

Where Oil Is Mined, Not Pumped

High Demand for Petroleum Makes a Boomtown in Northern Alberta

By Justin Blum

Washington Post Staff Writer

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FORT McMURRAY, Alberta -- Along Highway 63 here the rolling hills give way to massive open pits, huge waste ponds and tangles of pipes and refining equipment that spew smoke into the air.

In the pits, shovel trucks load dirt into dump trucks that are so gigantic a driver has to climb a ladder attached to the front grille to get behind the steering wheel.

The changing landscape reflects an ambitious quest to develop a new source of oil. Major companies -- faced with tougher prospects for developing big new oil fields around the world -- are doing what was once unthinkable: sinking billions of dollars into projects to wring oil out of deposits of petroleum buried amid sand and clay.

Until a few years ago, such projects -- called "oil sands" or "tar sands" -- sputtered at the fringes of the oil industry. But since **technological breakthroughs brought down costs** and oil prices have soared, companies have been investing heavily here. **Oil-sands production is now profitable when a barrel of oil sells in the low \$20s**, analysts said -- far below the recent \$50 range.

Just outside this boomtown, huge machines dig up the earth and remove the oil sands, whose deposits of a substance called bitumen smell something like roofing tar and are as thick and sticky as molasses. Companies are mining hundreds of feet deep and running the unearthed deposits through a complex process to convert them into oil. Companies move enough dirt and oil sands in two days to fill Yankee Stadium.

Factoring in the oil sands, Canada's proven oil reserves are reported to be nearly 180 billion barrels, second only to Saudi Arabia. U.S. energy officials say Canada's oil-sands deposits are among the largest in the world. The oil sands are buried under an area about the size of New York state. Fort McMurray, the hub of oil-sands activity, boasts on billboards: "We have the energy."

The oil sands also are enriching the province and creating thousands of high-paying jobs. On the edge of town, a modern museum has interactive exhibits showing how the mining and refining processes work. One exhibit allows visitors to smell samples of the oil sands. "As we call it: Sniff the smell of money," said Bert MacKay, the museum supervisor.

Companies here are producing increasing amounts of oil from this unconventional source -- about 1 million barrels a day. If all of that oil went to the United States, it would amount to roughly 5 percent of daily consumption. In 1995, oil derived from the sands was less than half the current amount. Alberta officials expect production to triple from today's level by 2020.

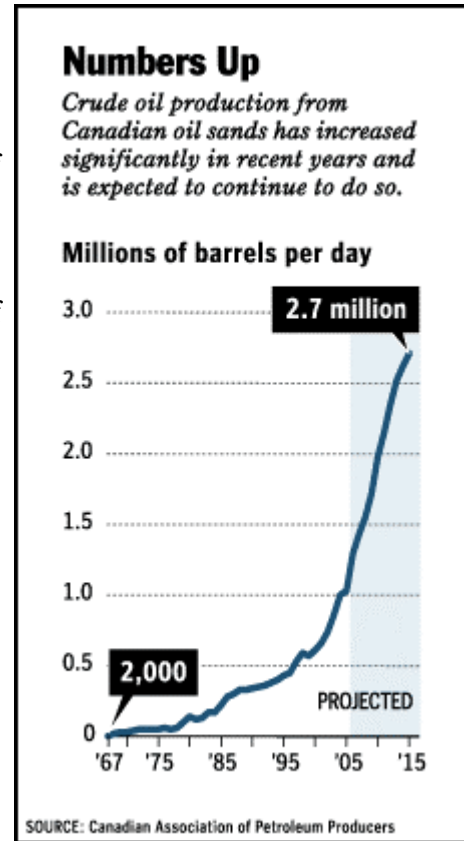
Oil companies have been struggling to replace aging fields whose production has tapered off. Many have been frustrated by oil-rich countries in the Middle East and elsewhere that refuse to open their doors to Western companies.

"We are all kind of fighting each other in the rest of the world where oil production is not increasing," said Michael Rodgers, a senior director of PFC Energy, a Washington-based consulting firm. "We have to start thinking about unconventional resources. A lot of companies are saying, 'We do have this option in Canada.' "

Canada was the top supplier of crude oil to the United States last year, providing about 16 percent of U.S. imports. Crude produced from the oil sands is making up a larger portion of what Canada sends to the United States. Even so, development of the oil sands is not happening fast enough to significantly reduce U.S. dependence on Middle Eastern oil. Companies such as **Exxon Mobil Corp., Chevron Corp., the Royal Dutch/Shell Group and ConocoPhillips Co. have oil-sands projects** here. China's oil companies, eager to gain access to supplies to satisfy the country's growing energy needs, are buying into oil-sands projects and would like to import some of the oil.

The oil sands are becoming increasingly important as the worldwide thirst for oil increases. Demand has surged and producers have struggled to keep up, pushing oil prices up. Gasoline has followed, with a gallon of regular selling for more than \$2 in the United States.

Though profitability has improved, making oil out of the oil sands can be less lucrative than traditional oil development. Oil-sands production also requires spending money in different ways. With normal oil production, companies have to invest heavily in



exploration and sometimes drill wells that come up dry. With oil sands, companies spend very little on exploration -- the soil here is loaded with bitumen -- but must devote large amounts of money to remove the deposits from the ground and change it into crude oil.

The pickup in production transformed Fort McMurray from a remote hamlet to a thriving city with more than 55,000 residents. The demand for skilled workers is so high that some companies are importing them from as far away as South Africa.

Some companies would like to invest more but are constrained by a tight labor market, logistical complications and sophisticated machinery that takes years to build. Companies are lobbying for improved roads, affordable housing and other government services they say are needed to support expansion.

"The industry is growing as fast as it can," said James E. Carter, president of Syncrude Canada Ltd., which started producing from the oil sands here in 1978.

On a recent day at Syncrude, the giant trucks rumbled through pits, the earth heaving from their weight. Fully loaded, some of the trucks weigh more than two Boeing 747 airplanes.

"It feels like you're driving a boat," said Lisa Goldie, who sat in the driver's seat of a truck, punching information into computer displays on the dashboard. Smaller vehicles fly bright orange flags above them so the huge trucks don't run them over.

The trucks haul away the top layers of dirt, exposing the espresso-colored oil sands. The sands are then collected and sent to processing facilities that separate the bitumen. It typically takes two tons of oil sands to produce one barrel of crude, which is 42 gallons. The companies move about 1 million tons of earth a day.

In other locations, the oil sands are buried too far below the surface for mining. To reach them, **steam can be injected underground to loosen the bitumen and allow it to flow through wells to the surface (see diagram).**

The companies say they plan to eventually fill all the pits and are planting trees. But they say the waste ponds -- filled with water, sand and petroleum byproducts -- will take years to settle.

Officials of the government agency Environment Canada said in a recent interview that in the past five years, they have taken 21 enforcement actions against oil-sands companies for such violations as releasing prohibited contaminants into the air and water.

Officials said the scale of the projects is unprecedented and they do not fully know what the environmental impact will be. "Nothing has been done on his scale before," said Robert Moyles, an agency spokesman. "The record to date is that it is being done in an environmentally responsible way."

Environmentalists complain that the mining pollutes the air and water and that huge amounts of clean-burning natural gas are used in the process of converting the oil sands into crude. Natural gas is in short supply in the United States, where prices have risen in recent years.

"Why are we taking this clean fuel and using it to create something really ugly," said Stephen Hazell of the Sierra Club of Canada. "Does Canada really want to be the tar nation? That's not the way to go. Not if we want to have a livable planet in 100 years."

The Alberta provincial government could not be more pleased with oil sands. The operations are bringing thousands of high-paying jobs to the region, and the companies have to pay royalties to the government.

In Fort McMurray, the impact of oil sands is laced through the city. More than half the population is connected to the industry. Visitors to the city's hotels often find a trail of mud footprints left by contractors working in the operations. Guests might end up at the Oil Sands Hotel or the Oil Can Tavern.

As the population booms and people move here from other countries, the flavor of the city also is changing. To cater to the culinary needs of the new arrivals, Annelies Geisler opened a store called the Import Connection, which sells food from around the world. The Latin American section includes bottles of yellow hot pepper and the South African section includes cans of guava halves.

Geisler has been expanding sections to match the changing population. "We're all here because of the oil sands," she said.

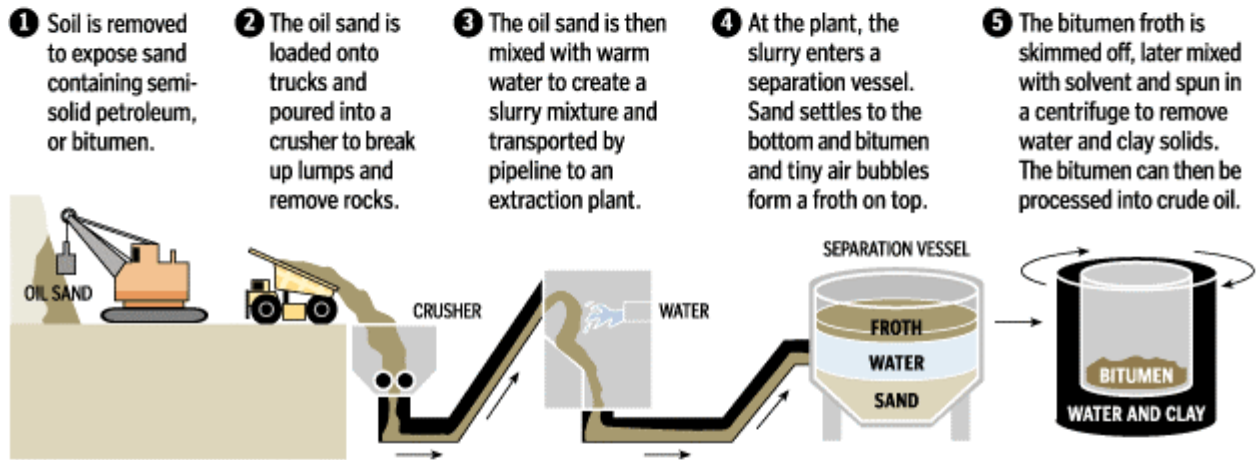
Source: Washington Post, June 15.

In recent years, companies in Canada have been producing more oil from oil sands—areas of earth containing semi-solid petroleum, or bitumen. Companies near Fort McMurray, Alberta, for example, mine the deposits. In areas where oil sand is too far underground to be mined, steam is used to soften the bitumen so that it can be pumped up to the surface.

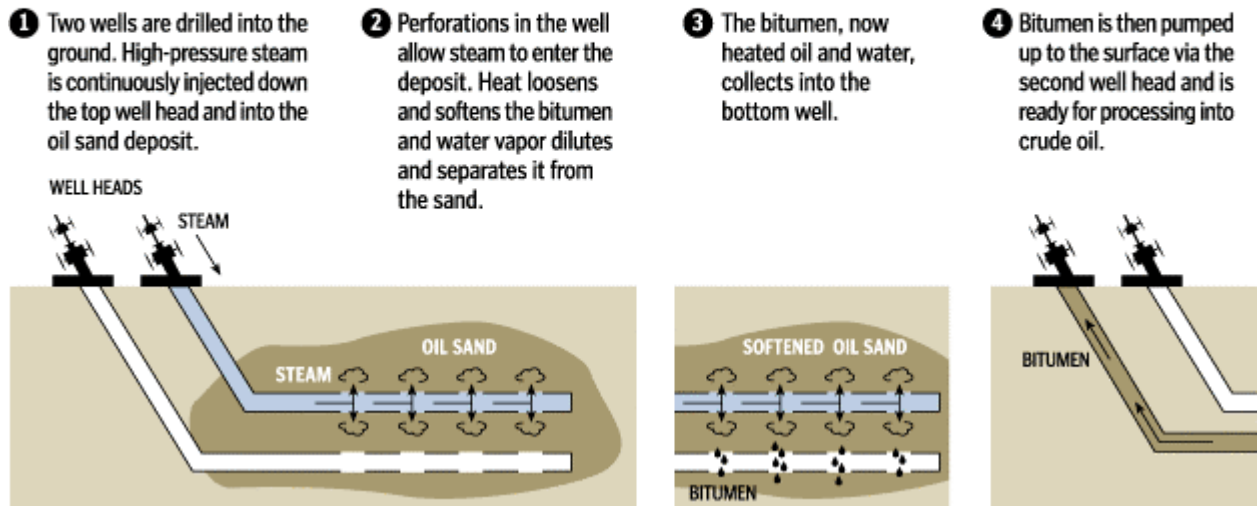


How both methods work:

Mining



Steam injection



Drawings are schematic.