

Digging a Carbon Hole for Canada

Will oil sands projects be white elephants in the post-Kyoto world?

by Peter Fairley



Melt the billions of barrels of hard tarry petroleum trapped in Alberta's oil sands and you have an oil reserve rivaling the Saudi oil fields—plus a heavy environmental price tag. It's been that way since the earliest days of oil sands development. In the late fifties, American petroleum giant Richfield Oil and U.S. nuclear weapons scientists proposed to melt Alberta's oil sands with a nine kiloton underground atomic blast, to free the black gold for refining into heating oil, asphalt and gasoline. Similar experiments in Colorado and New Mexico suggest that the resulting oil would have been radioactive. Luckily, cooler heads and geopolitics intervened: Prime Minister John Diefenbaker, who was lobbying internationally against nuclear proliferation at the time, buried the embarrassing atomic proposal in parliamentary procedure.

Half a century later, the oil sands are once again

sparking controversy. Close to one million barrels of oil are now pumped out of the Athabasca region every day—not with the searing heat of atomic blasts, but with steam generated by burning coal, natural gas and oil. In the process, the wildcatters of the region are driving up Canada's emissions of greenhouse gases. And with billions of dollars flowing into new oil sands projects, emissions from the region could easily double over the next decade. Expanding the oil sands would seem to fly in the face of the Kyoto Protocol on climate change, which Prime Minister Jean Chrétien's Liberals passed through Parliament last December. But investment in the oil sands is proceeding with the full support of the federal government, and it is likely to keep on growing. Demand for oil is strong, promising billions of dollars in profits to oil sands developers, and the Kyoto Protocol is simply too weak to stop the party.

BUSINESS IS BOOMING IN FORT McMURRAY, the capital of the oil sands. Producers such as Syncrude Canada and Suncor Energy are steadily perfecting the recovery of bitumen, pumping steam into the ground and pumping oil out or strip-mining shallow deposits and separating the sand, clay and bitumen in the industrial equivalent of a top-loading washing machine. In 2001 they averaged 800,000 barrels of oil per day—about 31 per cent of Canada's total production. Oil production from Alberta's buried reserves already exceeds the total energy output of Nigeria, and more is on the way as existing players expand and new players enter. According to the Fort McMurray-based Athabasca Oil Sands Developers, \$87-billion worth of development has been announced since 1995, of which \$17-billion is complete and another \$7-billion is under construction. If all the planned projects are completed, output from the oil sands could hit 4 million barrels per day within a decade.

To pump every new barrel of oil out of the ground, more oil, coal and natural gas must be burned, and more carbon dioxide is pumped into the air. Today, oil sands production generates about 26 million tonnes of carbon dioxide per year. The David Suzuki Foundation, an environmental think tank based in Vancouver, estimates that greenhouse gas emissions from the new projects alone will hit 60 million tonnes per year—adding nearly 10 per cent to Canada's total. Kyoto ratification commits Canada to *cut* its emissions by 240 million tonnes per year.

Oil industry analysts say projections such as Suzuki's are unrealistic worst-case scenarios. For one thing, not all of the projects that financiers envision will find backers or pass muster with regulators. The Athabasca Oil Sands Developers predict that around \$30-billion more will be invested in the oil sands in the coming decade, boosting output to 1.9 million barrels of oil per day. William Almdal, the group's executive director, says frightening estimates of ballooning greenhouse gas emissions such as Suzuki's also fail to account for energy-saving technological improvements in the oil sands process that are just around the corner. For instance, operations that recover bitumen by melting it in the ground, like Imperial Oil's operation at Cold Lake, are learning how to recover more oil with less steam. "We used to heat the oil sands up to about 80° C, heat that sucker good and hot, and now we're looking at 50° C. And there are trials out there at only 25° C," says Almdal. Similarly, the Suncor and Syncrude operations near Fort McMurray, which strip-mine shallow tar deposits, are washing the sand and clay away in cooler water.

Data from Natural Resources Canada suggests new technology will reduce emissions per barrel, but to a limited degree. In 2000, 74 kilograms of carbon dioxide were released to produce a barrel of bitumen, compared to 77 in 1990. And producing a barrel of synthetic oil—bitumen that has been partially refined into a light crude—generated 104 kg of carbon dioxide in 2000, 37 kg less than a decade earlier. However, NRCAN research suggests

that these improvements are leveling off. NRCAN projects that synthetic crude production will bottom out at 90 kg of carbon dioxide per barrel in 2005, and it predicts no further energy improvements for bitumen production.

Almdal and others insist that NRCAN's figures are out of date. The most recent development approved by Alberta's Energy and Utilities Board, a \$1.9-billion Fort Hills project championed by Calgary-based oil sands stakeholder TrueNorth Energy, promises to generate just 31–39 kg of carbon dioxide with each barrel of bitumen—a figure within striking distance of the 30 kg generated with each barrel of conventional oil.

TrueNorth's figures are only projections, though, and they may not be borne out when the equipment is built and operated at industrial scale. And even the smaller improvements projected by NRCAN assume that natural gas will remain the fuel of choice for new developments

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(as will be the case with the Fort Hills project). This assumption will be tested soon, as other developers consider cheaper and dirtier fuels. Oil sands hopeful Synenco Energy has considered mining a coal deposit near its oil sands lease to fuel its proposed 80,000 barrel-per-day steam-injection operation. Another fledgling player, OPTI Canada, is seeking approval to burn the dirtiest and least valuable fraction of the bitumen it recovers from the oil sands.

Even if all the promised efficiency gains are realized and natural gas remains the fuel of choice, greenhouse gas emissions from the oil sands will rise substantially, due to the scale of production. Almdal's group estimates that total emissions could nearly double to 45 million tonnes by 2010.

DESPITE THIS INEVITABLE RISE in greenhouse gas emissions, which will push Canada even further over Kyoto target levels, Chrétien's government has been a steadfast supporter of oil sands development. Chrétien has personally lobbied U.S. President George W. Bush on behalf of oil sands exporters, and his Department of Finance expects to provide \$1.2-billion in tax breaks for oil sands developments over the next decade.

In the heat of the Kyoto ratification debate last fall, Premier Ralph Klein suggested that the federal government was acting inconsistently and that Chrétien himself might not comprehend the finer points of climate change policy. And this point had been made before. A year earlier, when Canada's intention to ratify Kyoto was

in doubt, environmentalists were equally frustrated by Chrétien's attempt to have his cake and eat it too. Matthew Bramley, climate change director for the Pembina Institute, a Calgary-based environmental research group, said: "There's a clear lack of coherence here, and the Prime Minister needs to explain to Canadians how he intends for Canada to meet its Kyoto target while further expanding fossil fuel development. One wonders whether he's actually aware of the contradiction. I sort of hesitate to say that, because it seems so obvious. On the other hand, if it's so obvious, how does he think he can get away with it?"

Chrétien can "get away with" what appears to be a schizophrenic policy because the Kyoto rules will let him. The fact is, Kyoto is but a minor speed bump for oil sands financiers. It allows Canada (and other countries) to meet its obligations by paying other countries to

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reduce emissions, forgoing painful pollution-cutting steps at home. Canadian oil producers have long recognized that purchasing "carbon credits" could give them an out too, enabling them to compensate for their own emissions increases. Suncor executed one of the first such carbon trades in 1998. It paid an unspecified amount to acquire carbon credits earned by New York utility Niagara Mohawk Power, which switched from coal-fired power plants to natural gas during the 1990s. The deal slashed 100,000 tons of carbon dioxide emissions from Suncor's climate ledger.

Though Suncor has doubled its oil sands capacity since 1990, and plans to double it again by 2012, the company has committed to a Kyoto-scale greenhouse gas reduction of 6 per cent from 1990 levels by 2012. An economic analysis by Innovest, an investment research firm whose energy team operates out of Richmond Hill, Ontario, shows that carbon credits like those acquired from Niagara Mohawk could allow Suncor to fulfill that commitment with minimal impact on the bottom line. Innovest predicted little change in Suncor's profitability, even if the cost of buying carbon credits proves to be relatively high. "We're forecasting a reduction from just over \$80 per share down to about \$75 under a high-cost scenario—a 5–12 per cent drop in projected share price—post-2008. I don't think the average investor would be hugely put off by it," says Martin Whittaker, managing director of Innovest's carbon finance group.

Other analysts have arrived at similar figures. BMO Nesbitt Burns analysts Matthew Janisch and Mark Friesen told the investment firm's clients last April that buying relatively expensive credits to meet the reductions mandated



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under the Kyoto Protocol could raise operating costs at Canadian oil and gas firms by 20 per cent. This, in turn, would discount their stocks by around 10 per cent.

In fact, the impact on most firms is likely to be even less significant, thanks to Klein's lobbying. The federal government's "Climate Change Plan for Canada," announced last fall, seeks to minimize the economic pain felt by Alberta and its energy-intensive industries. The plan calls for a reduction in greenhouse gas emissions that doesn't place "an unreasonable burden on any region of the country." Limiting the burden on Alberta will likely mean that the rest of Canada will have to do more than its part. As the costs of emissions reductions are spread throughout the country, all Canadians will see higher taxes and more expensive goods and services.

toward renewable energy (or nuclear power) and turn the oil sands operations into white elephants.

It won't just be the oil sands developers and their investors who get soaked if the investments in bitumen and synthetic crude production prove untenable in a post-Kyoto world. The rest of us will have to make up the difference to balance Canada's greenhouse gas books. "If we further expand oil sands now, we're locking ourselves into big problems," says Bramley at the Pembina Institute. "Maybe we can manage it for the Kyoto commitment period by making reductions elsewhere in the economy. But there comes a point where you're in real trouble because you've committed to all this capital expenditure in these projects that are going to be running for 40 years."



DESPITE CANADA'S RATIFICATION OF THE KYOTO PROTOCOL, the oil sands are poised for profitable growth for the foreseeable future. But look a little further out, beyond the quarterly focus of Bay Street, beyond even the decade that the Kyoto Protocol considers, and the deal begins to sour. Why? Because oil sands developments are designed to pay dividends for decades—some well beyond 2050—and by then measures adopted to combat global warming may make Kyoto look like a walk in the park.

Climate scientists see the emissions reductions required under the Kyoto Protocol as nothing more than a small down payment on the reductions needed to stabilize the earth's climate. University of Victoria climatologist Andrew Weaver says climate models suggest that the earth will warm 2° C by 2100 and sea levels will rise 50 centimetres if no action is taken to rein in emissions of greenhouse gases. If the greenhouse gas reductions mandated under Kyoto are met, the models predict a 1.9° C warming and a 48 cm rise in sea levels. Just to stabilize atmospheric carbon dioxide levels at four times their pre-industrial levels would require emissions reductions greater than 50 per cent from 1990 levels, says Weaver. In other words, if the scientific consensus on global warming is correct, reductions an order of magnitude larger than Kyoto's will be needed to meaningfully slow the progression of global climate change—massive carbon cuts that will require a fundamental shift in our energy systems

Then, of course, there's the environmental impact. If the climate scientists' best guesses are even close, nobody will escape the long arm of climate change. Farmers will be forced to adapt to shifts in insect pests and rainfall. Cities like Calgary will be deprived of water supplies as glaciers disappear. Wildlife will be displaced as habitats transform. Canada's North may already be feeling the effects, as melting permafrost splits roads and cracks foundations. Ironically, this softening of the tundra could even pinch the oil and gas sector. According to NRCAN, the Mackenzie Valley, home to Canada's largest reserves of natural gas, has warmed by 1.7° C over the last century—more than any other region in Canada. Melting permafrost could complicate or even put an end to a proposed 2,200-kilometre pipeline that would deliver clean-burning natural gas from the Mackenzie Valley to Alberta.

Canada's climate is already on the move, and oil sands developments will almost certainly hasten this grand experiment. The problem for politicians and policy-makers is that oil sands developers are clamouring for investment and promising jobs today, while the climate shifts that result may take decades to play out. Climate change is not the kind of threat that's easy to spot, like radioactive fallout from an atomic blast. But its impact could be far worse.

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