

# Canada's oil-sands boom creates vast riches and a dirty footprint

## 2008- The Seattle Times

The huge oil reserves of Canada, where the stuff can literally be dug out of the ground, provide the U.S. with a nearby alternative to importing crude from distant, unstable countries. But Alberta oil-sands production has one major shortcoming: It results in far more greenhouse gases than traditional drilling.

by [Ángel González](#)

Seattle Times business reporter

STEVE RINGMAN / THE SEATTLE TIMES

FORT McMURRAY, Alberta — Energy security is not for the fainthearted.

In the giant, open-pit mines north of this sub-Arctic boomtown, oil literally is carved out of the ground. Shovels the size of buildings scoop hundreds of tons of oil-soaked dirt into Caterpillar dump trucks as big as two-story houses. The trucks move to and from the pits in a perpetual storm of dust.

Everything in the Canadian oil sands — from the machinery to the seemingly infinite oil reserves — is extra large.

"This is mining to the max — it's very extreme," said Brian Patey, who came from Newfoundland in eastern Canada and now runs the truck shop at the Albian Sands Energy mine, a joint venture by oil companies Shell, Chevron and Marathon. Patey said that when he first saw a mine truck, "I thought it was the biggest thing in the world."

Once shunned by oil companies that preferred easier-to-exploit reservoirs of liquid crude, Alberta's oil sands now have made Canada the top foreign supplier of crude to the U.S. They contain the world's second-largest storehouse of crude — surpassing U.S. reserves by a factor of eight.

If the United States is to reduce its reliance on importing oil from countries that are unfriendly or unstable, Canada's oil sands are the place.

Yet, no other source of oil better illustrates our society's Faustian dilemma between energy security and environmental responsibility.

Extracting the tarlike oil called bitumen and converting it into the light crude that refiners want is an energy-intensive process that annually produces as much carbon dioxide as 6 million cars.

Put another way, extracting oil from the sands creates about three times the greenhouse gases as conventional drilling.

Canada, which in 1997 signed the Kyoto treaty on reducing emissions, now struggles to reconcile its newfound role of energy superpower with its promise to cut greenhouse gases. Some say oil-sands profits have cooled the country's enthusiasm for the treaty.

"It's the one thing that is really dragging us in the opposite direction from Kyoto targets," said Simon Dyer, a fellow with the Pembina Institute, a Canadian environmental think tank.

Some U.S. policymakers question whether this country should continue to increase its reliance on the oil sands, due to their heavy environmental footprint.

And President-elect Obama could add pressure on the oil-sands industry to clean up its act, said Chris Sands, a senior fellow with the Hudson Institute think tank in Washington, D.C.

"For Obama, fossil fuels are something we should be moving away from — the dirtier, the worse," Sands said.

### **Extreme mining**

Northern Alberta reeks of oil. Over millions of years, vast quantities of petroleum were trapped in beachlike sand formations spanning an area roughly the size of Florida.

In some places, oil lies so close to the surface that it seeps out of the earth, a black, viscous goop that sometimes naturally spills into lakes and the Athabasca River, which flows northward toward the Arctic.

Shallow deposits of this very thick oil — called bitumen — are mined in open quarries, much like iron ore. Most of the oil, though, lies in deeper deposits commonly exploited by injecting steam into the ground to heat and liquefy the bitumen so that it can be pumped out.

The smell of petroleum begins just a few miles north of Fort McMurray, where both sides of the highway are lined with mazes of tubes and tall cylinders called "upgraders." That's where the bitumen is processed into synthetic light crude, the type most valuable to refiners because it's easy to convert into gasoline.

When the highway reaches the Albian Sands mine, a 4.5-square-mile trench carved out of the boreal forest, it's the landscape that smells. The mine's giant trucks can haul up to 380 tons of dirt, yielding about 190 barrels of oil, or about 3,600 gallons of gasoline — enough to fuel the average Washington state car for nine years.

The dug-up moonscape of the mine looks like an outlandish, 70-yard-deep sandbox for giants. Stand still too long, and your shoes will sink a little in the oily muck.

"We're a vast dirt-moving operation," Shell spokeswoman Janet Annesley said.

This rich region is about 700 miles north of the U.S. border, but most of the 1.2 million barrels of oil extracted here daily goes to the Midwest and even Texas, providing about 9 percent of U.S. crude imports. Washington state's refineries receive at least 10 percent of

their oil from Alberta, a figure expected to increase as production wanes on Alaska's North Slope.

Albian Sands, one of three active mines in the region, produces about 155,000 barrels of bitumen a day; an expansion under way will mean an additional 100,000.

Total output from the oil sands is expected to triple by 2020 to 3.5 million barrels of oil per day. Falling energy prices have made oil companies delay some projects, but most analysts still expect formidable growth in the long term.

"The oil sands have become a strategic resource for the whole world," said Don Thompson, head of the Oil Sands Developers Group. "All of a sudden, the spotlight is shining on us big time."

### **Boreal boomtown**

That spotlight has drawn thousands of workers to Fort McMurray, a former fur-trading post that has seen its population nearly double in a decade to 65,000. Thousands more live in temporary camps near the oil sands.

Most come from Canada's eastern provinces, but there are also Venezuelan petrochemists, Filipino hotel workers and South African doctors.

Theresa Ballard, a former hair stylist from Newfoundland who became a truck driver at Albian Sands, complains that the place has grown so rapidly that "there's no breathing space."

Demand for labor remains so high that a recent Craigslist ad seeking dishwashers at a pizza parlor promised \$14.20 an hour (Canadian), more than a starting mechanic at Boeing. Truck drivers and oil-sands workers earn well into the six figures.

Every day, Shell flies a Boeing 727 into the company's private airstrip to rotate crews of workers from impoverished regions in Atlantic Canada.

Two-lane Highway 63, which connects Fort McMurray's residential areas to the oil-sands developments, is jammed at rush hour with pickup trucks. Mobile homes can sell for \$400,000, while fancier houses sell for more than \$600,000, among the highest home prices in Canada.

More than 2,000 residences are under construction.

The runaway growth and profusion of highly paid single men have given Fort McMurray a Wild West reputation as a land of easy money, drug abuse and prostitution. The city also has one of Canada's highest homelessness rates.

In their stark combination of opportunity and grit, "all oil towns are pretty similar," Pedro Mujica said.

He and his wife, Marifé Valderrama, worked for Venezuela's state oil company but fled for political reasons and now work at different oil-sands operations. Politically, it's a lot calmer in Fort McMurray and there's less crime.

Life here "is a lot better," Valderrama said.

On weeknights, she gives dance lessons and leads salsa workouts at a fancy community center sponsored by oil money — a way of sharing her family's Caribbean heritage with their new neighbors.

Fort McMurray's good fortunes, however, have been accompanied by huge emissions of carbon dioxide and other greenhouse gases. In the long term, this could prove costly.

### **Climate concerns**

At Syncrude, Canada's largest single source of petroleum, the gleaming metallic skyline of the upgrader facility stands in harsh contrast to the brown and yellow autumn hues of the surrounding forest — a small city of towering vats, pressure cookers and the largest tower crane in the world, crowned by an immense plume of white vapor.

The plant also is Canada's third-largest emitter of greenhouse gases, according to the Pembina Institute.

Most of the emissions come from heating the bitumen oil to remove sulfur and from producing hydrogen that is later combined with bitumen to form light, so-called "sweet" crude.

Along with the mining, there are drilling operations where oil producers extract bitumen after heating it underground. That method burns natural gas — a relatively clean source of energy that could be used elsewhere.

The potential climate impact of the greenhouse gases has some asking whether the oil-sands crude is a good environmental bargain.

Oil sands "are delaying the inevitable shift that has to come," said Pembina's Dyer. "Do we want to get on this trajectory, or do we want to use this as a pretty clear signal that we've run out of easy oil and we need to start thinking about nonfossil-fuel alternatives?"

Oil companies and Alberta energy authorities downplay the fact that producing oil here results in three times more emissions than conventional drilling elsewhere. They say the oil sands account for less than 4 percent of Canada's total emissions and about 0.1 percent of global greenhouse gases.

They also say piping a barrel of oil to the U.S. from Alberta is cleaner than shipping it from the Persian Gulf. Traditional drilling also is becoming dirtier as the world runs out of light, easy-to-extract crude, so the carbon-footprint gap between conventional oil and oil-sands crude is narrowing.

Industry officials pass the buck to consumers, too, saying no matter how much carbon is emitted in producing oil, it's vehicle exhaust pipes that pump out more than 70 percent of the greenhouse-gas emissions from petroleum fuels.

Still, oil-sands producers are scrambling to quell the greenhouse-gas concerns by investing heavily in experimental methods to capture the carbon-dioxide emissions and inject them deep underground.

Government and industry officials say oil reservoirs and rock formations in western Canada could retain several centuries' worth of carbon-dioxide emissions from the oil sands.

"We have some of the best geological repositories in the world to sequester CO<sub>2</sub>," said Chris Holly, an official with Alberta's energy department.

In July, the Alberta government said it would put some \$2 billion into the so-called carbon-sequestration technology. By capturing carbon, improving energy efficiency and forcing oil producers to buy offsets, Alberta officials say they expect annual emissions to decrease by 5 million tons, or one-eighth of the current total, by 2015.

This month, Shell began drilling test wells to inject carbon dioxide into a porous rock and saltwater formation near its Scotford upgrader, which processes bitumen from the Albian Sands mine. The idea is to liquefy carbon dioxide from the upgrader and send it deep underground, where it would stay trapped in the rock's pores.

If it works, Shell could capture about 40 percent of the upgrader's greenhouse-gas emissions by 2013 or 2014, said Rob Seeley, Shell Canada general manager of sustainable development.

Carbon sequestration has seldom been tested on a large scale, but the experience has been successful so far, according to a recent Rand report.

### **Biggest test project**

The largest test is taking place in Weyburn, Saskatchewan, where carbon dioxide produced by a power plant in North Dakota is injected into a dying oil reservoir to help recover more oil.

In Norway, oil giant StatoilHydro reinjects excess carbon dioxide produced in some offshore natural-gas fields back under the ocean floor.

"The technologies are known," Seeley said. "However, it's new for oil sands. In some ways, it's putting together in a new way different pieces that have been done and proven elsewhere."

Some wonder, however, whether the oil-sands industry is pursuing what Pembina's Dyer calls "phantom mitigation."

Alberta penalizes producers \$15 per ton of carbon dioxide if they fail to meet the province's emissions-reduction goals.

But David Hobbs, head of global research at consulting firm Cambridge Energy Research Associates, estimates that carbon sequestration may cost between \$80 and \$140 per ton. So unless the government makes carbon sequestration mandatory or puts a heavy price tag on carbon emissions, it will be cheaper for oil companies to release the emissions into the atmosphere and pay the penalty.

"It's just talk, basically, at this point," Dyer said.

But many analysts think a carbon-emissions cap is likely, which would make sequestration economically attractive. "It's not yet cost-competitive, in the same way it was not cost-competitive to buy a new higher-fuel-efficiency car right up until the price of gasoline was going to hit \$5 a gallon," Hobbs said.

### **Giant client to south**

Canada's biggest customer, the United States, is growing increasingly restless with the oil-sands bargain as it awakens to the climate-change issue.

The 2007 federal energy bill says U.S. government fleets can't buy fuel from the oil sands and other sources whose production emits more greenhouse gases than conventional oil. However, it's nearly impossible for buyers to determine the origin of their fuel, so that restriction is symbolic.

California's low-carbon fuel standard, which goes into effect at the end of the year, also discourages buying such oil.

And in June, the U.S. Conference of Mayors singled out crude from the oil sands as an environmental bad boy. Addiction to Alberta's sludgy brew "slows the United States' transition to clean, renewable energy sources," the mayors declared.

Canadian officials and oil-sands producers are conscious of this image problem. "Canadians are nice people. If you say to them, 'We want you to meet the standards,' they're going to work to meet them," said the Hudson Institute's Sands.

But in a world starving for energy, with no large-scale options to petroleum, Alberta's oil producers hold a lot of cards.

The oil sands are destined to play a huge role in meeting energy needs "provided you deal with the environmental implications," said James Smith, Shell's country chairman for the United Kingdom, who recently toured the oil sands for the first time.

"We want something that's clean and cheap and always on," he said. "None of our current sources of energy fits the bill."