



Oil Sands Technology

We are driving the advancement of
oil sands technology.

At ConocoPhillips, we believe technology is the key to long-term sustainable development of the oil sands and we are driving its advancement. We have committed to spend over \$300 million over the next five years to advance heavy oil technology for our worldwide operations. A significant portion of this will be spent in the oil sands to improve the environmental and economic performance of our projects.



Technology Advancement at the Surmont Project



We are looking at several different technology applications for our oil sands projects that will minimize our environmental impact while maximizing the value of the resource. The Surmont Project is an exciting opportunity to demonstrate our technology commitment. Some of these technologies and innovations are planned for use in Surmont Phase 2 while others are under development. Many of these innovations are due to what we learned on Surmont Phase 1.

Technologies We Plan to Use in Surmont 2

Managing Greenhouse Gases

One of the ways we're reducing greenhouse gas emissions immediately is by optimizing well placement to take advantage of the geology of certain locations. Steam-oil ratio is closely tied to the characteristics of the reservoir and we're going to plan our first wells in places where we know we'll need a lower steam-oil ratio and therefore burn less gas per barrel of oil we produce.

Reducing Fresh Water Use

Surmont Phase 2 is designed to use water with increased salinity, which will significantly reduce the use of fresh water in the steam cycle. Phase 2 will also use an evaporator in the water treatment process. This will enable us to treat waste water for reuse in steam generation and will improve our overall water recycle. It will reduce the amount of source water required for steam generation.

Minimizing Land Disturbance

Surmont Phase 2's well pad design and well configurations will enable us to improve our recovery efficiency. In other words, we will be able to recover more barrels of oil per hectare from a smaller well pad in comparison to our Surmont Phase 1 project. We will also be continuing our Faster Forests program, where we regenerate forests more quickly by planting trees on old exploratory well sites or other surface disturbances. We will start planting trees and other vegetation through this program as soon as the areas cleared for construction are no longer required for building or operation. We'll be doing continuous reclamation.

Technologies We Are Exploring for Future Application

Managing Greenhouse Gases

Our future focus is on increasing our energy efficiency. By reducing the amount of energy we use, we also reduce our greenhouse gas emissions. One of the technologies that we are testing include vacuum-insulated tubing, which increases energy efficiency thereby decreasing GHGs. We are also looking at injecting lighter hydrocarbons into the wells along with the steam to lower the viscosity of the oil. This will reduce our energy needs and we'll need to burn less natural gas to recover the oil, reducing our greenhouse gas emissions per barrel of oil. We will also use less water with this process. We are researching advanced steam generation technologies that may enable us to both produce fewer GHGs and cost effectively and efficiently capture and store them.

Reducing Water Use

We are assessing the use of centrifuges to recover more of the water that we currently dispose of as waste water and have designed flexibility for future water treatment technology opportunities at Surmont Phase 2.

For more information about our oil sands projects, please visit our website: www.conocophillips.ca.

Innovation Highlights

We are minimizing our water use, land impacts and greenhouse gas emissions through innovation.

What We're Doing Now

- *Using low-impact technology*
- *Drilling longer wells*
- *Launching new programs, such as Faster Forests*
- *Using evaporators in Phase 2*
- *Improving energy efficiency*
- *Reclaiming disturbed land*
- *Reducing steam-oil ratio*
- *Exploring for saline water*
- *Managing our business holistically*
- *Investing in industry consortia*

Future Technology Applications

- *Applying new well configurations*
- *Assessing the use of lighter hydrocarbons*
- *Using saline water in future facilities*
- *Capturing water from combustion*
- *Using vacuum-insulated tubing*
- *Looking at alternate combustion techniques and fuel sources*
- *Facilitating carbon capture and storage*
- *Exploring amine-based systems*
- *Assessing various oxy burn technologies*