

# THE FUTURE OF THE OIL SANDS

## Introduction

### Focus

In this *News in Review* story we'll look at Canada's oil sands (sometimes termed "tar sands") industry. The oil sands of Alberta are an important part of the economy. But they are also an environmental nightmare. The oil sands have come under increased scrutiny lately because U.S. President Barack Obama has voiced his concerns about their environmental impact. In this *News in Review* story, we will examine the benefits and costs generated by the industry and what the future might hold for the oil sands.

### Did you know . . .

Alberta produces two-thirds of Canada's oil and gas. The only region in the world that has greater reserves of oil is Saudi Arabia.

Canadians have enjoyed the economic benefits of the oil boom for quite some time. Alberta, in particular, has benefited from the boom, because most of Canada's oil reserves are located in that province. Most of the oil in Alberta, however, isn't found in "pure" oil deposits. It is actually mixed with sand, and the extraction process involves heating the sand to separate it from the oil for processing.

Oil companies are expected to invest another \$100-billion in Alberta over the next decade. And \$16-billion worth of pipeline development is expected to deliver oil directly from Alberta to the many heavy-oil refineries along the U.S. Gulf Coast. The U.S. is banking on Canadian oil as the long-term replacement for dwindling or unreliable supplies from Venezuela and Mexico. Investment in the oil industry has created thousands of jobs and drawn workers to the oil fields from every Canadian province. Money has poured into government coffers—royalties for Alberta, taxes for Ottawa.

Oil sands development, however, comes at a huge environmental cost. In fact, many scientists, researchers, and even politicians believe that much of the environmental damage already caused by oil sands harvesting is likely irreversible. This damage includes the destruction of thousands of square kilometres of boreal forest, the removal of massive amounts of water from the Athabasca River, and the creation of giant "tailings ponds" that hold the toxic chemical byproducts of the extraction process.

Environmentalists and many Canadians have been aware of the negative environmental impact of the oil sands for years. But in the last few years, a series of events thrust the problems

onto the international stage and caused Canadian citizens and politicians to wonder about the future of the oil sands.

One of these events was the passage of the U.S. Energy Independence and Security Act at the end of 2007. Section 526 of the bill bans federal agencies from buying alternative fuels that produce more greenhouse gases than conventional oil. This would preclude the U.S. military and postal service—the two biggest consumers of fuel in the United States—from purchasing oil produced in Alberta.

Another event that increased public criticism of the oil sands was the death of hundreds of mallard ducks. In May 2008, a large flock of mallard ducks landed on a tailings pond that was located along their migratory flock path in northern Alberta. Five ducks were rescued, but the rest sank to their deaths in the oily lake. Negative reaction to the images of the dying birds prompted Prime Minister Harper to declare that both the federal and Alberta government would do more to ensure that the oil sands were developed in an environmentally responsible manner.

But the Prime Minister's reassurances weren't enough to quell concerns about the oil sands development. Gillian Steward, the former managing editor of the *Calgary Herald* wrote on May 11, 2008, that "The fate of the 500 ducks (it was later discovered that 1 500 ducks had actually perished) is symbolic of much deeper problems when it comes to the environmental consequences of Canada's largest industrial project."

When the global economy collapsed in November 2008, many observers questioned the continued viability of oil sands extraction. Generating oil from oil sands is relatively expensive—



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## Video Review

### Did you know . . .

North America's first commercial oil well was established in 1858 in . . . (wait for it), Petrolia, Ontario. Western oil development came much later.

Respond to the following questions as you watch the video.

1. What are oil sands?

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2. Is it more or less expensive to extract oil from oil sands than conventional methods?

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3. How has the global economic crisis affected the price of oil?

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4. How has the economic crisis affected the oil sands development in Canada?

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5. What are some of the environmental impacts of the oil sands development?

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6. How did the election of Barack Obama put pressure on the Canadian and Alberta governments to make changes to the oil sands projects?

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7. What is "carbon capturing" and how is it expected to solve the problem with greenhouse gas emissions?

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8. What are the criticisms of carbon capturing?

### Analysis

At the conclusion of the video, Merran Smith from ForestEthics, said: "The tar sands really show our addiction to oil, that we are willing to try to squeeze oil out of mud in order to keep us driving our cars. We need to move forward on the new path, and the question really is: 'Are we going to do it now or are we going to be dragged there and do it later?'"

In a small group, discuss this quote, and decide whether you think that now is the time for the world to break its dependence on oil. This would mean drastic changes to how we transport ourselves, heat our homes, and produce goods.

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## National Geographic

### Further Research

Check out the oil sands story and the photos in *National Geographic* online at <http://ngm.nationalgeographic.com/2009/03/canadian-oil-sands/kunzig-text>.

### Quote

"The blustering that passed for a political Canadian response to the article might be adequate for domestic consumption but it is unlikely to impact anyone who has just been introduced to the dark side of the oil sands through 24 pages of frankly devastating pages."  
— Chantal Hébert (*Toronto Star*, March 1, 2009)

### Further Research

Check out the report prepared by the Canadian Petroleum Producers at [www.capp.ca/aboutUs/mediaCentre/CAPPCommentary/Pages/NationalGeographic\\_March2009Issue.aspx](http://www.capp.ca/aboutUs/mediaCentre/CAPPCommentary/Pages/NationalGeographic_March2009Issue.aspx).

The March 2009 issue of *National Geographic* ran a feature on the environmental impact of the oil sands entitled "The Canadian oil boom: Scraping bottom." The feature described the negative impact of the oil sands on the environment and included 24 pages of devastating pictures. Although *National Geographic*'s is not the first story to criticize the oil sands, it is certainly the one that has reached the greatest audience—an estimated 50 million people.

The feature includes information on the amount of resources needed to produce oil from the sands, the impact on the Athabaska River and First Nations communities in the area, and the growing concern over the impact on human health. For example: "In 2006, John O'Connor, a family physician who flew in weekly to treat patients at the health clinic in Fort Chip, told a radio interviewer that he had in recent years seen five cases of cholangiocarcinoma—a cancer of the bile duct that normally strikes one in 100 000 people. Fort Chip has a population of around 1 000; statistically it was unlikely to have even one case. . . . Two of O'Connor's five cases, he says, had been confirmed by tissue biopsy; the other three patients had shown the same symptoms but had died before they could be biopsied. (Cholangiocarcinoma can be confused on CT scans with more common cancers such as liver or pancreatic cancer.) 'There is no evidence of elevated cancer rates in the community,' Howard May, a spokesperson for Alberta Health, wrote in an email last September."

### The Canadian Response to the *National Geographic* Article

The Canadian government scoffed at the depiction of the oil sands presented by

the magazine. Environment Minister Jim Prentice denied that the oil sands present Canada with a major public relations challenge. And Liberal Leader Michael Ignatieff said he "did not take his orders from a foreign publication" (*Toronto Star*, March 2, 2009).

Columnist and political affairs analyst Chantal Hébert believes that the Canadian government should not dismiss the *National Geographic* criticism too quickly. She believes that international criticism can have a significant negative impact on a country's reputation. She noted that East Coast sealers have never recovered from the damage done when bloodied seal pups became front-page news around the world. As well, when a group of Québec Cree leaders paddled down the Hudson River in New York to protest against Hydro-Québec's Great Whale project, the state of New York cancelled a contract to purchase power from Hydro-Québec. The Great Whale development was subsequently abandoned.

The Canadian government was not the only group of individuals to disagree with the *National Geographic* report. The Canadian Association of Petroleum Producers (CAPP), an association representing over 130 oil and natural gas companies, has a strong interest in defending and protecting the reputation of oil and gas companies in Canada. In response to the *National Geographic* report CAPP wrote and published "*National Geographic's* article on Canada's oil sands: An incomplete perspective" (citation in margin feature "Further Research").

CAPP's response addresses the fact that they believe the *National Geographic* piece represented an incomplete perspective on the oil sands

and their impact on the environment. In particular, “What readers do not see is that all oil sands developments are ultimately reclaimed and returned to a natural state.” The story is accompanied by photos of reclaimed mining sites and tailings ponds.

CBC broadcaster Rex Murphy was also critical of the *National Geographic* feature, calling it “high-minded hypocrisy” (Point of View, February 26, 2009). On the one hand, Murphy pointed out, if we want to live the way we do in the 21<sup>st</sup> century—with cars, houses, communications, a military, a transportation network—then we need oil. Yet on the other hand, we criticize companies who secure that oil for us. He also stressed that the oil sands development has done more for Canada

than “just” produce oil: “*National Geographic* didn’t take pictures of rural Nova Scotia or Newfoundland for this spread either: of the tiny towns and out ports that have sent their sons and daughters to Alberta during the last decade—spared them from EI and welfare—kept their families intact and their dignity in place, with an honest dollar for an honest day’s work. No foldouts, either, of some of the hospitals and schools and roads and research equipment—revenues from the oil sands enabled; nor did or could they take pictures of what Alberta prosperity has meant for this whole country during the decade before the recession, and how it has left the whole country better positioned than most, now that the recession is here.”

## Analysis

1. Photographs can create powerful emotions. Compare the photos of the oil sands in the *National Geographic* story with the photos included in the feature written by the Canadian Petroleum Producers (Web sites listed in the margin of the previous page).

a) Do you believe that sites like the oil sands development can be reclaimed to look like the photos at the CAPP site? Why or why not?

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b) Should journalists have to include photographs that show both sides of an issue they are reporting on? Explain the reasons for your answer.

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2. Do you think the critical feature in *National Geographic* will actually bring about a positive change in the way companies involved in the oil sands conduct their businesses? Explain the reasons for your answer.

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3. Carefully outline your personal view of Canada’s development of the oil sands.

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## *What Are the Oil Sands?*

### Did you know . . .

Until recently, the Alberta oil sands were often called the Alberta tar sands. A conscious effort has been made to discourage the use of that name. "Tar sands" is an inaccurate description; what is contained in the sands is an extremely heavy form of crude oil, not tar. And, of course, "oil sands" sounds much less repulsive to the average person.

### Further Research

An excellent introduction to oil sands and heavy oil—its production and use—is available from the Centre for Energy at [www.centreforenergy.com/generator2.asp?xml=/silos/ong/oil\\_sands/oilsandsAndHeavyOilOverview01XML.asp&template=1,1,1](http://www.centreforenergy.com/generator2.asp?xml=/silos/ong/oil_sands/oilsandsAndHeavyOilOverview01XML.asp&template=1,1,1).

Oil sands are deposits of bitumen, a molasses-like oil that is mixed with sand or other deposits. The oil will not flow from the bitumen deposits unless heated or diluted with lighter hydrocarbons. The oil sands deposits cover a huge portion of the northern part of Alberta. Oil sands do exist in parts of neighbouring Saskatchewan, but it is the mammoth oil sands of Alberta that are generating the current criticism and controversy.

### Areas Being Mined

The oil sands deposits are found in an area of about 140 000 square kilometres of boreal forest. Four major deposits, covering over 77 000 square kilometres, are currently being mined: Peace River, Athabasca, Wabasca, and Cold Lake.

The centre of the region—and the centre for mining operations—is the Regional Municipality of Wood Buffalo, which includes the town of Fort McMurray. Wood Buffalo is currently the fastest-growing municipality in Canada. Its population has doubled since 1999 and continues to grow at a rate of nine per cent per year.

Thanks to the oil sands, jobs are plentiful, and salaries in Fort McMurray are high. In 2004, the median family income was \$120 000. Albertans often refer to the town as "Fort McMurray." Rapid growth, however, has led to many problems.

### Giant Reserves of Oil

The amount of oil held in the Alberta oil sands is staggering, even if much of it will never be removable. About 1.7 trillion barrels of oil are contained in the sands, and about 174 billion barrels of oil are considered to be recoverable

with current technology. The only other area in the world with greater reserves is Saudi Arabia.

As new techniques for extracting oil emerge, and if extraction costs drop and prices rise, more barrels should become available. The British magazine *The Economist* (May 26, 2007) estimates that rising prices and lower costs alone could result in making an additional 141 billion barrels worth extracting. New techniques could open up even more production.

### Extracting Oil from Sand

Most extraction currently takes place by open-pit mining, where the sands are dug up and then separated into their various components. The sands are mixed with hot water and shaken; the water, sand, and bitumen (the crude oil portion) then separate. The process is both water-intensive and energy-intensive. It takes two to five barrels of water to produce one barrel of oil. And producers use 17 million cubic metres of natural gas every day—enough to heat 3.2 million Canadian homes.

Only about 10 per cent of the reserves can be extracted in open-pit mining. The remainder of the oil sands, located far below the surface in porous rock, will have to be extracted by a much more complicated process, called *in situ* (in place) extraction. The costs associated with this process are much higher.

Both methods have serious environmental consequences. *In situ* extraction causes far less surface damage than open pit mining. On the other hand, it requires a much greater expenditure of energy and produces far more greenhouse gases.

## The Producers

As of May 2007, Alberta oil sands production was up to 1.2 million barrels of oil per day—an amount that, less than 10 years ago, experts predicted would not be reached before 2020. Many now expect that Alberta oil sands production in 2020 will reach four million barrels per day—the same amount that Iran currently produces.

Today, there are 14 companies producing at least 5 000 barrels of oil per day—and many others producing smaller quantities—at 24 sites in the oil sands.

Another 30 projects have been approved or are already under construction. While there are many companies involved in extracting Alberta oil, three major companies are responsible for about two-thirds of the output. In 1967, Suncor was the first company to become a serious investor in the oil sands. Syncrude followed in 1978. Together, these companies produce about 560 000 barrels per day. International giant Shell began working in the oil sands in 2002 and now extracts 160 000 barrels per day.

## Analysis

1. What resources are used in great quantities in oil sands extraction?

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2. Briefly describe the differences between open-pit and *in situ* extraction of the oil from the oil sands.

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3. What are some of the possible results of Canada being in possession of such vast oil wealth?

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## Headlines Collage

**“Canada delusional about oil”**  
— *Toronto Star*, January 26, 2009, pA15

**“Carbon capture technology no silver bullet for tar sands; only a small portion of greenhouse gases could be sequestered”**  
— *Toronto Star*, February 27, 2009, pA21

**“Oil sands producers stuck over a barrel”**  
— *The Globe and Mail*, February 20, 2009, pB3

**“Cleaning up Alberta’s ‘dirty oil’”**  
— *Toronto Star*, February 15, 2009, pA19

**“Harper rolls dice to play oil sands ‘wild card’”**  
— *Toronto Star*, March 2, 2009, pB01

**“No stigma against the oil sands”**  
— *The Globe and Mail*, January 26, 2009, pA12

**“The Canadian oil boom: Scraping bottom”**  
— *National Geographic*, March 2009-04-04

**“National Geographic’s article on Canada’s oil sands: An incomplete perspective”**  
— Canadian Association of Petroleum Producers, CAPP Commentary, available online at [www.capp.ca/aboutUs/mediaCentre/CAPPCommentary/Pages/NationalGeographic, March2009Issue.aspx](http://www.capp.ca/aboutUs/mediaCentre/CAPPCommentary/Pages/NationalGeographic, March2009Issue.aspx)

**“Tarred by ‘dirty oil,’ some producers fight back”**  
— *The Globe and Mail*, February 19, 2009, pB3

**“Obama’s message to Canadians: Alliances matter, ‘dirty oil’ not so much”**  
— *The Globe and Mail*, February 18, 2009, pA1

### Analysis

1. Based on the headlines included here, does one newspaper or source appear to be more “pro” oil sands than the others? If so, why might that be?
2. What overall pros and cons of the industry are raised by these headlines?
3. Choose the headline that you consider to be the most accurate and explain your choice.

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## *Cap and Trade*

### Did You Know . . .

The oil sands are only a tiny part of the world's carbon problem; they account for less than one-tenth of one per cent of global carbon dioxide emissions. But to many environmentalists, the oil sands are the first step along a path that could lead to other, even dirtier sources of oil: producing it from oil shale or coal.

### Further Research

Many environmentalists and organizations, such as the World Wildlife Fund, believe that carbon capture technology is too expensive and unreliable to work effectively. Consider reading "Carbon Capture technology no silver bullet for tar sands" in the *Toronto Star*, February 27, 2009.

### The Oil Sands and Greenhouse Gas Emissions

Producing oil from oil sands creates three times more carbon dioxide than extracting oil in liquid form. Carbon dioxide is a major component of the greenhouse gases that are believed to be contributing to global climate change. This heavier carbon footprint raises criticism of oil sands extraction and is a source of international criticism.

### The Cap-and-trade Solution

In June 2008, Alberta Premier Ed Stelmach announced a plan to cap, or catch, the extra emissions. He said that his province would spend over \$1.5-billion to develop the technology for capturing carbon dioxide and storing it underground. By the year 2015, Alberta is hoping to capture five million tons of carbon dioxide from bitumen upgraders and coal-fired power plants. According to the plan, by 2020 the province's carbon emissions will level off, and by 2050, they will be 15 per cent below their 2005 levels.

Oil sands giants like Syncrude believe that much of the cost of building these carbon capture and storage (CCS) systems will be recouped when companies sell the captured carbon on the open market. New Energy Finance estimates that carbon pricing might start at USD\$10 per tonne in 2012, and climb no higher than \$15 by 2020 (*Toronto Star*, March 2, 2009).

### Criticisms of Cap and Trade

There is a great deal of concern that Canada is planning on "solving" the problems of the oil sands development through a cap-and-trade carbon scheme. First of all, no one knows if it will really

be possible, or safe, to cap and store carbon emissions underground. And even if it does work, no one knows whether enough emissions can be captured to make a difference in climate change. Tyler Hamilton, an energy reporter with the *Toronto Star*, believes that "Prime Minister Stephen Harper is delusional if he believes that capturing carbon dioxide from coal plants and oil-sands operations and storing it underground is going to have a material impact on reducing greenhouse gases over the next decade, let alone the next two decades" (March 2, 2009).

Second, financial observers believe that carbon prices alone will never be high enough to cover the costs of CCS systems. The C.D. Howe Institute, an independent think-tank, estimates that it will cost anywhere between \$50 and \$100 to capture and store one tonne of carbon dioxide. If it is true that carbon prices on the open market will climb no higher than \$15 by 2020, companies will either argue that it is simply too expensive to develop CCS systems or ask the government for big subsidies to develop the systems.

Even people within the oil industry caution the Canadian government about putting all its hopes into a cap-and-trade system. Murray Edwards, a Canadian billionaire and the owner of a number of energy companies, cautions that "To the extent that cap-and-trade can deliver carbon emissions that will benefit overall society at a reasonable price, that is one alternative, but you don't want to have just cap-and-trade. At some point you are going to run into no more obvious cheap offsets, and you are going to need technology investments, where you are going to have step change to have a



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## **Activity: The Great Debate**

### Quote

“Last year \$20-billion was spent in Canada on oil sands projects and this year, because of all these deferrals, we’ve dropped down from \$20-billion to \$10-billion.”— Greg Stringham, VP Markets and Oil Sands, Canadian Association of Petroleum Producers (*Resource World*, March 2009)

This *News in Review* story has explored many aspects of oil sands development. It is clear that the oil sands have generated huge amounts of money. It is also clear that the impact of the oil sands on the environment is significant. So where do we go from here?

### The Activity

In this activity, you will have the opportunity to participate in a debate on the future of the oil sands. Your teacher will decide which of the debate questions will be used by your class. Your teacher will also determine whether you will be in the group that argues in favour of the debate question or against it. Your teacher may also decide to create a small group of students to act as judges of the debate. You might be placed in that group.

### Debate Questions

- Be it resolved that oil sands development in Alberta should be halted immediately because the damage the development has had on the environment is catastrophic.
- Be it resolved that because of continued world demand for oil, oil sands development in Alberta should continue until alternative, greener sources of energy have been developed.

### The Procedure

With your group members, you will prepare a set of arguments to support your position. Make sure you refer to as many pieces of factual information as possible. You might locate that information by viewing the *News in Review* video again, by referring to other sections of the resource guide, or by conducting additional research.

Students who have been placed in the judges’ group should generate a list of arguments that they anticipate the two different sides may use during the debate. They should also spend some time determining how they think they should score the debate and discuss these ideas with their teacher.

Each group should begin with a short opening statement. The debate should then proceed on a point-counterpoint format. When all points have been discussed, the debate should wrap up with each side giving a short concluding statement. Judges should then confer and announce a winner.

### Further Research

Sources that support development of the oil sands:

- Alberta Government: <http://oil.sands.alberta.ca>
- Canadian Association of Petroleum Producers: [www.capp.ca](http://www.capp.ca)
- Syncrude Canada: [www.syncrude.ca](http://www.syncrude.ca)

Sources that are against further development of the oil sands:

- Tar Sands Watch: [www.tarsandswatch.org](http://www.tarsandswatch.org)
- Sierra Club of Canada: [www.sierraclub.ca](http://www.sierraclub.ca)
- David Suzuki Foundation: [www.davidsuzuki.org](http://www.davidsuzuki.org)
- Water Conserve: [www.waterconserve.org](http://www.waterconserve.org)