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Canada's tar sands

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Rising oil prices and falling production costs favour the extraction of oil from Alberta's tar sands. But environmental objections are fierce

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SMOKESTACKS dot the horizon; a whiff of oil hangs in the air; gargantuan vehicles clog the highway. There is a din of heavy machinery, punctuated by blasts from cannons scaring birds away from toxic lakes. But golf courses and suburban housing make the place liveable, and some locals have grown attached to Alberta's tar sands and Fort McMurray, the town at the centre of them. "I'd like my son and grandson to work here,"

says a worker at one of Shell's mines.

He may get his wish. After a brief hiatus during the economic downturn, world oil consumption is rising again, pushing the price of a barrel towards \$100. By 2035, believes the International Energy Agency (IEA), demand may reach 110m barrels per day (b/d), about 20% more than in 2009. For those who exploit the tar sands, which contain the world's second-largest trove of oil, this is a welcome forecast.

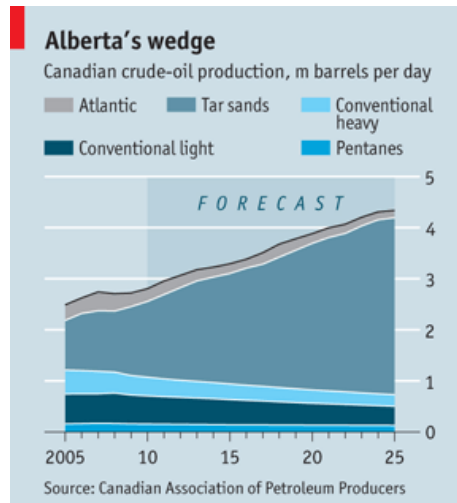
Despite rapid development in the past decade, the sands produce only 1.5m b/d, less than 2% of global supply. However, the Canadian Association of Petroleum Producers (CAPP), an industry group, expects output to be nearly 3.5m b/d by 2025 (see chart). Thirst for fuel is not the only thing in the oilmen's favour. The cost of production has fallen: a few years ago most firms thought the break-even price was \$75 per barrel, but now companies such as Shell say new developments are economical at \$50. The provincial and federal governments are unsurprisingly supportive.

There are obstacles too, mainly because of the sheer dirtiness of the business. In America, the main market, objections to the import of more of Alberta's bituminous oil are loud. And domestic opposition to exploiting the tar sands and building pipelines, which has long been fierce, is gathering momentum.

First, the economics. The IEA believes that global production of conventional oil, the stuff that can be recovered easily using drills and wells, is near or already at its peak, and that only a leap in output from unconventional sources will prevent new leaps in price. Even if countries around the world agree on measures to control carbon-dioxide emissions, says the agency, bituminous crudes like Canada's must fill a coming supply gap. That the sands lie in Canada is a rare geological fluke in the West's favour. With 70%-plus of the world's remaining oil in the hands of OPEC, half of its "free oil" is in the tar sands, notes Peter Tertzakian, chief economist of Arc Financial, an investment firm.

No self-respecting oil major has let a position in the tar sands pass by. A flock of national oil companies has joined them, led since 2005 by China's state-controlled firms. In December Total, a French oil firm, and Suncor Energy, one of the original tar-sands developers, announced plans to spend about C\$20 billion (about \$20 billion) on new projects in the next decade. This year alone developers will spend C\$15 billion, predicts CAPP.

All this is making Alberta the flag-bearer of a new oil age, and the province is already becoming wealthy. At 173 billion recoverable barrels, the tar sands are worth \$15.7 trillion at today's price. As the resource owner, Alberta captures much of this wealth, but a good deal filters through to the rest of Canada in contracts for goods and services as well as in



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federal equalisation payments that send some of the rich west's billions to poorer eastern provinces.

Alberta has become something of a petro-state: the oil-and-gas sector accounts for 31% of its GDP. The provincial government, run by the Progressive Conservatives for more than four decades, is naturally keen on such a generator of money and jobs. The only serious opposition, the Wildrose Alliance, is further to the right and also supports the tar sands.

Although natural resources are under provincial jurisdiction, the tar sands are a national issue too, not least because of the federal government's repeated failure to produce a plan to tackle climate change. Critics of Stephen Harper, the Conservative leader of a minority administration, say this lack of progress has everything to do with the prime minister's desire to protect the oil business and to avoid offending voters in Alberta, where his party has its core support. The environment minister, Peter Kent, upset some Canadians recently when he defended Alberta's "ethical oil", the proceeds of which would not be spent on palaces or civil wars, as they might have been elsewhere. Michael Ignatieff, the leader of the Liberals, the main opposition at federal level, also supports development of the tar sands, though he says it has to become more sustainable.

A bitumen bottleneck

However, if Canada's oilmen are to fulfil their rosy output forecasts, they will need new ways of reaching customers. America is an obvious place: Canada is already America's biggest supplier of oil and petroleum, and as the sands are exploited further its market share should only rise. By 2030, according to IHS CERA, a firm of consultants, the tar sands should supply more than one-third of America's imported oil.

But Alberta's bituminous crude needs specialised coking facilities, and its only significant outlets are refineries in the American Midwest. By 2014, says Jackie Forrest of IHS CERA, new production from the tar sands will have filled the available coking capacity. That will create a bottleneck and hinder upstream spending.

With this in mind, TransCanada, a Calgary firm, has proposed building a \$7 billion pipeline, Keystone XL, to send 510,000 b/d of Albertan oil to refineries in Texas (see map). It already has a line of similar capacity, Keystone. The company says that the new one would pump \$20 billion into the American economy and hand \$5 billion in taxes to states on the route. Keystone XL would not only take more Canadian oil to America; via terminals on the Gulf of Mexico it could connect the tar sands with international markets as well. There are also plans to ship oil to Asia from Canada's Pacific coast.

However, these plans require political approval, and this is an awkward time for North American politicians to be weighing oily matters. You might imagine that last year's



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spill in the gulf would have done Alberta's onshore reserves in the sands, 40 times the size of those in the gulf, a favour. But the spill has stained the whole industry's reputation in America and has intensified long-running opposition to the sands in Canada.

Hillary Clinton, America's secretary of state, who must approve Keystone XL (because it crosses the border), has said she is "inclined" to do so; and 39 Republican members of Congress have written a letter asking her to support it. But the pipeline is meeting opposition. The governor of Nebraska, one of the states along the route, and one of its senators, both Republicans, have expressed concern. In December a union of Nebraskan farmers, not known for radical greenery, voted to oppose the project. Online petitions have drawn thousands of virtual signatures in Texas and elsewhere. And last year the Environmental Protection Agency demanded that the State Department review its assessment of the pipeline's environmental impact. This has left the decision hanging and may yet upset TransCanada's plans.

Northern Gateway, an ambitious Pacific coast proposal, would allow exports to Asia and help Canada become the "new energy superpower" Mr Harper predicted in 2006. But last month the project, which would cost C\$5.5 billion and carry 525,000 b/d of oil, ran into opposition too. Leaders of First Nations in British Columbia said they would prevent the pipeline from crossing their territories. The chiefs talked of "inevitable" spills, a threat to salmon runs and devastation of their way of life. Spills last summer from pipelines in the Midwest owned by Enbridge, the company behind Northern Gateway, were scarcely a public-relations triumph.

To many critics the broader environmental legacy of the tar sands is reason enough to halt the whole endeavour. To get at the bitumen, the companies bulldoze wetlands to create vast open-pit mines. Inside them, the world's largest dumptrucks ferry paydirt to nearby separation plants, where the tarry soil is crushed and diluted until bitumen can be skimmed off. This needs lots of water and energy, and yields the notorious "tailings", a residue of sand, unclaimed bitumen, water, clay particles and contaminants. Some lakes of this have been festering for decades.

Mining accounts for just over half of production. It will become less common as shallower reserves are exhausted. Extracting the deeper stuff is less ugly but also damaging. Typically it involves drilling wells to pump steam into the ground to melt the bitumen and make it easier to suck up to the surface. Heating the steam burns much natural gas, emitting CO₂. Both methods, say the tar sands' critics, threaten local rivers, poison fish, destroy the landscape, kill wildlife and pollute the air.

The movement to stop this "dirty oil" has gathered momentum. Several American states, led by California, have passed laws designed to stop Albertan oil reaching their citizens. Some American retailers have forsworn fuel from the tar sands. A coalition of green groups has launched a campaign, "Rethink Alberta", to dissuade tourists from visiting the province until expansion of the tar sands stops.

The provincial government has begun to fight back with advertisements in newspapers and in Times Square. The industry has run ads featuring ordinary workers talking up the wonders of the oil sands. Both often offer journalists and activists tours, hoping to persuade them that things are better than they think. This candour is usually rewarded with more negative publicity. Aided by, among other things, the death of 1,600 ducks in a tailings pond and photos making northern Alberta look like a moonscape, environmentalists have succeeded in tarnishing the province's brand. "The oil sands have

become the harp seal of the environmental movement," says Preston McEachern, a water scientist with the provincial government: the easiest, and softest, beast to club.

David Schindler, an ecologist at the University of Alberta, has long been publishing peer-reviewed studies showing that airborne emissions from smokestacks on upgraders, which convert the bitumen into synthetic crude oil, have polluted the Athabasca, the giant river that flows through the tar sands. His findings gained more publicity in September, when he offered photographers deformed turbot and other species pulled from the river. The images prompted a federal investigation. "I'm surprised it wasn't mounted on a block of bitumen," said an oil executive of Dr Schindler's piscine trophy.

Such weary sentiment is widespread in the industry. Sometimes it is justified. Agriculture has severely depleted south-eastern Alberta's rivers, for example, yet is allowed to use more than six times as much water as the tar sands in a region soaked with lakes and rivers. David Keith, a scientist at the University of Calgary, says the tar sands' water use is so benign, in pollution and consumption, that environmentalists ought to drop the issue. In December a report by the Royal Society of Canada (RSC) dismissed other complaints. Claims that the tar sands were the "most environmentally destructive project on Earth" were "not accurate", it said. Although reclamation of the land, a legal obligation, has not kept up with the disturbance of the tar sands, it was "achievable". The RSC added that "no credible evidence" supported worries about elevated human cancer rates downstream of the developments.

Progress by developers in cleaning up after themselves tends to win only grudging approval. In September Suncor reclaimed Pond 1, a toxic lake of residue that had been an open wound for decades. This was a small step, to be sure. The Pembina Institute, a local environmental think-tank, claims that a lot of the mature, fine tailings were merely transferred to other, larger lakes; Suncor says not. Such toxic lakes still cover 170 square kilometres (66 square miles) and will keep growing, according to the RSC. Some of them leach their waste into the ground, says Pembina, although how much is uncertain.

Suncor is promising to spend another C\$1.2 billion to deal with its tailings. Rick George, its chief executive, believes that as companies share new technology, like that used by Suncor on Pond 1, the tar sands will within a decade look like any other mining operation, with only one lake open, temporarily, per mine. Only since the turn of the century have the companies cracked the economics of the tar sands, argues Mr George. Now they can concentrate on greening them.

Whether Alberta's government can be relied on to promote greener tar sands, however, is questionable. The province has been a model of laissez-faire. In private many oil-industry executives wish it would be more diligent as a regulator, feeling that its lax approach has become a threat to developments, not an incentive. Most of the province's best minds don't join the government in Edmonton, goes a frequent lament, but head for deep-pocketed oil companies in Calgary.

Both the RSC's report and another commissioned by the federal government, also released last month, demolished Alberta's claims to have monitored the tar sands' impact adequately. Regulators had "not kept pace with rapid growth" and the province's environmental assessments had "serious deficiencies" leaving them below "international best practice", the RSC said. The federal report rubbished the province's water-monitoring, which involved handing the job to an industry body—putting the "fox in charge of the henhouse", says Dr Schindler. After December's reports both the federal and

provincial governments promised new measures to improve monitoring, an admission that the current arrangements are inadequate. Yet Mr Kent, the federal environment minister, has flatly rejected Dr Schindler's research into the pollution of the Athabasca.

Clean and scrub

Some environmental problems could be solved fairly easily. One long-standing idea is to create a large wildlife refuge in areas that will eventually be tapped for bitumen. Only after a developer has restored land it has already mined could it begin tearing up an area of equivalent size within the refuge. Pembina says up to 40% of the region could be protected this way, with no impact on oil production. Various nasties Dr Schindler found in the Athabasca could be dealt with by adding "simple off-the-shelf" scrubbers to upgraders' smokestacks, he says. Though they are not legally required, many companies have added them to capture sulphur dioxide. Enforcement of rules to make operators deal safely with half of their tailings by 2013 has been patchy. Many operators will miss the deadline, says Pembina, and another rule is needed for the other half.

Outside Canada, most complaints are about the tar sands' CO₂ emissions. Here too, confusion abounds. Some critics, calculating emissions from extraction through to refining ("well to tank"), say fuel sourced from the sands is up to three times more carbon-intensive than others consumed in America. But from "well to wheels", counting emissions from cars' exhaust pipes, tar sands are only 5-15% dirtier, says IHS CERA. Most CO₂ comes from burning the petrol, not digging up the oil.



Filthy rich

Whatever the measure, Alberta lacks an adequate strategy to deal with emissions.

Its climate-change targets would allow emissions to grow until 2020. And those from the tar sands could triple in the next decade, as more oil is extracted by steam-based methods. Still, the sands are carbon-emitting minnows. Just 5% of Canada's CO₂, about 0.1% of the world total, comes from the developments, says CAPP. If people are serious about fighting climate change, argues Dr Keith, they should worry first about coal-fired electricity, whose emissions in America dwarf those from the tar sands. Andrew Leach, of the Alberta School of Business, calculates that the tar sands create about C\$500 of value-added per tonne of CO₂, against C\$20-30 from coal-fired power stations.

Peter Silverstone, of the University of Alberta, argues in a recent book that the province should levy its tar-sands royalties on a scale that reflects each project's emissions. Some companies may welcome this. Shell already adds a nominal carbon levy of \$40 per tonne to its projects when deciding whether to invest in the region, calling this a "licence to operate", even though Alberta's own carbon tax is just C\$15 per tonne. With hefty provincial funding, Shell is also among those hoping to capture CO₂ emitted by one of its tar-sands upgraders. Alberta is investing C\$2 billion in carbon capture and sequestration,

its favoured way of cleaning up emissions.

Environmentalists may regard such schemes with mixed feelings. Carbon-neutral extraction would do nothing to cut the bulk of oil-related emissions that come from combustion. Eco-friendlier tar sands could also encourage unconventional development elsewhere: Jordan, Madagascar, Congo and Venezuela, where the government claims a reserve of bitumen even greater than Alberta's, may be less open to environmental scrutiny. Kill Alberta's tar sands, say some, and rising crude prices would choke oil consumption and force an era of clean energy into being.

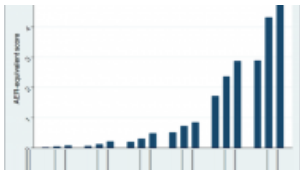
This would be a hard argument to make, especially in the United States. Even if America's consumption keeps shrinking, it will remain the world's biggest oil buyer for decades: foreign supplies will grow more, not less, important in its market. Ezra Levant, author of a recent polemical defence of the tar sands, argues that Americans would rather buy from Canada than from Venezuela and the Middle East.

Meanwhile in Calgary, oilmen expect a pipeline to the Pacific, and in effect to Asia, to come sooner than later, especially if Keystone XL is blocked. A settlement with First Nations opposed to Northern Gateway, involving both money and environmental safeguards, could hasten that. Chinese oil companies would happily take delivery, might be less fickle customers than the southern neighbours and might help Canada fulfil Mr Harper's dream of energy superpowerdom. Many Americans, however, might ask why the State Department had allowed a rising economic rival into such a vast oil reserve.

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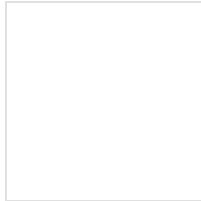
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