joint agreement between governments and industry that framed Canada’s oil sands as a major national opportunity and set out policy changes to unlock development. Alongside advances in new technologies for oil sands production, it helped trigger significant investment and expansion by improving fiscal and regulatory certainty.

1993–2013 This 20-year period sees several companies using the new science of bitumen extraction to launch major oil sands projects in Alberta. These projects include Canadian Natural’s heavy crude operations (1993); MEG Energy’s multi-phased Christina Lake project (1999); EnCana’s SAGD Foster Creek operation (2001); Petro-Canada’s MacKay River in-situ facility (2002); Canadian Natural’s Albion Sands project (2003); Suncor’s Firebag in-situ facility (2004); ConocoPhillips



- Canada's Surmont SAGD facility (2007); Canadian Natural's Primrose East project (2008), Horizon Oil Sands (2009) and Kirby South SAGD project (2013); and Imperial Oil's Kearl project (2013).
- 2012** Canada's Oil Sands Innovation Alliance (COSIA) is formed, focusing on collaborative action and innovation in oil sands environmental technology.
- 2015** Shell Canada Energy opens the Quest Carbon Capture and Storage (CCS) facility, the world's first commercial-scale CCS facility for oil sands operations; ConocoPhillips Canada begins operations for Phase 2 of the Surmont oil sands project.
- 2021** The Pathways initiative is launched to help advance a CO₂ emissions strategy and a proposed carbon capture and storage (CCS) project. The initiative originally brings together Canadian Natural, Cenovus Energy, Imperial, MEG Energy and Suncor, with ConocoPhillips Canada joining later that year.
- 2022** Pathways Alliance (renamed Oil Sands Alliance in 2026) is formally established, representing six of Canada's largest oil sands companies: Canadian Natural, Cenovus Energy, ConocoPhillips Canada, Imperial, MEG Energy and Suncor. COSIA also becomes part of the organization, further strengthening the alliance's shared approach to innovation.



- 2024** Imperial's Grand Rapids project in Cold Lake begins production. It's the industry's first commercial application of solvent-assisted SAGD technology.



- 2024** On behalf of Pathways Project proponents, Canadian Natural begins filing regulatory submissions for the CO₂ Transportation Network and Storage Hub project. When operational, it will transport carbon dioxide (CO₂) from multiple oil sands facilities to a capped, sandstone formation in the Cold Lake area of Alberta for underground storage.



- 2025** With Cenovus's acquisition of MEG Energy in 2025, Oil Sands Alliance (known as Pathways Alliance until 2026) now stands at five members.
- 2026** Pathways Alliance industry association changes its name to Oil Sands Alliance to better reflect the purpose and mandate of the organization. The Pathways name is used exclusively in reference to the proposed CO₂ transportation network and storage hub, which will continue to be known as the Pathways Project.



From deposit to product

Bitumen from the oil sands is the building block for a wide variety of products we use in our daily lives. How does it go from being underground to becoming something usable like gasoline? For oil sands producers, it's a multi-stage process.

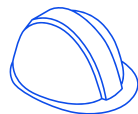
Oil sands: a multi-stage process



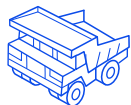
1 Exploration



2 Planning and approvals



3 Construction



4 Production

- Mining
- In-situ



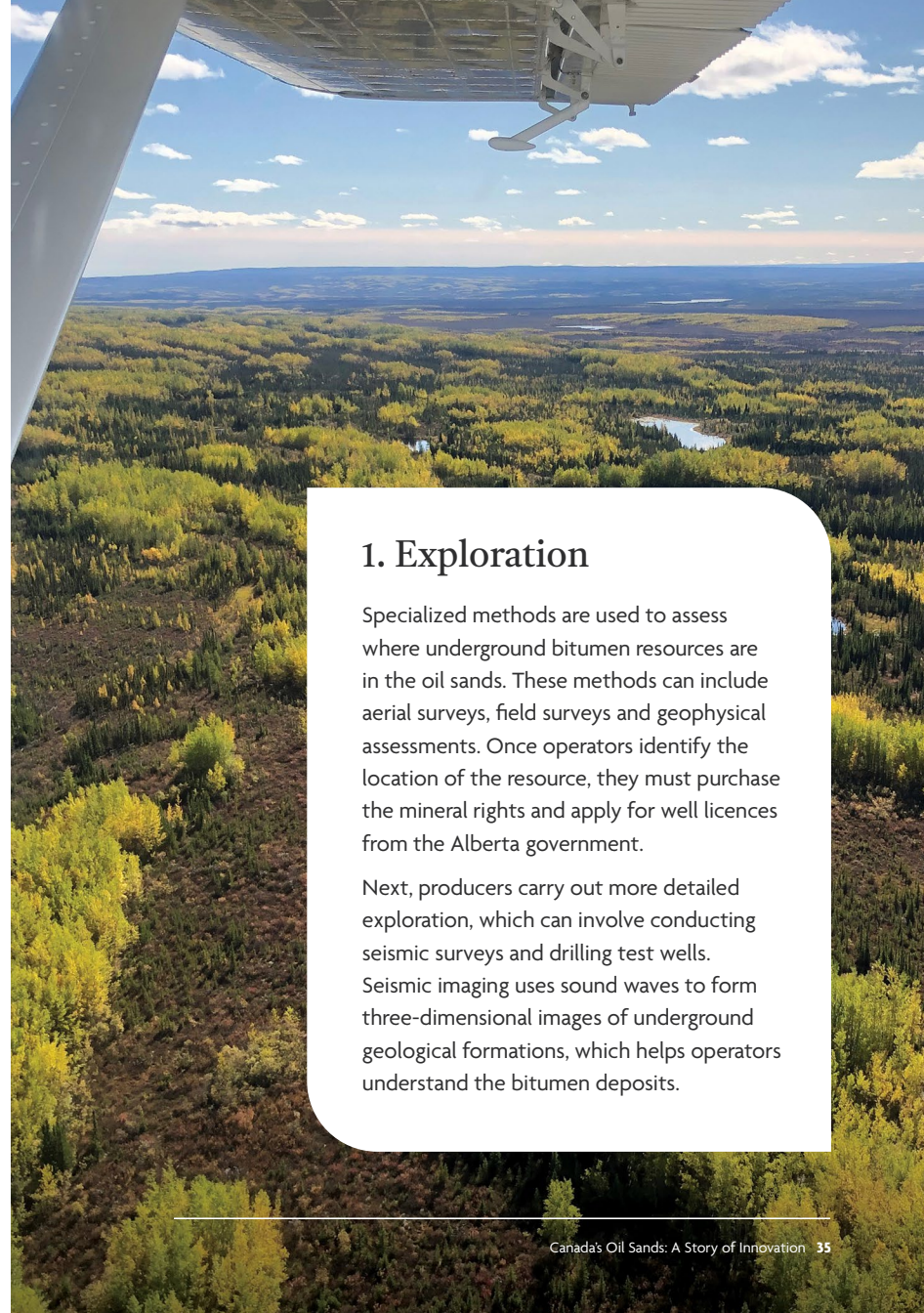
5 Upgrading



6 Refining, marketing and transportation



7 Reclamation and closure



1. Exploration

Specialized methods are used to assess where underground bitumen resources are in the oil sands. These methods can include aerial surveys, field surveys and geophysical assessments. Once operators identify the location of the resource, they must purchase the mineral rights and apply for well licences from the Alberta government.

Next, producers carry out more detailed exploration, which can involve conducting seismic surveys and drilling test wells. Seismic imaging uses sound waves to form three-dimensional images of underground geological formations, which helps operators understand the bitumen deposits.

2. Planning and approvals

Before operations begin, producers develop plans that map out the full life cycle of the planned project, from the first shovel through to reclamation and closure. Once complete, the plans are filed with the Alberta Energy Regulator (AER).

As part of the application process, producers consult with Indigenous groups and local communities in order to identify and mitigate concerns related to the project. Community engagement is an iterative process, which continues throughout the project. Producers may also be required to complete an environmental impact assessment, which gauges the potential environmental effects of the planned project.

Once the AER grants approval, producers must continue to meet all regulations and requirements through the full project life cycle. They must submit annual plans and reports detailing project progress and providing updates about new data, techniques or other information that could inform future practices and approaches.



3. Construction

After a project receives the appropriate regulatory approvals, producers can begin to construct extraction facilities. This could include building access roads, well pads, mine sites and processing infrastructure.

4. Production

Traditional techniques won't extract bitumen from the oil sands. One challenge is that bitumen is mixed in with sand and clay. Another challenge is that bitumen is almost solid at room temperature (about the same consistency as peanut butter) and doesn't flow. There are two methods of recovering oil from oil sands.

Mining

About 20% of Alberta's oil sands reserves are very near to the surface and can be mined (less than 75 metres deep). During mining, large shovels scoop the oil sands ore into heavy haul trucks for transport. The trucks move the oil sands ore to processing facilities where the ore is broken down into smaller pieces, then mixed with hot water and sent to an extraction plant. Once at the plant, the water and oil sands mixture goes through a series of pipelines and vessels that allow the bitumen to separate and be recovered.

In situ

Otherwise known as in-place extraction, in situ describes a process where bitumen is extracted directly from the underground deposit. This method is used when bitumen in the oil sands is too deep underground to be mined, which is the case in about 80% of all deposits.

Steam-assisted gravity drainage (SAGD) and cyclic steam stimulation (CSS) are two of the technologies used for in-situ extraction. In both cases, steam is injected into the underground bitumen deposit, heating the bitumen so it becomes less thick and can be pumped to the surface for processing.



5. Upgrading

Once bitumen is recovered using mining or in-situ techniques, it goes to an upgrader. Since bitumen from the oil sands is made up of many complex molecules, it usually needs to be broken down before going to a refinery. Upgrading helps break up the molecules and reduce the bitumen's viscosity so it can be transported through pipelines across long distances. In some cases (depending on how the bitumen is processed by the operator after separation), further upgrading isn't needed and bitumen can go directly to the refinery.

Upgraders also help remove water, solids, impurities and residue from the bitumen. The end product of upgrading is called synthetic crude oil, and this is what's sold to refineries. The total upgrading capacity in Canada is 1.3 MMb/d.⁹

Most Canadian refineries don't have the capability to process heavy oil. The majority of Alberta's bitumen is sold to the U.S., mostly the Midwest and Gulf Coast, which are better equipped to process our oil.

Major companies with upgrading capacity include Oil Sands Alliance members Suncor, Canadian Natural and Cenovus.¹⁰

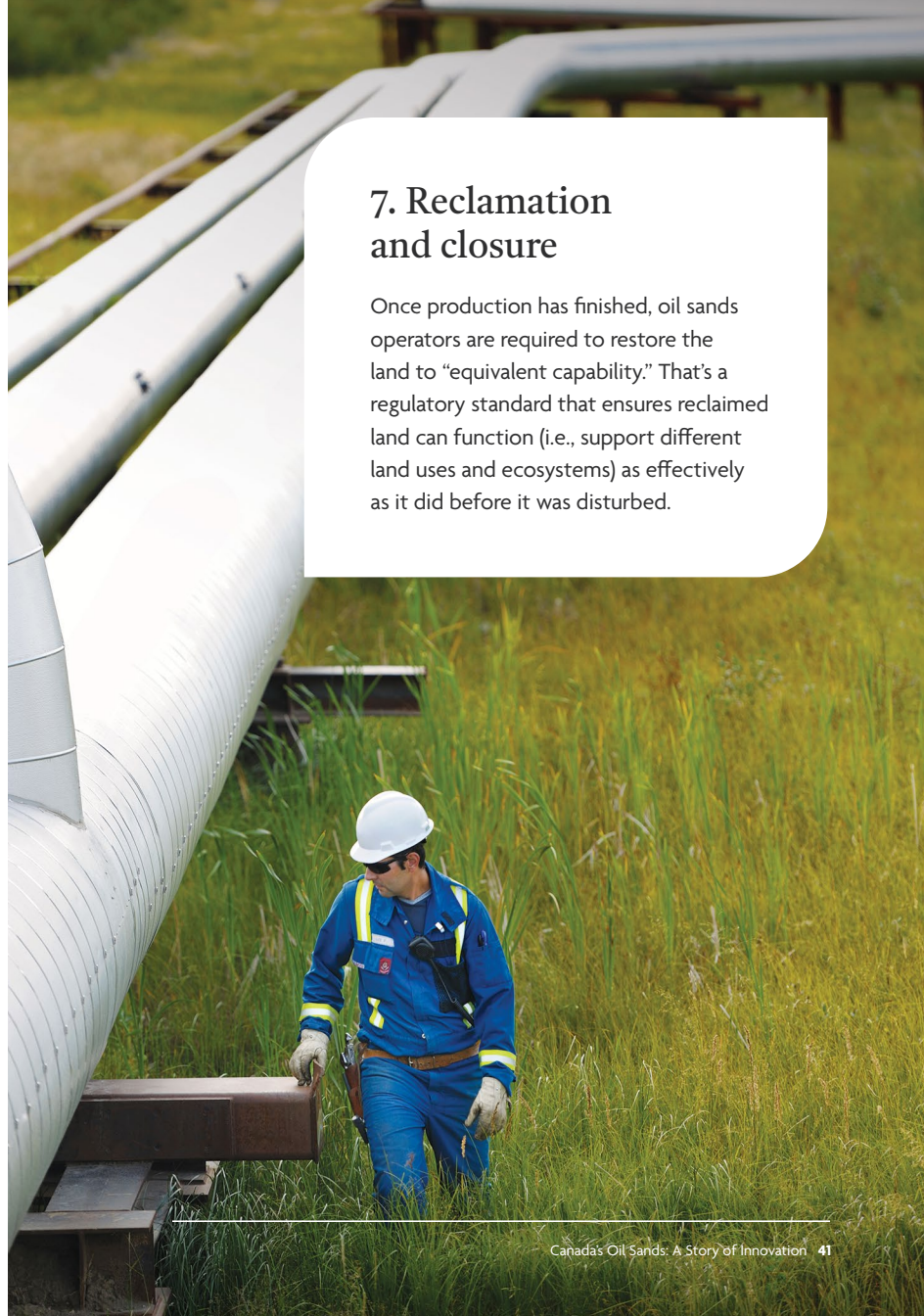
6. Refining, marketing and transportation

Once at the refinery, crude oil is broken down further into different hydrocarbons, which are then blended into final products like fuels or feedstock for other chemicals.

After being refined, the various petroleum products are placed in storage tanks and eventually shipped to markets using pipelines, trains, tankers or ships.

7. Reclamation and closure

Once production has finished, oil sands operators are required to restore the land to "equivalent capability." That's a regulatory standard that ensures reclaimed land can function (i.e., support different land uses and ecosystems) as effectively as it did before it was disturbed.



Canada's export infrastructure

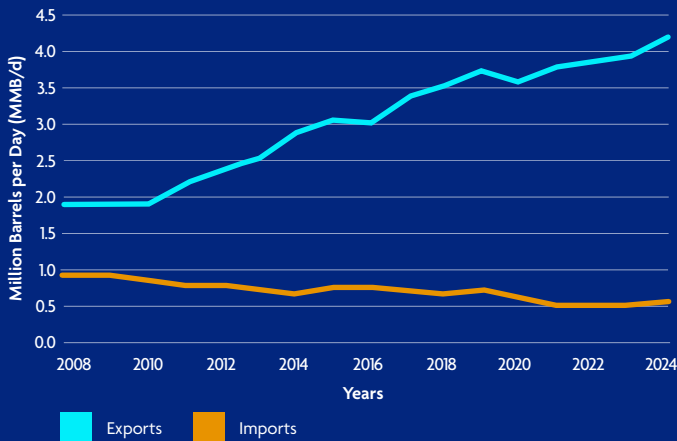
In 2024, approximately 4.6 million barrels per day of crude oil and natural gas liquids (NGLs) were exported to the U.S. and Eastern Canada via six major export pipelines.¹¹

Pipeline	Capacity KB/d* (2024)	Destination
1 Trans Mountain	515	B.C.
2 Enbridge Mainline	3,060	U.S., Eastern Canada
3 South Bow Keystone	624	U.S.
4 Enbridge Express	276	U.S.
5, 6 Rangeland / Milk River	127	U.S.

*thousand barrels per day



Canadian trade of crude oil¹²





A story of innovation

Technology and innovation have been essential ingredients in establishing the modern petroleum industry in Canada.

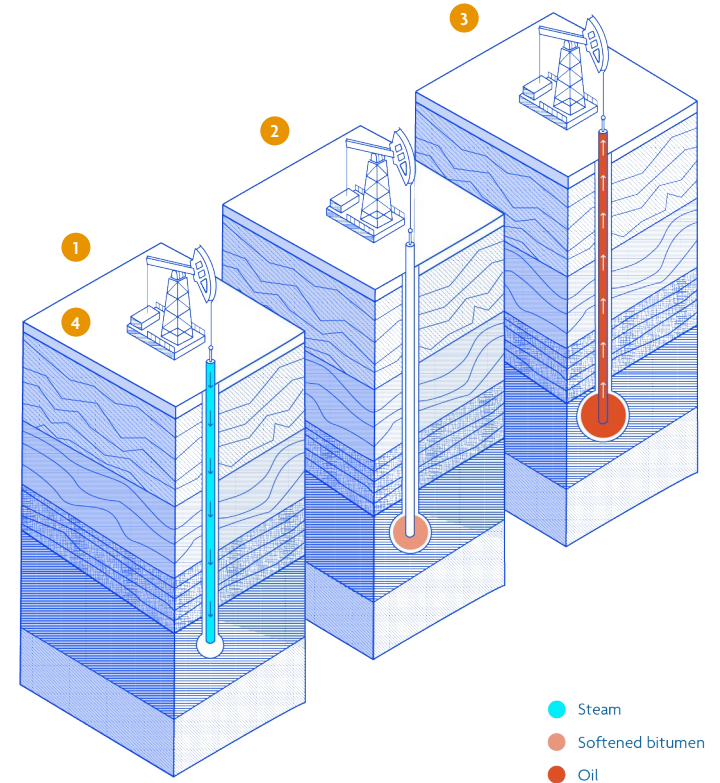
Production technologies

About 80% of the bitumen in the oil sands is too deep underground to be mined. What's more, most of the oil in Alberta is thick, with a peanut butter-like consistency that's difficult to get out of the ground. Innovations have made it possible to extract even the deeper oil sands from the ground and to separate bitumen from other materials.

Cyclic steam stimulation (CSS)

Attempts to extract oil resources too deep for mining began in the early 1900s, using underground wells and various methods to heat and liquefy the bitumen so it could be pumped to the surface. In the 1960s, Imperial was the first to test a method that is now known as cyclic steam stimulation, eventually running a pilot program before successfully commercializing the technology in the Cold Lake region in 1985. The CSS process includes the following steps:

- 1 Steam injection: A vertical well is drilled deep underground into the bitumen formation. Steam is injected into the well to help soften the bitumen.
- 2 Soak phase: Steam is left to “soak” in the underground formation until the bitumen is soft enough to flow.
- 3 Production: The same well is then used to bring the bitumen and condensed steam mixture to the surface.
- 4 New steam is then injected to begin a new cycle when oil production rates fall below a critical threshold because of the cooling of the reservoir.



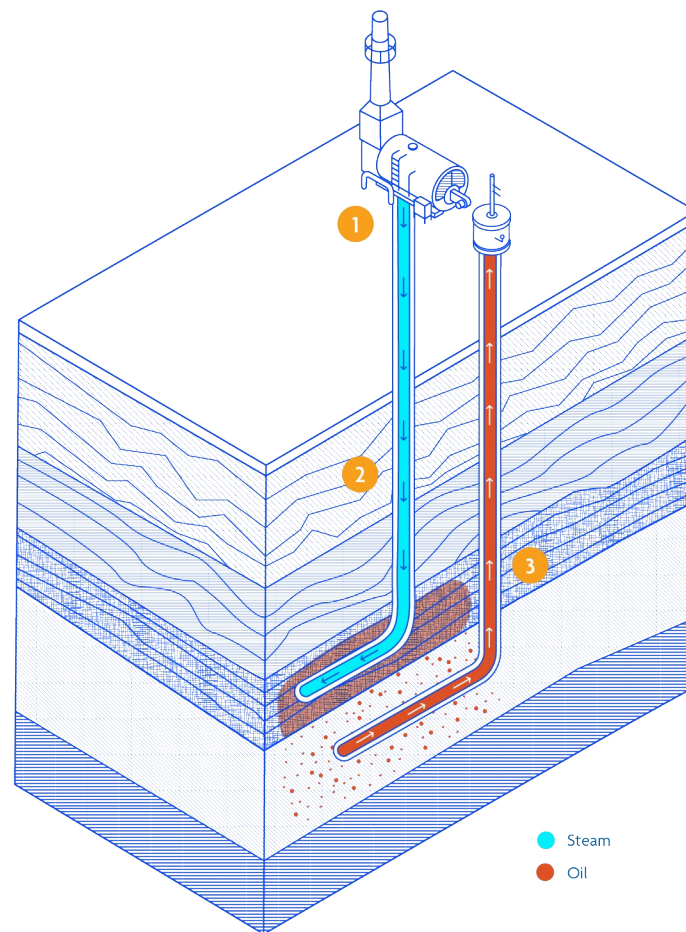
Steam-assisted gravity drainage (SAGD)

In the 1970s, retired Imperial employee Dr. Roger Butler began work on another technology that would eventually become critical to the oil sands industry: steam-assisted gravity drainage. By the 1980s, a test facility was built near Fort McMurray to further develop SAGD technology, which led to the first SAGD pilot projects in the 1990s.

Like CSS, the SAGD process uses steam to liquefy the bitumen. However, instead of one vertical well, in SAGD two horizontal wells are drilled one above the other, creating separate wells for steam and bitumen. The introduction of two wells opened up the potential for continuous production. In SAGD:

- 1 Two horizontal wells are drilled deep underground into the bitumen formation.
- 2 Steam is injected into the top well to help soften the bitumen in the surrounding reservoir.
- 3 As the bitumen softens, gravity causes it to flow into the bottom well, where it is brought to the surface.

The resulting substance is a mixture of oil and condensed steam, which is sent to a plant for separation and treatment. The separated water is reused to create steam in the SAGD process.

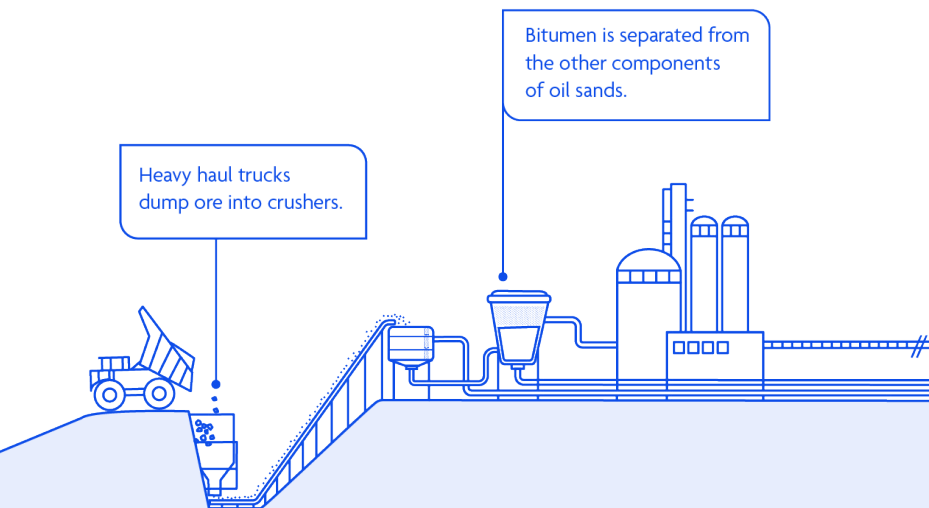


Hot water separation

Oil sands are a mixture of bitumen, sand, clay and water. Until the bitumen is separated from the other materials, it can't be used for fuel or other applications. In 1929, Dr. Karl Clark of the University of Alberta received a patent for a separation method using hot water and chemical agents.



In mining, the first step of processing the oil sands is crushing, where they are broken down into smaller pieces. These pieces are then conveyed, mixed with hot water and sent to an extraction plant. Once at the plant, the water and oil sands mixture goes through a series of pipelines and vessels that allow the bitumen to separate and be recovered.



Alberta Oil Sands Technology and Research Authority (AOSTRA)

In the 1970s, the Alberta government formed a Crown corporation to kick-start research and development on in-situ extraction in the oil sands. It started with a \$100-million investment from the government that eventually led to additional funding from both the public and private sectors.

In 1984, AOSTRA developed an underground facility near Fort McMurray, where a version of the SAGD process was tested and eventually proven to be commercially viable.



Environmental technologies

Today, oil sands innovation continues. Oil Sands Alliance member companies are currently advancing dozens of emerging environmental and emissions-related technologies, and they're forming technical working groups to study and advance more technology development projects with the potential to reduce emissions intensity.

As a result of investments by member companies in new technologies, innovations and operational improvements, CO₂e per barrel of oil produced dropped about 26% in the Canadian oil sands from 2011 to 2023.¹³

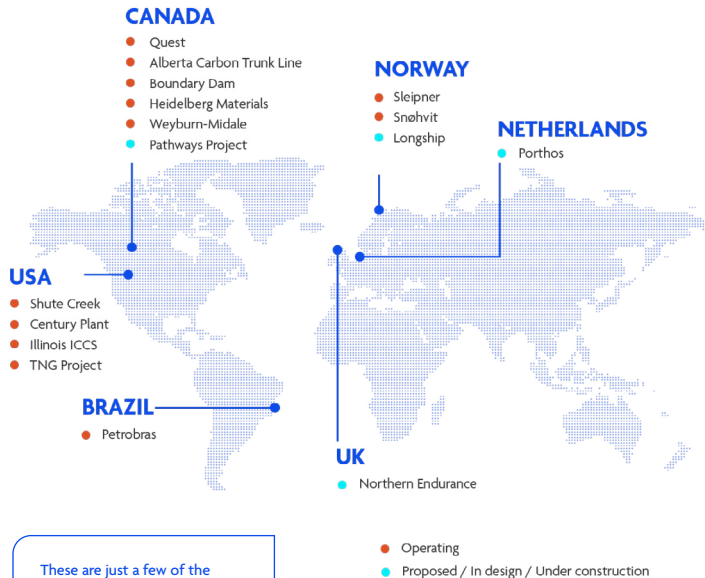
In 2022, environmental protection expenditures by Canada's oil and gas sector totalled

\$4 billion.

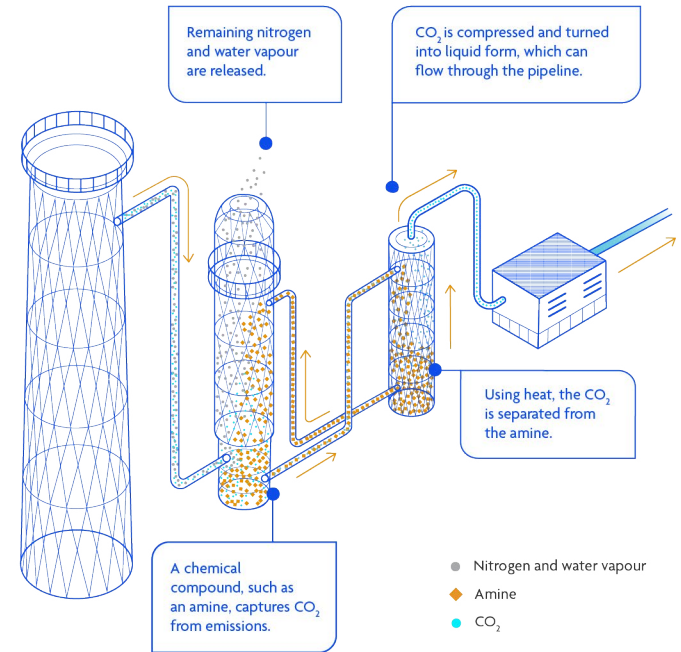
This accounts for the largest share of environmental protection expenditures made by all industries.¹⁴

Carbon capture and storage (CCS)

CCS has the potential to help prevent CO₂ created by industrial activities from entering the atmosphere. The International Energy Agency has recognized CCS as an important technology to help reduce CO₂ emissions in the energy sector. According to the Global CCS Institute's 2025 report, there are 77 carbon capture and storage projects operating worldwide, with an additional 47 projects currently under construction and 610 in development.



These are just a few of the large-scale CCS projects currently operating around the world.



In the CCS process:

1. Capture technologies are fitted to a large emission source, which makes it possible to capture CO₂ emissions.
2. Captured CO₂ is compressed and turned into liquid form, which can flow through a pipeline to a storage facility.
3. CO₂ is stored deep underground, typically between 1,000 and 2,000 metres beneath the Earth's surface.

CCS in Canada

Expertise in the construction and operation of large-scale CCS projects exists here in Canada. According to the International CCS Knowledge Centre, Canada accounts for approximately 15% of the world's current CCS capacity, even though our nation contributes less than 2% of global CO₂ emissions. CCS projects in Canada have securely stored more than 50 million tonnes of CO₂.¹⁵

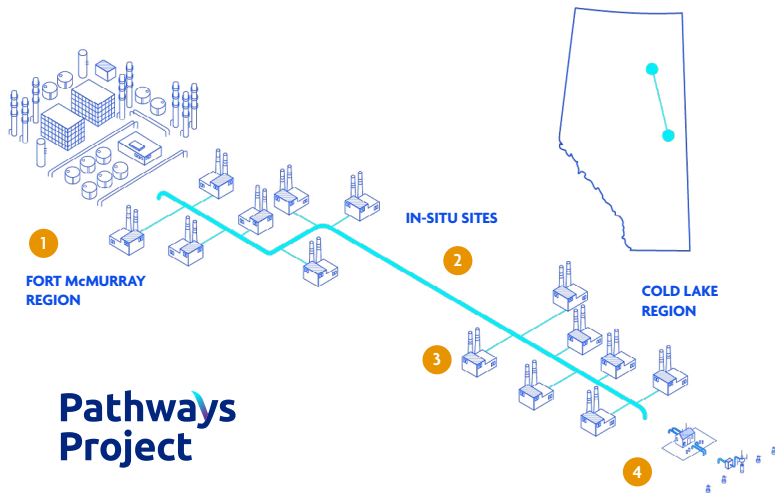
CCS facilities currently operating in Canada:

1. Quest CCS facility
2. SaskPower Boundary Dam Carbon Capture Project
3. Wolf Alberta Carbon Trunk Line
4. Entropy Glacier CCS
5. Weyburn-Midale CO₂ storage facility



Photos (clockwise from top): Quest CCS facility, SaskPower Boundary Dam, Quest CCS facility, SaskPower Boundary Dam



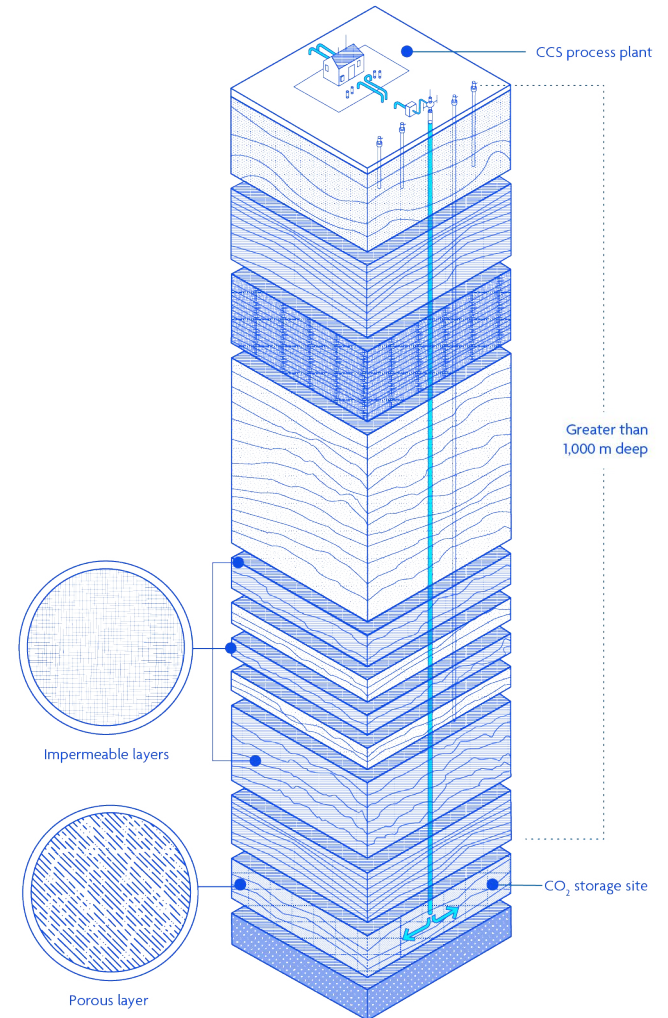


Pathways Project

Pathways Project

The Pathways Project proponents, Canadian Natural, Cenovus, ConocoPhillips Canada, Imperial and Suncor, have proposed a carbon capture and storage (CCS) network and pipeline that, when operational, will have the capacity to transport captured CO₂ from multiple oil sands facilities to a hub in the Cold Lake area of Alberta for permanent underground storage. The line could be made available to other oil producers and industries in the region interested in capturing CO₂ emissions. Appropriate fiscal support and regulatory approvals would be necessary to make this project a reality.

- 1 Oil sands upgraders, mining and in-situ area
 - 2 650+ km CO₂ transportation network
 - 3 Oil sands in-situ recovery area
 - 4 Joint carbon storage hub
-  Facility
-  CO₂ transportation network



Above: Rock formations that have securely stored oil and gas for millions of years can also safely and permanently store CO₂. These multiple overlying layers of impermeable rock formations act as natural seals.

An economic driver

Construction on the proposed CCS project is anticipated to drive direct, indirect and induced economic activity.¹⁶



\$16.5B in GDP

\$12.2B
in labour income



129,000+
full-time jobs (between
18,500 and 43,000 annually)
during project construction



Advancing technologies

Canada's innovators are advancing CCS technology development projects, including some supported by Oil Sands Alliance members, that have the potential to be used by other industries and exported globally. Those include:



Advancing conventional carbon capture technology to improve energy and cost efficiency.



Assessing and piloting next-generation CCS technologies, such as those developed by Svante and Ionada (companies that specialize in climate technology, including CCS).



Conducting a direct air capture landscape study to assess and understand the potential for future use.



Evaluating the feasibility of CO₂ sequestration in depleted natural gas fields.



Steam reduction

Steam-reduction technologies reduce the need for steam, which is a major driver of emissions from in-situ oil sands production. Oil Sands Alliance members are piloting technologies using solvents (lighter hydrocarbons) for SAGD optimization. These processes have the potential to lower costs, reduce steam-to-oil ratios and lower greenhouse gas emissions per barrel from oil sands production.



Oil Sands
Alliance



cosia®

Collaboration driving innovation

COSIA is the innovation arm of Oil Sands Alliance. COSIA is focused on fostering innovation in oil sands environmental technology in four key environmental priority areas: tailings, water, land and greenhouse gases.



Innovation hub

COSIA works with oil sands companies to identify technical hurdles in their operations. Those challenges then become opportunities for innovators, who are invited to submit proposals for new processes and technologies through an Environmental Technology Assessment Portal. COSIA identifies and collaborates with promising innovative organizations, supporting their journey to commercialization. By collaborating with innovators at all stages of development, COSIA identifies the resources they need to advance to the next stage of product development.

H2nanO

Mine water from oil sands operations contains contaminants that can be difficult and costly to remove. To help address this challenge, COSIA put out the call for new low-energy technologies to treat mine water, and H2nanO's SolarPass solution caught their attention. SolarPass technology uses floating photocatalyst beads that harness sunlight to generate oxidants, breaking down organic contaminants.

Because it relies on sunlight, SolarPass can treat water with less energy, fewer chemicals and lower costs than traditional methods. The technology has already been tested in real-world conditions — including pilot work with Oil Sands Alliance member Imperial — and is advancing toward broader deployment.



OTSG research project

COSIA is engaged in a five-year, \$2-million research project. The research focuses on reducing buildup, erosion and corrosion in Once-Through Steam Generators (OTSGs), boilers that generate superheated steam used in in-situ extraction processes. The project is overseen by the Southern Alberta Institute of Technology's (SAIT) Centre for Energy Research and Clean Unconventional Technology Solutions. It's a true collaboration involving the University of Calgary, the University of Alberta and SAIT, and it's supported in part by funding from the Natural Sciences and Engineering Research Council of Canada.

Researchers have access to three pilot-scale OTSGs in a new energy research lab called the Imperial Energy Innovation Centre. This 40,000-square-foot, \$37-million facility was funded by a historic donation from Oil Sands Alliance member Imperial in 2025. The lab is intended to connect researchers with industry professionals, providing a space to find solutions to industry challenges and progress applied energy research.

Impossible Sensing Energy

COSIA provided funding to help support Impossible Sensing Energy in developing a prototype sensor designed to detect butane, propane and other solvent gases used in in-situ oil sands operations. Using solvents allows operators to reduce or eliminate the need for steam to extract bitumen, which has the potential to lower water use, reduce energy intensity and decrease greenhouse gas emissions intensity.

By enabling more accurate monitoring, this technology helps companies better detect solvents that are recovered so they can be reused.





BioOilSolv

Clean-tech company BioOilSolv has created a solvent made from biomass to help recover bitumen from oil sands using less steam. Traditional SAGD relies on steam, which can be energy intensive to generate, but solvents can improve oil flow, reducing the amount of steam needed. Unlike conventional solvents, biomass-based solvents are renewable and are even more effective at reducing the need for steam in SAGD operations.

COSIA and Oil Sands Alliance have helped move this plant-based technology forward by supporting early development, connecting BioOilSolv with industry partners and enabling funding and technical validation. With ongoing backing from Oil Sands Alliance members, BioOilSolv is advancing toward pilot-scale production and field testing, bringing the solution closer to real-world application.



Expenditures on hydrocarbon technology research, development and demonstration (including CCS)¹⁷

\$138M

Federal
(2023–24)

\$57M

Provincial &
territorial
(2023–24)

\$998M

Industry
(2022)



Working with Indigenous groups

Engagement, community relations and economic inclusion

Having a strong and constructive relationship with communities where we operate is vital. Oil Sands Alliance members have a long history of collaborating with Indigenous groups to enable them to acquire equity and share in the benefits of resource development.

Oil Sands Alliance members recognize the importance of working with Indigenous communities and taking steps towards economic reconciliation through building long-term relationships.

Indigenous businesses

Indigenous-owned businesses have become an integral part of the oil sands industry throughout the past four decades.

Bouchier

This 100% Indigenous-owned company in Fort McKay, Alberta, is one of the largest contractors in the oil sands industry. It employs nearly 1,400 people, 38% of whom self-identify as Indigenous, working at sites for Canadian Natural, Cenovus, Imperial and Suncor.



“Economic reconciliation isn’t just a policy, it’s a practice. Our story isn’t just about contracts. It is about leadership, skill building and creating space for the next generation to rise.”

—Nicole Bourque-Bouchier, co-owner and CEO of Bouchier Group

Indigenous spend and agreements

Oil sands operators recognize the importance of ensuring Indigenous groups share in the economic opportunities from resource development. Indigenous businesses are a critical part of our industry’s success and provide high-quality competitive services.

- Nationally, Indigenous-affiliated spending by the oil sands sector grew by 81% between 2019 and 2023, reaching \$6.6 billion in 2023.
- In total, oil sands operators purchased \$23.8 billion worth of goods and services from Indigenous-affiliated vendors between 2019 and 2023.
- Between 2019 and 2023, the annual median spend per Indigenous-affiliated vendor increased by nearly 104%, growing from approximately \$540,200 in 2019 to \$1.1 million by 2023.

Note: Oil Sands Alliance conducted a study among its members to quantify supply chain spending and community investments from 2019 through to and including 2023. The study is based on the Shared Values Reporting (SVR) methodology developed by iTOTEM Analytics, an Indigenous-affiliated data science and communications firm with offices in Vancouver and Houston. SVR reporting focuses on measuring vendor impact and societal progress, highlighting areas where economic success overlaps with community benefits.

Cenovus Indigenous Housing Initiative

Cenovus supported the construction of nearly 200 homes in six First Nations and Métis communities near its oil sands operations in northeast Alberta: Beaver Lake Cree Nation, Chard Métis, Chipewyan Prairie First Nation, Cold Lake First Nations, Conklin Métis and Heart Lake First Nation.

Cenovus is now expanding the program through an ongoing investment of up to \$8 million per year.

“The best word to describe the impact of the initiative is transformative. In my career, I cannot point to any program or industry initiative that has been this powerful and successful in elevating the quality of life of vulnerable people.”

—Scott Duguid, CEO of Conklin Resource Development Advisory Committee

Partnership Accreditation in Indigenous Relations (PAIR) program

The Canadian Council for Indigenous Business has a program called Partnership Accreditation in Indigenous Relations (PAIR), which offers formal certification to companies based on an assessment of their Indigenous-inclusion initiatives. PAIR certification recognizes companies that are demonstrating commitment to Indigenous communities in four main areas: leadership action, employment, business development and community relationships. Oil Sands Alliance member Imperial is PAIR-accredited at the silver level. Cenovus is recognized as being “PAIR committed,” meaning it intends to undergo external verification of its Indigenous relations performance, with a commitment to continual improvement and working across cultures.



82% of respondents

in a public opinion survey said they view the oil sector as important to Canada's long-term economic future. More than half said they were proud of Canada's role in supplying oil and natural gas to the world.¹⁸

The future of oil

Forecasts vary, but what's certain is that global energy demand hasn't peaked yet. The global middle class is currently growing at a pace of 100 million people per year.¹⁹ Today, worldwide oil consumption is just over 100 million barrels per day.²⁰ To meet demand, oil will continue to be a major part of the energy mix.

Global consumption
of oil is just over

100M

barrels per day

Global middle class
is growing by

100M

people per year

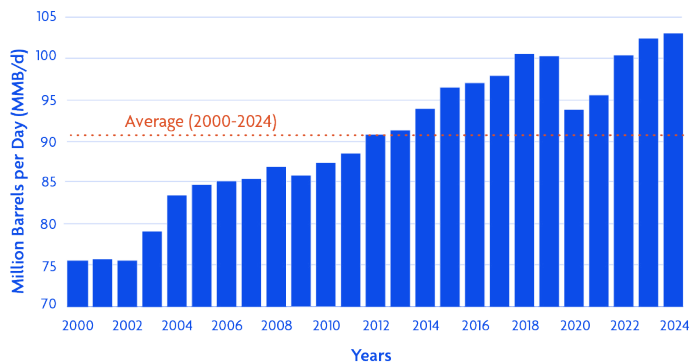
With the

4th largest

proven oil reserves in the
world, Canada has an
important role to play

In 2025, Ipsos conducted a survey commissioned by Oil Sands Alliance, which involved more than 14,000 adults in 18 countries. Respondents were asked to rank suppliers of imported oil. Canada was the top preferred supplier of oil to G7 countries, as well as in North America. The preference may be attributed to Canada's stable political situation, reliable supply, environmental measures and established trade relationships.²¹

Global oil demand



Source: U.S. Energy Information Administration



“These results speak to Alberta’s growing reputation and profile as a secure, responsible energy producer with the resources and expertise our partners around the world are looking for.”

—Danielle Smith, Premier of Alberta

Acronyms and industry terms

AER

Alberta Energy Regulator. The AER is an independent government agency that regulates the development of energy resources in Alberta.

bbl/day

Barrels per day. One barrel is equivalent to 42 U.S. gallons.

CAPP

Canadian Association of Petroleum Producers. An industry association that advocates on behalf of its member companies, which include Oil Sands Alliance members Canadian Natural, Cenovus, ConocoPhillips Canada, Imperial and Suncor.

CCS

Carbon Capture and Storage. An established, proven process that captures CO₂ emissions caused by industrial activities and stores them permanently underground.

CO₂e

Carbon dioxide equivalent. A standard unit for measuring the effect of greenhouse gases on climate change. Different types of emissions are converted to the equivalent amount of CO₂.

COSIA

The innovation arm of Oil Sands Alliance. COSIA focuses on advancements in four environmental priority areas: land, water, greenhouse gases and tailings.

CSS

Cyclic Steam Stimulation. An extraction method that uses steam to help heat and soften bitumen.

EIA

Environmental Impact Assessment. Required by the Government of Alberta, an EIA is a detailed evaluation of the potential effects a proposed project could have on the environment.

G7

The Group of Seven. An informal grouping of countries, including Canada, France, Germany, Italy, Japan, the United Kingdom and the United States, as well as the European Union.

In situ

Sometimes called in-place extraction, in-situ processes are used when bitumen in the oil sands is too deep underground to be mined.

KB/d

Thousand barrels per day.

MMB/d

Million barrels per day.

OTSG

Once-Through Steam Generator. A boiler used in in-situ extraction processes that generates superheated steam.

PAIR

Partnership Accreditation in Indigenous Relations. Developed by the Canadian Council for Indigenous Business, this certification program assesses and confirms corporate performance in Indigenous relations at the Bronze, Silver or Gold level.

SAGD

Steam-Assisted Gravity Drainage. An in-situ extraction method that recovers bitumen from deep oil sands deposits using pairs of horizontal wells.

Additional reading

Alberta Energy Regulator

Government agency that oversees the development of energy resources in Alberta.

[AER.ca](https://www.aer.ca)

Canadian Association of Petroleum Producers

Industry news, research and reports.

[CAPP.ca](https://www.capp.ca)

Canadian Centre for Energy Information

Energy-related publications, data and information.

[Energy-Information.Canada.ca](https://www.energy-information.canada.ca)

Careers in Energy

Information and resources about the energy industry and labour market.

[CareersInEnergy.ca](https://careersinenergy.ca)

CCS Knowledge Centre

Non-profit organization dedicated to advancing large-scale CCS projects.

[CCSKnowledge.com](https://www.ccsknowledge.com)

Additional reading

Government of Alberta

Datasets, publications and information.

[Open.Alberta.ca](https://open.alberta.ca)

Oil Sands Magazine

Digital knowledge-sharing platform focused on the oil sands and Canada's energy patch.

[OilSandsMagazine.com](https://oilandsmagazine.com)

Natural Resources Canada

Government of Canada department responsible for Canadian resource development.

[Natural-Resources.Canada.ca](https://natural-resources.canada.ca)

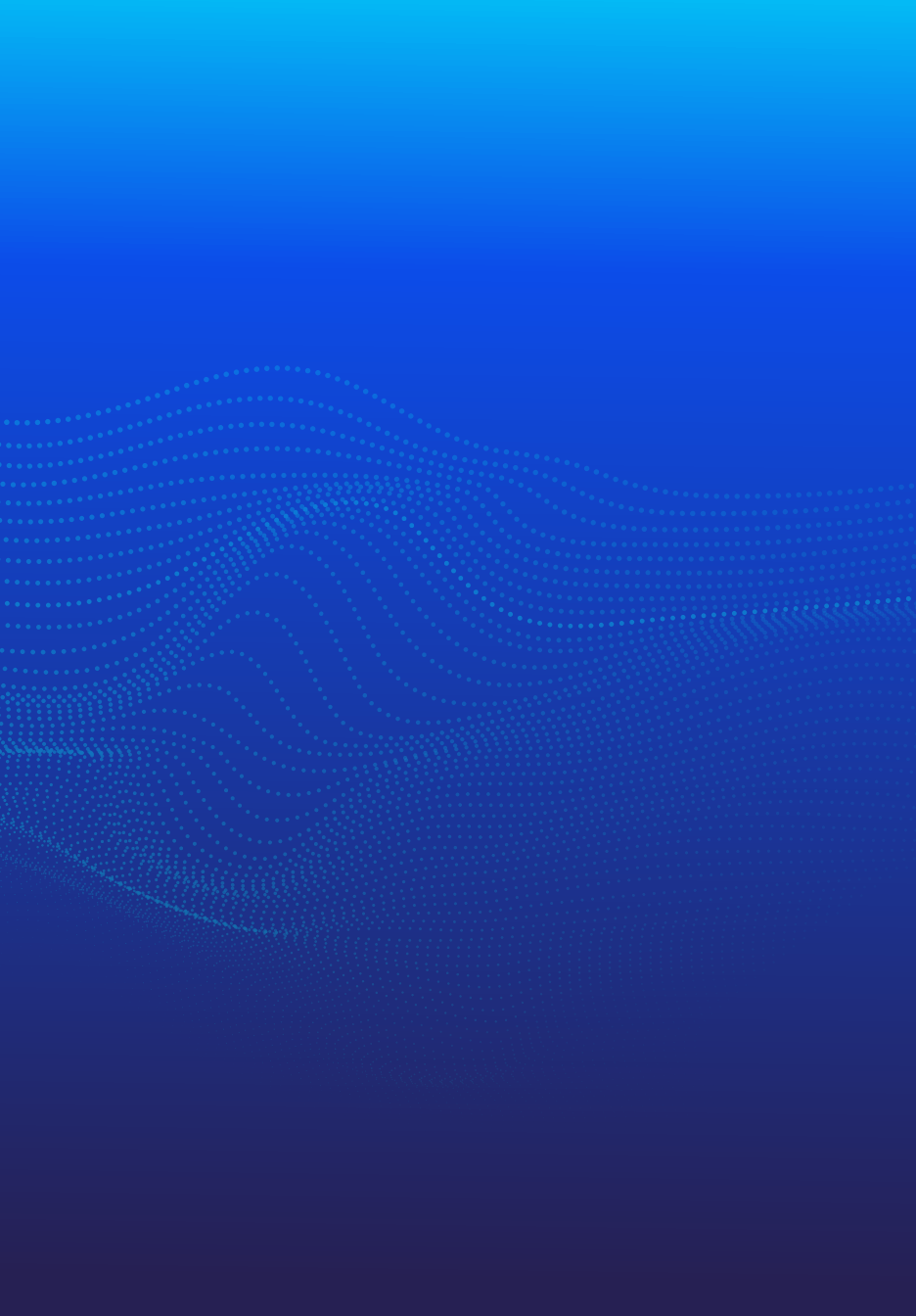
S&P Global Commodity Insights

Market data, benchmarks and insights for global energy markets.

[SPGlobal.com](https://spglobal.com)

Footnotes

- ¹ [Macdonald-Laurier Institute, 2024. \(2000–2021 data collected through CAPP. 2021–2024 data from public sources. This number does not represent profits or dividends. It is the amount of direct spending: capital, operating expenses, taxes and royalties.\)](#)
- ² [“Energy Fact Book 2025–2026.” Natural Resources Canada, 2025.](#)
- ³ [“Energy Fact Book 2025–2026.” Natural Resources Canada, 2025.](#)
- ⁴ [“The Economic Impact of Canadian Oil and Gas.” CAPP, April 2025.](#)
- ⁵ [“Canada’s Energy Workforce: National Labour Market Outlook to 2035.” Careers in Energy, February 2024.](#)
- ⁶ [“Estimated Production of Canadian Crude Oil and Equivalent.” Canada Energy Regulator, March 2026.](#)
- ⁷ [“Alberta Water Use Performance Report.” Alberta Energy Regulator, October 2025.](#)
- ⁸ [“Alberta Water Use Performance Report.” Alberta Energy Regulator, October 2025.](#)
- ⁹ [“Alberta Mineable Oil Sands Plant Statistics.” Alberta Energy Regulator, December 2024.](#)
- ¹⁰ [“Energy Fact Book 2025–2026.” Natural Resources Canada, 2025.](#)
- ¹¹ [“Canadian Oil and Gas Export Infrastructure.” CAPP, April 2025.](#)
- ¹² [“Energy Fact Book 2025–2026.” Natural Resources Canada, 2025.](#)
- ¹³ [“Alberta Oil Sands Greenhouse Gas Emission Intensity Analysis.” Government of Alberta, June 4, 2025.](#)
- ¹⁴ [Statistics Canada, Tables 38-10-0130-01 and 38-10-0132-01.](#)
- ¹⁵ [“Addressing Key Questions About Carbon Capture and Storage in Alberta.” International CCS Knowledge Centre, August 2024.](#)
- ¹⁶ [“Economic impacts of the Pathways Alliance Carbon Capture and Storage Project.” Nichols Applied Management Inc., April 2023.](#)
- ¹⁷ [“Energy Fact Book 2025–2026.” Natural Resources Canada, 2025.](#)
- ¹⁸ [2025 report from an ongoing online survey conducted by Innovative Research Group on behalf of Oil Sands Alliance.](#)
- ¹⁹ [Agnolucci, Paolo & Makarenko, Nikita. “Growing Oil Supplies Amid Moderating Demand and Geopolitical Uncertainty: What Lies Ahead for Oil?” World Bank Blogs, Nov. 5, 2024.](#)
- ²⁰ [“Oil Analysis and Forecast to 2030.” International Energy Agency, 2024.](#)
- ²¹ [Ispis poll conducted on behalf of Oil Sands Alliance between April 25 and May 9, 2025.](#)





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