Oil Sands

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Introduction

It is generally accepted that oil will not last forever. Global demand has been rising and is expected to continue to do so into the future, particularly due to increased consumption in developing countries like China and India. Coupled with this is the fact that major conventional oil discoveries are declining (Harrison 2006: par 9). These issues have brought our current oil dependent way of life up for debate. On one side are those who take this as a signal to move toward alternative energy sources like solar and wind power, and on the other are the optimists who believe that the oil age is far from over. The optimists have hope that more oil will be discovered and that advances in technology will provide the opportunity to develop unconventional sources of oil (those that are not currently economically or technologically feasible to produce and so not included in reserve estimates).

Oil Sands

Oil sands, one of these unconventional sources, have increasingly been in the spotlight. While oil from conventional sources is relatively easy to extract, extraction from oil sands requires a much more complicated process. Bitumen, the oily substance in the sands, is an extremely thick and heavy oil that vaguely resembles molasses at room temperature. Because it is so thick, it does not flow like other oil unless heated or mixed with lighter hydrocarbons. Oil sands contain about 10-12% bitumen, 80% sand and clay, and 4-6 % water. This mixture can simply be dug out of the ground. It is then processed to separate the bitumen from the clay and sand, and then processed again to upgrade the bitumen to crude oil that can be sent to refineries. It takes about two tons of bitumen mixture to produce one barrel of oil (Holt 2006: par 4). However, this method is only applicable to a small amount near the surface. Most of the bitumen mixture is located far underground and requires much more complicated, in-situ (or in place) methods. In-situ methods require that a series of wells are built so that the bitumen can be reached and treated, for instance with steam, so that it can flow to the surface like regular oil.

Canada's oil sands

Located in Alberta, a long-time oil-producing province, Canada's oil sands represent one of the two largest areas of oil sands worldwide. While first discovered in 1778, Canada's oil sands lay undeveloped until recently because of technological and economic barriers; it was simply not worth investing in oil sands when there were so many other easily and cheaply reached sources of oil. The first developments were in 1967 by Suncor Energy, and in 1978 by the Syncrude consortium. However, it was still a relatively expensive process, 23 dollars per barrel, a price that remained constant throughout the 1970s (Armistead 2002: par 5). A third development opened in 2003 by the Albian Sands consortium.

Several factors have recently led to a large expansion of interest in the Alberta oil sands. One is that conventional sources of oil in western Canada have been declining. Advances in technology have also led to cheaper and easier methods of extracting the oil.

In addition, world oil prices have risen, which makes development of the Canadian oil sands a much more viable prospect. The price to produce a barrel of oil sands oil is now between 10 and 20 dollars (Lavelle 2006: par 9), which means relatively large profits at the current world price of oil. Canada now produces twice as much from its oil sands as it did four years ago (Lavelle 2006: par 6), and with all of the recent interest, this is expected to rise in the future. In fact, the United States Geological Survey (USGS) predicts that by 2025 the Alberta oil sands could be producing 70% of Canada's oil production, that's up from the current 26% (CBC 2005: par 16).

Because development of Alberta's oil sands has become much more economically viable, Canada's reserve estimates have been altered. Previously the oil sands were not considered in estimates because the oil was far too complicated and expensive to produce. However, the USGS recognized Canada's oil sands in 2002 and increased Canada's total reserves from 5 to 180 billion barrels (CBC 2005: par 15). This change drastically alters Canada's role as an energy producer in the world. The only country with more extensive reserves than Canada is Saudi Arabia. While Saudi Arabian oil may be more easily reached, Canada is a much more politically stable and reliable supplier. This is a characteristic appealing to the U.S. which is trying to reduce its dependence on the Middle East. In fact, Canada has become the U.S.'s primary supplier of oil (Lavelle 2006: par 6).

Environmental Concerns

As with the oil industry in general, major environmental concerns have been raised in response to oil sands development. Infrastructure development, including utilities, roads, bridges, housing for workers, pipelines, etc., has meant stripping the land of its natural habitat. One of the most salient environmental issues surrounding the oil sands is its enormous use of resources and its contribution to greenhouse gas emissions. Elizabeth May of the Sierra Club stated that, "Tar sands oil is to conventional oil what crack cocaine is to ordinary cocaine powder" (Holt 2006: par 5). Oil sand development requires significantly more energy than regular oil production because of the complicated processes required not only to extract the oil from the ground, but to upgrade it to the same level as other oil. "Each barrel of oil requires two to five barrels of water, carves up four tons of earth, uses enough natural gas to heat a home for one to five days, and adds to the greenhouse gases slowly cooking the planet, according to the industry's own calculations" (Struck 2006: par 5).

Canada's increasing oil sands activity poses problems for Canada at a time when it is struggling to decrease its greenhouse gas emissions. The National Energy Board estimated in 2001 that greenhouse gas emissions from oil sands would more than double from 2000 to 2015 if no further pollution controls were established (Laird 2001: par 23). Greenhouse gas emissions at Suncor have been increasing, going from 4.9 to 10 megatonnes between 1990 and 2002 (Laird 2001: par 22). Between 1994 and 1998 Nitrogen oxides at Suncor increased 54% (Laird 2001: par 22). Syncrude Canada is the largest producer of synthetic oil from oil sands worldwide (Dabrowski 2006: par 8). It operates two separate mines and its "…utilities complex already cranks out enough electricity each day to power a city of 500,000 as it works nonstop to turn the tar-soaked earth into synthetic crude" (Dabrowski 2006: par 11). In 2001 Suncor and Syncrude together ranked as the fourth largest CO2 emitters in Canada (Laird 2001: par 9). In the

end, 1000 litres of oil from oil sands burns 350 kilograms of CO2, versus the 300 from conventional light crude oil (Jones 2003: par 10).

The major benefits of developing oil sands are mostly political: less dependence on unstable foreign sources of oil which allows us to maintain our current oil dependent way of life. However, the drawbacks of oil sands development are quite serious environmentally. Should we be focusing so much attention on development that is so much more damaging to the environment than its already disastrous conventional sibling? Or should we take this as a signal to put more effort in developing alternative sources of energy and reducing consumption?

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For information on oil sands projects in Alberta, see: http://www.alberta-canada.com/statpub/albertaConstructionProjects/mpgetem.cfm