

The Oil Drum: Canada

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Tar Sands: The Oil Junkie's Last Fix, Part 2

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This is part 2 of a guest post by [Chris Nelder](#). It was originally written for Friday's [Energy and Capital](#).



This is a continuation of my previous article ([Tar Sands: The Oil Junkie's Last Fix, Part 1](#)) on the challenges facing the Canadian tar sands, in which we looked at the cost and financing issues. Today we look at water, energy, labour and the environment.

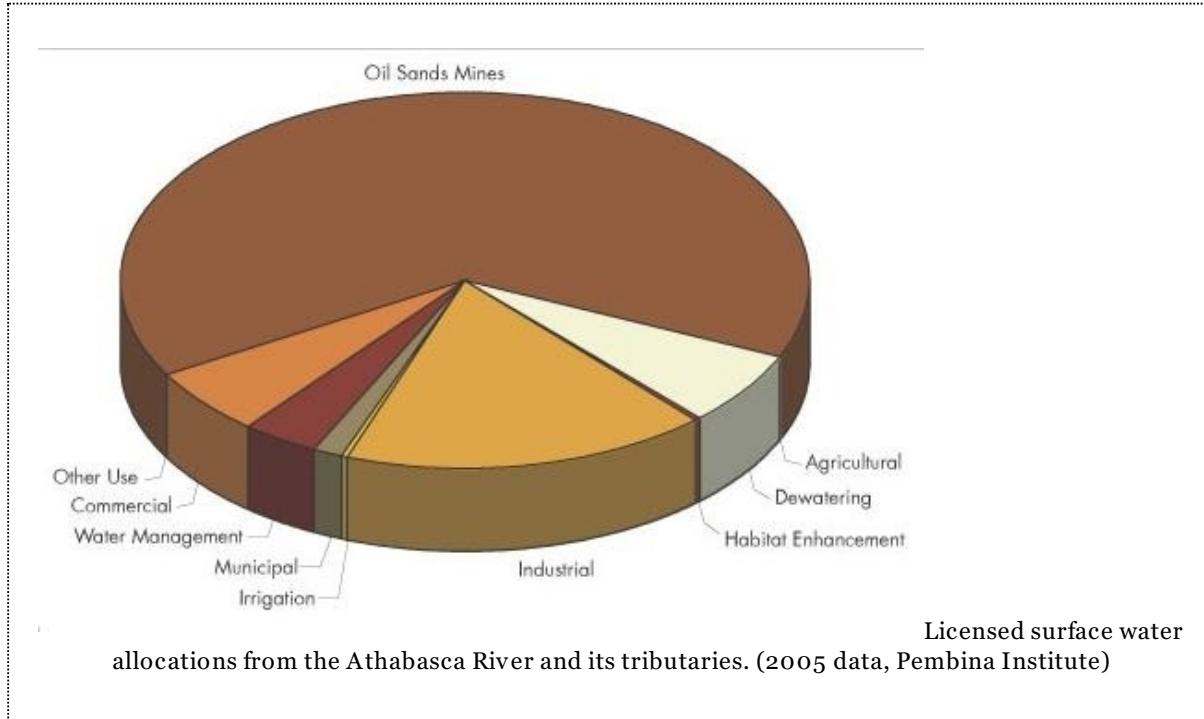
Water

Water is another major problem. Tar sands plants typically use two to four barrels of water to extract a barrel of oil. Currently, the water consumption is enough to sustain a city of two million people every year. And after it's been through the process, the water is toxic with contaminants, so it cannot be released into the environment. Some of it is reused, but vast amounts of it are pumped into enormous settlement ponds to be retained as toxic waste.

These "ponds" are actually the largest bodies of water in the region--big enough to be seen from space--and some of the world's largest man-made ponds overall, with miles of surface area. It may take 200 years for the smallest particles to settle down to the bottom of this toxic brew, which also contains very high levels of heavy metals and other health-threatening elements.

According to a recent joint study by the University of Toronto and the University of Alberta, the projected expansion of the tar sands projects will kill the Athabasca River, the only abundant source of water in the area. "Projected bitumen extraction in the oil sands will require too much

water to sustain the river and Athabasca Delta, especially with the effects of predicted climate warning," the study said. If that amount of water were used, they warned, it would threaten the water supply of two northern territories, 300,000 aboriginal people and Canada's largest watershed, the Mackenzie River Basin.



With the tar sands currently producing at the rate of about 1 million barrels per day (mbpd), water levels in the river are already going down. Given such intense water demands, it's completely unclear how production can be increased to the target of 4 mbpd by 2020.

One of the authors of the study, Dr. David Schindler, who is considered Canada's top water expert, says that between the climate change-induced reduction in Athabasca flows and the seven major tar sands plants either operating or planned, the river's water "is fully allocated, possibly over allocated, right now."

Energy

Perhaps the most paradoxical part of the tar sands receding horizons problem is the need for energy.

Typically, tar sands are produced using natural gas to heat the steam that drives the oil out of the sands. It takes a lot of gas to do this: over 1,000 cubic feet--about \$8 worth--to produce one barrel of bitumen.

At the current production level of about 1 mbpd, the tar sands operations consume about 4% of Canada's natural gas supply. So quadrupling production would consume fully 16% of the supply, and completely max out the gas market. Nearly all estimates for tar sands operations over the next ten years exceed the projections for available amounts of natural gas!

Canada's natural gas supplies are running out fast. Numbers from the EIA and the NEB suggest that its proven reserves of natural gas will be gone in about eight years.

And plans for pipelines to bring natural gas from Alaska and the Mackenzie valley are currently mired in environmental and financial quagmires. The projected costs for the Mackenzie pipeline have risen so fast that the oil companies have put the project on hold, demanding that Ottawa pay

But the entire planned capacity (1.9 bcf/d) of the proposed Mackenzie Valley gas pipeline could only support tar sands production up to about 3 mpbd by 2025.

Professor Kjell Aleklett of Uppsala University, a recognized expert on tar sands, puts it bluntly: "The supply of natural gas in North America is not adequate to support a future Canadian oil sands industry with today's dependence on natural gas."

After gas, the next obvious choice is nuclear energy--building dozens of nuclear plants to generate the heat needed to create the steam needed to drive the hydrocarbons out of the sand. But by any sober assessment of that alternative, it would probably take on the order of ten years or more to build out that kind of nuclear capacity, with skyrocketing costs. And then you still have the problem of water to turn into steam and cool the nuclear plants.

What's worse, depending on a host of factors, the total Energy Return On Investment (the energy profit, if you will) for tar sands production is typically only around 5% to 10%. In fact, it has even been suggested that the EROI is negative in some cases. But with the current circumstances of stranded and otherwise useless natural gas, oil over \$60, an extremely tight global oil supply situation, and a host of complicating factors like tax relief (which we'll get to in a moment), it still makes economic sense, if no other kind.

Even if an alternative energy source could be found, there is still the matter of the hydrogen needed to upgrade the produced bitumen into a useful hydrocarbon. That hydrogen is currently derived from natural gas. According to Princeton geology professor emeritus and peak oil author Ken Deffeyes, there is just one alternative source of hydrogen: water. But as we already know, there's no excess water.

In the interest of scientific fairness, there are some new in situ processes for tar sands harvesting, like "toe heel air injection," which have been demonstrated to produce more bitumen than the traditional process with far lower energy and water inputs. But these processes are still in the experimental phase and have not been proven against the various challenging geological structures in which tar sands are found. They are certainly in no immediate position to become commercially viable, let alone saviors.

Labor

Not only is there a perennial shortage of skilled labor, even at average salaries above \$100,000 per year, but a general strike now seems unavoidable this fall. Seven out of 25 key construction unions in Alberta--including carpenters--are contemplating their first multi-trade strike in almost 30 years. They're no fools; seeing the oil and gas companies racking up record profits in the billions per quarter, they want a bigger piece of the action.



Though wages are high--a journeyman electrician can make \$35 an hour--conditions are tough, too. Labor is demanding quality of life concessions, noting the horrors of traveling to and from and living anywhere near the northeastern Alberta work camps, where the living conditions have been compared to the Klondike gold rush days. It's a rough place of rough men, and crime and drug problems are on the rise.

According to one former oil sands worker, a mobile home trailer is going for \$425,000. Workers are bunking in residents' basements and parking on their lawns, for lack of anywhere else to sleep or park. And sometimes the fumes coming off the slurry ponds are so bad that the schools have to be shut down. Stores have to shut down for several hours a day for lack of employees. There is a desperate shortage of schools, hotel rooms, police, firemen, and just about everything else that makes a town.

Indeed, the mayor of Fort McMurray, the largest city in the Athabaskan region, warned that she could not promise a community that was safe and functional, and had no idea how the expected thousands of additional workers could be housed.

Environment

Naturally, the biggest hit from tar sands operations will be taken by the environment--the one player in this drama that can't speak for itself or charge anyone anything for the damages it suffers.

Former Alberta premier Peter Lougheed recently warned that a clash over the environmental cost of the oil sands is inevitable, and that this will be fought all the way to Canada's Supreme Court. A primeval boreal forest the size of Florida is being utterly destroyed beyond repair, while highly toxic sludge ends up in gargantuan tailings ponds even though laws stipulate that the land must be returned to its original state.



So far, the industry pays next to nothing for causing this environmental destruction, but it seems certain that this won't last, particularly in view of stricter federal environmental legislation.

The Junkie's Last Fix

Now, the above story wasn't easy to piece together. The press is almost universally in favor of anything that sounds like "more oil," no matter the cost. Nearly all we hear about is X billion in new investment announced by Y Company. We don't hear too much about the cancellations, delays and cost overruns. A full reckoning is rarely attempted.

But that's what we're here for.

So let's reckon this.

What we have here is arguably the most environmentally destructive activity man has ever attempted, with a compliant government, insatiable demand and an endless supply of capital turning it into "a speeding car with a gas pedal and no brakes." It sucks down critical and rapidly diminishing amounts of both natural gas and water, paying neither for its consumption of natural capital nor its environmental destruction, to the utter detriment of its host. And all to eke out maybe a 10% profit, if it turns out that the books haven't been cooked, and if the taxation structure remains a flat-out giveaway.

All of that, just to produce enough oil to offset the declining conventional oil production in the rest of Canada. Maybe.

And that, my friends, is what I call the oil junkie's last fix. An act of sheer desperation to stave off just a little longer that inevitable day when we are forced to realize that the fossil fuel game is truly over. No more rabbits in the hat. Done.

In the July 2006 issue of Rolling Stone, Al Gore called the tar sands "crazy," a huge waste of energy and an eyesore on the landscape of Western Canada. "For every barrel of oil they extract there, they have to use enough natural gas to heat a family's home for four days," Mr. Gore told the magazine. "And they have to tear up four tons of landscape, all for one barrel of oil. It is truly nuts. But you know, junkies find veins in their toes. It seems reasonable, to them, because they've lost sight of the rest of their lives."

Until next time,

Chris

Many thanks to Roel Mayer for his contributions to this piece.



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