



Oil sands

Capability Statement

Energy security and the drive to net-zero emissions

Creating unprecedented outcomes for our clients by partnering with them to develop better ideas

The global energy crisis has moved energy security to the forefront of international policy agendas and has boosted momentum behind the deployment of clean energy technologies. Investment in clean energy is accelerating at a faster rate than for fossil fuels, helping bring peak oil demand into view, according to the International Energy Agency (IEA).

Canada is striving to balance the promotion of responsible natural resource development, while strengthening our environmental performance, including a pledge to reduce CO₂ emissions 40% below 2005 levels by 2030, and to achieve net-zero emissions by 2050.

The S&P Global Community Insights, however, see a growth period for Canadian oil sands producers to around 2032.

The growth will most likely be achieved by ramp-up and operational efficiency gains, debottlenecking and step-out optimization projects.

To thrive in this complex, shifting environment, you need your projects to become leaner, smarter, and simpler. They need to be better executed—quicker and more efficiently.

That means utilizing strategies and innovations that cut capital outlays and operating costs without compromising the integrity of your operation. You need innovative solutions, in-depth industry knowledge, and new technologies that can reduce capital intensity and your environmental footprint. In short, you need to maximize value.

We can help.



Partnering to solve your toughest challenges



Our approach

Hatch has been in business for over six decades and acknowledges the importance of collaborating with our clients in long-term working partnerships to tackle their complex oil sands (mining and in-situ) challenges. This has meant working in remote areas, developing new processes, and creating innovative technologies to help our clients.

We are a nimble organization that can quickly respond to the changing needs and priorities of our clients by adapting quickly, which is a benefit to being privately owned with a single bottom line. This corporate structure allows us to easily assign and retain the best personnel to each project, regardless of their location or business sector. At the same time, our employee base is over 10,000 people globally, which allows us to scale our project teams up or down, as required.

We are also passionately committed to the development of a future shaped by a sustainable global society.

Using our exceptional and diverse teams, we apply our vast technical and business knowledge to designing and building practical, safe, and innovative solutions to combat climate change. As a testament to this, we have been engaged on over 70 carbon capture, utilization, and sequestration (CCUS) projects and over 200 carbon abatement projects. We can help identify a decarbonization roadmap for your operations and bring those projects to reality.

Oil sands are part of our core expertise, and we have decades of experience in mineable and in-situ processes. We are equipped with a deep understanding of ore preparation, hydrotransport, extraction, tailings, tailings management, froth treatment, heavy oil separation, and utilities. We can also assist you in providing the design for pilot plants prior to engaging in a full-size commercial plant.

In addition to our core oil sands process expertise, our Dynamic Earth Solutions (DES) practice provides our clients with services and capabilities in the earth science disciplines. For the oil sands, these services include site development (e.g., mines, tailings ponds, storage ponds, etc.), closure and reclamation, heavy civil engineering, geotechnical, geology, hydrogeology, hydrotechnical, hydrology, geospatial, and geoenvironmental engineering.

You need innovative solutions, in-depth industry knowledge, and new technologies that will not only decrease capital intensity and your environmental footprint but will also save on energy consumption. We're here to help and your bottom line is always top of mind.



At the forefront of technology development

We know the oil sands industry. Hatch has a proud history of partnering with our clients to help develop and commission groundbreaking technology for the extraction of bitumen.

From the mining pit to the extraction process, to tailings management and emissions reductions, all the way to the pump at the gas station, our engineers have been involved in all aspects of the technology development lifecycle. These technologies continue to make unconventional oil resources more economically viable and strategically attractive.

Extraction and processing

The development and successful commissioning of several pilot plant facilities—for both extraction and froth treatment—have allowed us to gain vital knowledge that will ensure the efficient and timely development of full-scale operations. This includes effective sequencing of engineering deliverables, materials, and coordination of permits.

Non-aqueous solvent extraction

Hot water is currently used in the bitumen extraction processes (mineable oil sands), which contributes to

the growing volume of tailings in the tailings ponds and requires considerable energy use. Non-aqueous extraction, if commercially successful, could significantly reduce the environmental and carbon footprint and enable significant improvement of the clean-up of future oil sands sites. We have worked with major oil sands players, to develop a non-aqueous solvent bitumen extraction concept along with the associated tailings roadmaps.

Paraffinic froth treatment

Oil sands operators are challenged with finding more sustainable and less energy-intensive ways to recover a bitumen product. Paraffinic froth treatment is one way to achieve this result. Utilizing less energy, while partially upgrading the bitumen, will reduce GHG emissions for each barrel of oil produced. Our experts have vast experience with the paraffinic froth treatment pilot work and were involved with the design of various paraffinic froth treatment projects including froth settling units (FSUs), solvent recovery units (SRUs), and tailings solvent recovery units (TSRUs).

Tailings treatment

The biggest challenge in the tailings management of mineable oil sands is to reduce the legacy of mature fine tailings (MFT) volume and to minimize tailings areas. Our experts are familiar with the Alberta Energy Regulator Directives, and with tackling fluid tailings management for oil sands projects. We have provided engineering and operational support to oil sands operators including CNRL, Shell, and Suncor to address this issue through various non-segregated tailings (NST) and MFT projects in conceptual, prefeasibility, feasibility, and detail design phases. Our experience also consists of tailings impoundment upgrades—having delivered the complete EPCM for the Albian Sands Musket River mine tailings upgrade project—chemical injection in tailings, and evaporative methods of tailings drying technology.

Technology development

Technology development is in our DNA. Our furnace technologies, high-pressure autoclaves, industry-leading tube digestion, pressurized chemical looping, plug flow internal recirculation fluidized bed reactor, petcoke valorization and turquoise hydrogen are just a few examples of our out-of-the-box thinking.

Solvent based in-situ extraction

Nsolv[®], a proprietary technology, lets you access hard-to-produce heavy oil reservoirs in situ for a fraction of the traditional cost of a thermal recovery scheme. A CAD\$70-million pilot plant in Fort McMurray, Canada, has produced over 130,000 barrels of partially upgraded oil sands bitumen using Nsolv[®]'s proprietary technology at its bitumen extraction solvent technology (BEST) pilot facility. In today's low-carbon environment, Nsolv[®] offers a pathway to reducing in-situ extraction emissions by up to 75% when compared to SAGD, while providing a higher return on investment.



Services-at-a-glance

Our services range from greenfield facility design to brownfield sustainable projects. From mine planning/development to closure and reclamation, bitumen extraction and processing, heavy oil separation, utilities and offsites—our oil sands team can deliver the full suite of services.

Our diverse team of engineers are experienced in all areas of oil sands projects. Some of our clients include, Suncor (Fort Hills), Suncor (Base mine), Syncrude (Mildred Lake), CNRL (Albian), CNRL (Horizon), Total (Joslyn), Teck (Frontier), Kearl, MEG Energy, Cenovus, ConocoPhillips and COSIA with Pathways Alliance.

Specialized services

- Site development (pit, mine, tailings ponds, water storage ponds, etc.)
- Heavy civil engineering
- Geology and geotechnical
- Hydrogeology and hydrotechnical
- Hydrology
- Geospatial
- Geoenvironmental engineering
- Bulk material handling
- Closure and reclamation
- Ore preparation and materials handling
- Slurry and hydrotransport pipeline design
- Extraction
- Tailings and tailings management
- Froth treatment (Paraffinic and Naphthenic)
- Integrated water management and treatment
- RAM modeling
- Technology development
- Transient Analysis
- Advanced Process Control (APC)
- Carbon capture, utilization, and sequestration (CCUS)
- Decarbonization roadmapping



Selected project experience

Dedicated disposal area 3 (DDA3) tailings pond Canadian Natural (CNRL) | Canada

Non-Segregating Tailings (NST) are currently deposited in a Dedicated Disposal Area 2 (DDA2) located in the mine. The active mine pit is where DDA3, the next tailings disposal area, is slated to be located and NST will start to transition to DDA3 in 2027 until about 2032/33. After this period, NST will start transitioning to DDA4, and then to DDA5.

This project focuses on the development of assets (e.g., slurry pump additions, polymer injection skids, gland water infrastructure support, etc.) to support the transition from DDA2 to DDA3 with design consideration for future transition to DDA4 and DDA5. We have successfully executed both the pre-FEED and FEED phase of this project.

Christina Lake SAGD Post-Combustion Carbon Capture MEG Energy | Canada

MEG Energy | Canada

Conceptual study was to evaluate CO₂ capture from flue gas from multiple Once-Through Steam Generators (OTSGs). A FEL-1 level of design was developed for an amine-based capture system inclusive of flue gas duct system design, CO₂ compression and dehydration and CO₂ pipeline as well as initial capital and operating cost estimates.



Decarbonization road mapping (emissions abatement alternatives)

Confidential – Mineable oils sands facility | Canada

Decarbonization roadmaps were developed using a bottom-up approach that started at the site level where we identified and analyzed emissions reduction opportunities unique to the assets (fleet trucks, processing facilities, utilities, etc.).

By using this bottom-up approach, we ensured that the roadmaps were developed in collaboration with the site to get unique insights into the real cost, implementation risks, and execution timeline for these opportunities. The decarbonization options defined the applicability, cost, and implementation timeline which will assist our client in their goal of achieving net-zero by 2050.

Nsolv BEST Pilot

Nsolv | Canada

This project included design basis memorandum through detailed engineering, project and construction management, and operation of the Nsolv pilot plant—a new oil sands bitumen extraction technology using warm solvent injected underground to dissolve and mobilize bitumen and allow for extraction and recovery of the valuable resource. This is a low GHG, low energy intensity, and no water use extraction technology.

COSIA with Pathways Alliance

Canada's Oil Sands Innovation Alliance | Canada

Some of the studies we have completed for COSIA include:

- Hydrogen enriched natural gas study
The feasibility study identified the impacts of hydrogen enriched natural gas on equipment performance, safety systems, process safety, and infrastructure. The study scope was limited to fired heaters and fuel gas systems in both mineable and in-situ oil sands facilities and included a Class V cost estimate.
- Small modular nuclear reactor (SMNR) heat integration study
The feasibility study identified how SMNRs can be integrated with existing mineable and in-situ oil sands facilities and a Class 5 cost estimate was developed. The study also highlighted the practicality, limitations, risks and identified the appropriate electrical area classifications and regulatory interfaces.
- Dry methane reforming study
The feasibility study analyzed the techno-economics of a dry methane reforming (DMR) process to convert CO₂ to syngas for potential use as a feedstock for synthetic fuels and/or chemical manufacturing.

Fort Hills Ore Preparation Plant

Suncor | Canada

Reviewed and validated the DBM and front-end engineering design for Phase 1, a Class 3 cost estimate and stage gate review for the ore preparation plant. This is one of nine silos which form the bitumen production plant, designed to increase the bitumen feed to the upgrader.

ESEIEH Phase II Small Scale Pilot Project

Suncor Energy Oil Sands Limited Partnership | Canada

Completion of FEL-3 services. The project was to design the ESEIEH pilot plant to demonstrate the ESEIEH technology—a new in-situ bitumen recovery strategy that combines electromagnetic formation heating with enhanced solvent vapor extraction, independent of steam injection.

OPP and HT Train 4 and 5

Canadian Natural Resources Limited | Canada

Prepared design basis memorandum and engineering design specifications. Reviewed design and technology for the dry side material handling and wet-side slurry preparation of the ore preparation plant, hydro transport, utility pipelines and associated equipment of the Horizon Oil Sands project, trains 4 and 5.

Mature Fine Tailings (MFT) De-Watering Pilot Plant

Canadian Natural Resources Limited | Canada

Provided engineering and procurement services from concept through construction, commissioning, and start-up of this MFT dewatering pilot facility. A cost estimate was developed to remove MFT from an existing tailings pond, treat it with chemical injection, and deposit it into a dedicated disposal area. The scope of facilities included a floating barge, floating pipeline to shore, pipeline with booster pump stations, power supply, and controls.

Albian Full Spectrum NIR Analyzer

Albian Sands Energy | Canada

Installation of full spectrum NIR analyzer in oil sands feed application for feed forward process control.

Non-segregated Tailings Pilot

Shell Canada | Canada

Engineering, procurement, commissioning, and operational support services were provided for a 100-tonnes-per-hour pilot plant built by Shell Canada. Results from the pilot plant were used to support planning and the design efforts for a commercial plant, and to develop long-term tailings strategies.





About Hatch

Hatch is a global engineering, project management, and professional services firm. Whatever our clients envision, our professionals can design and build. With over six decades of business and technical experience in the energy, infrastructure, and mining sectors, we know your business and understand that your challenges are changing rapidly.

We respond quickly with solutions that are smarter, more efficient and innovative. We rely upon our 10,000 staff with experience in over 150 countries to challenge the status quo and create positive change for our clients, our employees, and the communities we serve.

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