

Cold Lake expansion project

Initial project description | Plain language summary
March 2016



Our commitment

Imperial Oil Limited's success depends on our ability to maintain an open dialogue with, and ongoing support from, local communities and stakeholders. Our social licence to operate and continued responsible growth as a company means we must balance the supply of rising global energy demands with the appropriate environmental protection. The company continues to reduce environmental effects of oil sands development through research and the application of innovative technologies. Our near- and long-term business success depends on delivering the highest standards of integrity in all that we do. Integrity is a commitment to do the right things, every time – in safety, environmental performance, business ethics and community engagement.

Imperial Cold Lake expansion project

Imperial

Imperial is an industry leader in applying technology and innovation to responsibly develop Canada's energy resources. As Canada's largest petroleum refiner, a major producer of crude oil and natural gas, a key petrochemical producer and a leading fuels marketer from coast to coast, our company remains committed to high standards across all areas of our business.

Cold Lake overview

Cold Lake is North America's largest in-situ operation, with production averaging about 150,000 barrels of bitumen per day in recent years. The operation is the longest-running in-situ operation in Canada and the first to implement Imperial's patented cyclic steam-stimulation recovery technology. Cold Lake produced its billionth barrel of bitumen in 2009, the only in-situ operation in Canada to achieve this milestone.

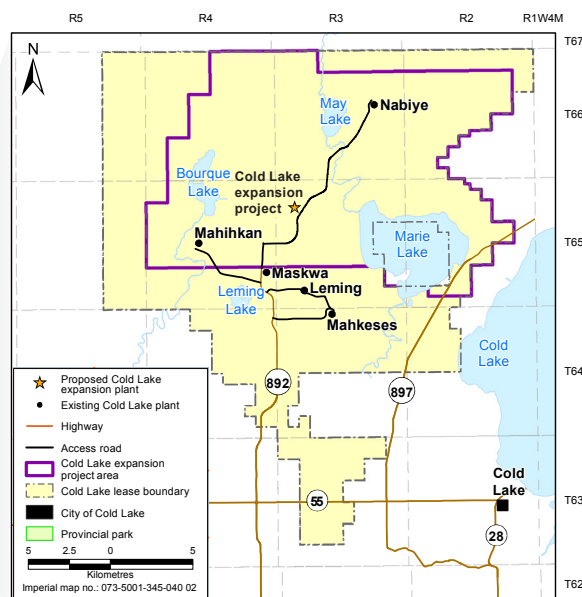
Technology developments have increased bitumen recovery rates from about 20 percent in the mid-1990s to more than 50 percent today. Over the same period, new technologies in water treatment and re-use have enabled Cold Lake operations to reduce fresh water requirements by more than 60 percent for every barrel of bitumen produced, and today more than 95 percent of Cold Lake's water is recycled.

Our leases at Cold Lake cover about 780 square kilometres of oil sands and we operate five plants in the area – Leming, Maskwa, Mahihkan, Mahkeses and Nabiye.

Cold Lake expansion project

Building on the success of our Cold Lake operations, Imperial is proposing to develop an expansion that will utilize solvent-assisted steam-assisted gravity drainage (SA-SAGD) to recover the bitumen. The proposed development, named the Cold Lake expansion project, will be located within the existing Cold Lake lease area.

The Cold Lake expansion project is expected to have eventual average annual production of about 50,000 barrels of bitumen per day. Based on the resource characteristics and proposed recovery method, the Cold Lake expansion project has an expected lifespan of up to 30 years.

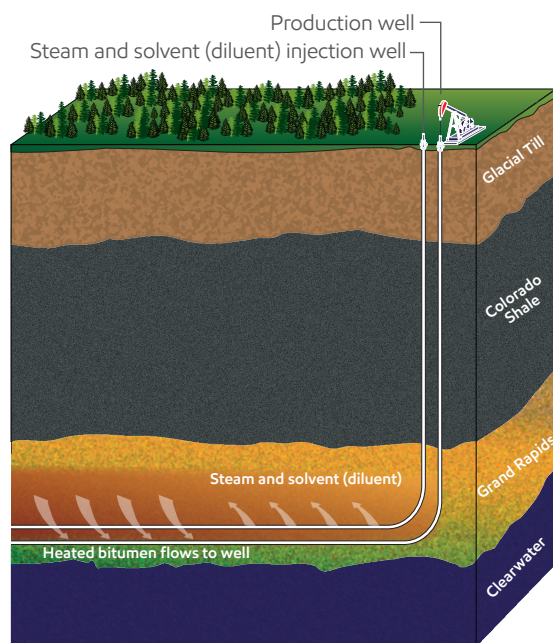


Proposed in-situ facilities and operation

SA-SAGD recovery

The depth and characteristics of the resource in the Cold Lake expansion project area are best suited for an in-situ recovery method using a solvent-assisted steam-assisted gravity drainage (SA-SAGD) process. This process will be used to recover bitumen from the oil sands located in the lower half of the Grand Rapids Formation, approximately 350 metres below ground, and uses the injection of a steam and solvent (diluent) mixture to recover the bitumen.

- Two horizontal wells (“well pair”) are drilled into the reservoir, one about five metres above the other
- The steam and diluent are injected into the upper well where it mixes in the bitumen layer
- The mixing process heats and thins the surrounding bitumen which allows it to flow down into the lower production well
- A pumpjack on the production well is used to pump the bitumen to surface where it is transported to facilities for processing



Imperial has a long research history with SAGD technology. In 1978, the company piloted the first SAGD well at Cold Lake, Alberta and patented the technology in 1982. Today, more than 100 billion barrels of oil in the Athabasca oil sands are accessible through in-situ SAGD recovery.

Project facilities

Field infrastructure for the Cold Lake expansion project will include construction of 10 to 11 initial well pads, with six to 11 horizontal well pairs per pad. Future well pads will be constructed in order to maintain production over the operating life of the asset.

The well pads will be connected to the central processing facility (CPF) through a pipeline network that will deliver steam and diluent to the wells for injection into the reservoir, and will transport the steamed bitumen mixture (bitumen, diluent, water and gas) to the CPF for processing. The water and gas that are produced will be used for additional steam generation. The diluted bitumen will then be transported off-site through a pipeline network system to refineries and market distributors.

The central processing facility will include:

- bitumen processing facilities
- water treatment and recycling facilities
- steam generation facilities
- waste management facilities
- tanks (e.g., water, bitumen, diluent)
- process and non-process buildings

Regulatory process and project schedule

Regulatory process

Imperial, as project owner and operator, has submitted a regulatory application and related Environmental Impact Assessment (EIA) to the Alberta Energy Regulator (AER).

Imperial initiated the environmental baseline studies for the EIA for the Cold Lake expansion project in August 2013.

The regulatory application will seek to amend the Imperial Cold Lake operations (CLO) Commercial Scheme Approval (Scheme Approval 8558) under the Oil Sands Conservation Act, as well as amend the CLO environmental approval under the Alberta Environmental Protection and Enhancement Act to include the Cold Lake expansion project development.

Aboriginal and stakeholder consultation

Aboriginal and stakeholder input are important to adequately assess potential environmental impacts and develop appropriate mitigation measures for the development. Imperial strongly encourages Aboriginal and stakeholder feedback throughout the consultation process in order to adequately identify and address concerns. Imperial will host a variety of ongoing forums to provide Aboriginal and stakeholder groups with opportunities to review and provide input to the project design and execution.

Potential project schedule

Pending regulatory approval, full project funding, and market conditions, it is anticipated that The Cold Lake expansion project could begin construction as early as 2019 and production by 2022.

Potential project schedule*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Application preparation, submission and regulatory review											
Aboriginal and stakeholder consultation					Aboriginal and public engagement throughout the life of the project						
Construction											
Production											

*Schedule subject to change

Project effects

Environmental management

Imperial is committed to environmental management as a key part of its business. This includes integrating environmental considerations in business planning, facilities and project design, operating processes and training programs. The company's current development projects and operations incorporate extensive environmental design and protection measures to mitigate effects on water, land and air quality. Imperial is in the process of completing an EIA for the Cold Lake expansion project that will assess the potential impacts of the project on:

- surface water
- aquatic resources
- groundwater
- air
- soil
- wildlife
- vegetation
- biodiversity
- noise
- land and resource use
- health
- historical resources
- socioeconomics
- traditional land use

Reclamation

The construction and development of the in-situ project facilities for the Cold Lake expansion project will require changes to the on-lease landscape and it is anticipated that access to the lease area will change and current use will be affected. As such, Imperial is committed to understanding the local land use of the project area and working with community members to reduce impacts and plan for timely reclamation. The reclamation approach proposed is to restore the areas on lease that are considered surplus during the life of the project.

Socioeconomic benefits

Imperial will continue to utilize and build upon regional socioeconomic information for baseline assessment purposes for the Cold Lake expansion project. Consultation with community members in proximity to the proposed development is essential to understanding potential socioeconomic effects and benefits of this project. We expect benefits to include:

- support of local and regional business development by preferring to use, on a competitive basis, qualified local and regional materials and service suppliers with high safety and environmental performance standards
- training and capacity building opportunities to support local employment and long-term workforce development
- it is estimated that the size of the workforce required for construction of the Cold Lake expansion project will average approximately 500 people per year
- during project operations, the workforce needed will be about 100 people
- revenue, taxes and royalties will provide additional benefits to the municipal, provincial and federal government (estimates will be determined through the socioeconomic impact assessment)

Constraints mapping The EIA approach includes the use of constraints mapping – mapping of environmentally sensitive areas, including culture and land use. During the project design process, these constraints maps are used to guide project facility design to reduce impact to these sensitive areas.

Protect tomorrow. Today.

Imperial is committed to operating in a way that protects the environment and takes into account the economic and social needs of the communities where we operate.

Contact us

Information received from ongoing engagement activities will be considered and, where appropriate, incorporated into final project design, mitigation and monitoring programs.

Inquiries related to the proposed project are welcome, and should be directed to:



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Inquiries and feedback related to Cold Lake operations should be directed to:



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All other inquiries are welcome, and should be directed to:

Imperial's media information line at 587-476-7010

For more information, please visit our website at:

www.imperialoil.ca/coldlakeexpansion

Bitumen • a naturally occurring viscous mixture of hydrocarbons containing sulphur and nitrogen compounds. In its natural state, it is not commercially recoverable through a conventional well because it is too thick to flow.

Cold Lake expansion project • a proposed in-situ oil sands development project located 23km from Cold Lake, Alberta.

Diluent (solvent) • a light hydrocarbon product that, when blended with bitumen, allows bitumen to flow more easily through pipelines.

In-situ • a Latin term that means "in place." In-situ operations are used to recover bitumen that is buried too deeply underground to be surface mined.

Process water • water that is used for the SA-SAGD process, including the utility systems that support the process.

Produced water • water that accompanies bitumen from the production wells. It is a combination of water found in the oil sands deposit and water (condensed steam) from the SA-SAGD process.

Reclamation • returning disturbed land to a stable, biologically productive state. Reclaimed property is returned to the province at the end of operations.

Solvent-assisted steam-assisted gravity drainage (SA-SAGD) • an in-situ production process using two closely spaced horizontal wells: one for steam and solvent (diluent) injection and the other for production of the bitumen/water emulsion.

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Purpose

This plain language summary provides an initial overview of proposed plans for the Cold Lake expansion project. Additional information will be shared as the Environmental Impact Assessment is completed, Aboriginal and stakeholder consultation continues and project engineering and design progresses.

Disclaimer

This document contains forward-looking information on future production, project start-ups and future capital spending. Actual results could differ materially due to changes in project schedules, operating performance, demand for oil and gas, commercial negotiations or other technical and economic factors.

