

U4L3A3 | Sustainable resource management: Canada vs Norway

overview

In this activity, you will examine an infographic to better understand the economic value of oil extraction in Canada. Then you will look at a resource from the Canadian government that outlines the measures the federal government takes to protect the environment. You will then read a selection of news articles outlining Canada's environmental protection strategies in action. Finally you will watch a video from the government in Norway and read an article to see how another wealthy nation is handling sustainable resource extraction.

learning goal

- To understand the Canadian government's policies on environmental protection.
- To analyse the validity of these policies using the Alberta oil sands as a case study.
- To compare Canada's perspective on oil extraction with that of Norway.

success criteria

- To investigate a variety of materials and complete assigned activities.
- To work cooperatively with group members to explore and share information.

Inquiry question

- How do Canada's sustainable resource management practices compare to that of Norway, another wealthy oil producing nation?

The following activities will help you gain an understanding of the economic benefits and the environmental issues around the oil sands in Canada.

1. Understanding why the Canadian government continues to promote the oil sands at home in Canada and abroad in the United States and Asia is important when analysing the Canadian perspective on environmental protection in this region.

- a Read the following article and infographic on the economic benefits of oil sands production in Alberta and Canada.

www.huffingtonpost.ca/2014/02/12/canadian-oilsands-economic-impact_n_4776472.html

2. Complete the following organizer to summarize the economic value of the oil sands.

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Economic Benefit	Evidence from the article and infographic
Employment	
Oil production (barrels)	
\$ contributed to GDP	
Government revenues (tax income)	

3. Investigate the following webpage from the Government of Canada's Economic Action Plan that discusses strategies for environmental protection. Answer the questions that follow:

actionplan.gc.ca/en/backgrounder/r2d-dr2/enhancing-environmental-protection

- a What claim does the government make in the first paragraph (from the Responsible Resource Development plan)?
- b In the first section of the website, 'Enhancing Enforcement and Liability,' how many times do the words 'intends,' 'plans,' 'will,' 'proposed' and other future tense verbs appear? How is this section potentially misleading to Canadians?
- c What is the National Energy Board?
- d Identify one strategy that the Canadian government is implementing to ensure oil pipeline safety.
- e How is the government protecting coastal regions in Canada against tanker spills?

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4. Read the following two articles from the news on current environmental protection regulation issues in Canada.
 - a Describe the main issue outlined in each article.
 - b Evaluate the government response in each situation, based on evidence from the articles.

www.cbc.ca/news/canada/british-columbia/taseko-new-prosperity-mine-at-fish-lake-rejected-again-1.2553002

www.theglobeandmail.com/news/british-columbia/canada-failing-to-learn-from-world-class-oil-spill-cleanups/article24017204/
5. Oil extraction from the Alberta oil sands is a highly controversial environmental issue in Canada. The environmental impact of this energy project is debated internationally and has the potential to interfere with Canadian economic growth through rejected international pipeline initiatives and potential moratoriums on continued oil extraction in the region.
 - a In groups of three, read the accompanying article from Canadian Geographic. The article has been broken into three sections due to length. Each section has the introduction and the concluding paragraphs which will allow each member of the group to have the context.
 - b Complete the organizer together using point-form notes.

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Recommended Strategy	Why is this recommended?	What is the government and/or industry doing?
Carbon capture and storage (CCS)		
Dry tailings		
Reduce water usage		
Reducing emissions		
Protecting tracts of boreal forest		

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6. Understanding how Norway, another wealthy oil-producing nation is sustainably managing their resource can provide leadership to Canada.
 - a Watch the video titled 'Sustainability: A Norwegian Perspective'
 - b Read the following article on Norway's strategies for economic growth within the context of environmental protection
www.theglobeandmail.com/report-on-business/international-business/european-business/norway-proves-oil-rich-nations-can-be-both-green-and-prosperous/article21514455
 - c Describe 3 strategies Norway is using, that Canada is not, that has allowed Norway to be one of the wealthiest, most productive countries in the world while still meeting targets for environmental protection.

Scar sands

Canadian Geographic June 2008

More than a million barrels of crude flow out of Alberta's oil-sands plants every day. Environmentally, it's a disaster zone. There's no turning off the tap, but improvements in five areas could limit the staggering scale of the ecological damage.

By Curtis Gillespie with photography by Garth Lenz

"HARD TO BELIEVE, HEY?" says Scott Kinnee, the helicopter pilot flying me over the Athabasca oil sands north of Fort McMurray, Alta. "You don't really get a sense of the scale of things unless you come up top." Up top being 500 metres above ground level, high enough to see 70 to 80 kilometres in any direction; that is, until the sky closes over as we near the dozens upon dozens of emissions towers and flare stacks of the Suncor, Syncrude and Albian Sands plants. The limpid winter sunshine we'd had at the airport hangar 30 kilometres to the south is gone, and the sun is now a dull white bulb wobbling unsteadily behind a motionless sooty haze. "Yeah," says Kinnee, nodding as I remark upon the sun's enervation. "These plants are so huge, they basically create their own weather system."

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- 1 Carbon capture and storage
- 2 Dry tailings instead of wet
- 3 Reducing the overall water usage of the plants
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- 5 Establishing large areas of boreal forest that are off limits

The beauty of the boreal forest that surrounds Fort McMurray and covers most of northern Alberta lies in its magnitude, but once you arrive at oil-sands central, what you see is a landscape erased, a terrain stretching in a radius of many hundreds of square kilometres that is not so much negatively impacted as forcibly stripped bare and excavated. Dominating this landscape are half a dozen giant extraction and refining plants with their stacks and smoke and fire, disorienting wide and deep mines, and tailings ponds held in check by some of the world's largest dams. As a panoramic vision, it's all rather heartbreaking but, if one is forced to be honest, also awe-inspiring, such is the energy and the damage produced by human ambition.

Yet despite how important, and how environmentally divisive, the oil sands have become in today's politically charged energy domain, the early and even fairly recent days of this resource were decidedly humble. In fact, although it's been a century or so since people first began trying to exploit the resource, it wasn't until the mid-1990s that the Athabasca oil sands were launched on today's bitumen mega-arc, bitumen being the thick, tarlike hydrocarbon extracted from the sands and refined into synthetic crude oil.

Predictions vary slightly, but production is expected to at least quadruple to four or five million barrels of refined oil a day by 2020. From the start of the major expansions that kicked off in 1996 to the conclusion of current planned construction in 2011, close to \$100 billion will be spent by industry on the Alberta oil sands. All of this is staggering given that in the early 1990s, not a single dollar of new investment was planned for the region and that oil was selling for less than \$20 a barrel. As this issue went to press, it was going for \$119 a barrel.

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But in the early 1990s, Eric Newell, the former CEO of Syncrude and now Chancellor of the University of Alberta, saw a different future for the oil sands. It was Newell who spearheaded the formation of the National Oil Sands Task Force in 1995, which issued a report that year calling for a new vision and scope in exploiting the sands. Newell and his task force made the case, in Edmonton, Ottawa and Washington, D.C., that it was a resource in which it was worth investing. “We pulled together a vision of what we thought was possible,” says Newell. “And that was to triple production in 25 years and invest \$21 billion to \$25 billion.” He stops and chuckles. “I’d stand up and say that, and a lot of people thought I was smoking something funny. We were a bit off! It took only eight years to triple production, and the industry spent \$30 billion. And now another \$70 billion of investment is on the books, with production projected for 10 times what it was then. None of us saw that happening, that’s for sure.”

It was a broad spectrum of unforeseeable conditions that allowed for today’s large-scale exploitation of the resource: high oil prices, dwindling conventional oil, increasing worldwide demand and rising market instability (call it the Chávez Factor, after Venezuelan President Hugo Chávez). As a result, Alberta now sits atop one of the world’s most sought after resources, though the seat is hardly comfortable. Questions of national self-determination, controversies over royalty rates and profound environmental concerns have made the oil sands one of Canada’s touchstone issues.

Former Premier Ralph Klein once told an audience that greenhouse gases were ‘dinosaur farts.’

The questions are many. Are the environmental criticisms focused enough to engender change? Is the current level of scientific and technological research deep enough to improve efficiency and ease the environmental impact of the industry? And do Alberta’s regulators have the steel, and transparency, to maintain the province’s economic advantage while remaining well placed to one day heal the ragged scar being left on the planet?

If this were a poker game of Texas Hold ‘Em, you would say that every player is all in. There is so much oil, and it’s worth so much money, and so many people want it that it would be politically impossible to shut off the taps. Yet it is so environmentally troubling — both on the ground and as a symbol of where we’re headed — that it’s becoming ever more obvious the current business model will eventually fail us all. Does a path exist to lead us away from this end-game?

“THERE ARE FIVE MAJOR THINGS that the oil-sands companies need to do if they really truly do care about the environment,” says Simon Dyer, director of the oil sands program for the Pembina Institute, a respected environmental research and education non-profit organization based in Calgary. “And the amazing thing is that all five are achievable, not all that expensive, and all use already existing technology.” Dyer rhymes them off: (1) Carbon capture and storage; (2) making a move to dry tailings instead of wet tailings;



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(3) reducing the overall water usage of the plants, particularly during winter's low flow, for the sake of the ecological health of the Athabasca River and for downstream communities; (4) clamping down on the level of acidifying emissions released through the stacks; (5) establishing large areas of boreal forest that are off limits, which even some oil companies themselves have called for in recent months.

"Don't get me wrong," says Dyer, "there are many, many more things I could list. But these five would demonstrate a huge commitment on industry's part toward the environment."

Although Dyer personally believes tailings and water usage are the highest priority, a combination of urgency, level of damage and "do-ability" makes carbon capture and storage (CCS) the most immediate step the industry could take to at least start reducing its environmental imprint. In its broad outlines, CCS is not complicated. Carbon emissions are captured at their release location, piped to a different location, then injected into the cracks and strata of deep formations for long-term "storage," often using old oil or gas wells as entry points.

Industry and environmentalists are talking about CCS, as is the federal government (in March, Environment Minister John Baird announced a plan to make CCS mandatory as of 2018), but the technology, and even the industry's willingness to experiment with it, has been available for decades. One of the largest CCS projects in the world is in Weyburn, Sask. (see "Carbon cemetery," Jan/Feb 2008). Operating since 2000, it has allowed scientists and industry to develop considerable expertise in the technology, an expertise that is taking shape despite years of governmental foot-dragging.

"Industry isn't doing any carbon capture and storage right now," says Dyer, "because nobody's forcing it to, so it's hard for industry to justify the cost to its shareholders. But the oil sands are so high in emissions and operate in such a concentrated area that it's actually the perfect place to do carbon capture."

There is increasingly little argument about the utility of CCS as a short-term solution, since there is also increasingly little argument that it's but a stop-gap to, in the longer term, deep reductions in carbon emissions. In fact, says Dyer, "it's inexcusable to approve any new project without making CCS mandatory. Becoming zero net emitters would be a huge help, and it's economically viable. If anyone ever says that it's a choice between having no greenhouse gases and shutting down the oil sands, that's a false discussion."

Even industry champions like Eric Newell believe it ought to be happening right now. "The biggest thing we've got to do today is carbon capture and storage," he says. "It's not going to be cheap, but with my peers in the industry, I have been pushing to get this thing going. We need to stop arguing about who's going to pay for it, and as a province and a country, we need to get people excited, see what's possible, create a task force. Once we get that, we'll figure out how to make it happen."

The standard industry defence on greenhouse gases in the past few years has been its "success" in reducing intensity based emissions (fewer greenhouse gases per barrel of oil produced). Many scientists, such as Murray Gray, the scientific director of the Centre for Oil Sands Innovation (COSI) at the University of Alberta, and David Keith, a climate-change expert at the University of Calgary who was named Canadian Geographic's Environmental Scientist of the Year in 2006, suggest that the oil-sands industry isn't all wrong when it claims to be unfairly maligned as the sole carbon devil roaming the land. But industry arguments have nothing to do with the inherent fraudulence of intensity-based emissions. If your company puts 100 tonnes of carbon into the atmosphere and, through efficiencies and scientific advance, reduces that number to 85 tonnes, this is a good thing. But quadrupling your production means you are now putting 340 tonnes of carbon into the atmosphere, an extra 255 tonnes, three times the 85-tonne mark for which you want reduction recognition. Intensity-based targets, which very few global jurisdictions even use anymore, are simply a platform for industry to say that what's worse is better. It defies rudimentary standards of logic.

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The Alberta government has acknowledged that CCS is on its radar but has yet to make any serious moves on the issue. In 2002, then Premier Ralph Klein explained to an audience that greenhouse gases were “dinosaur farts.” Earlier this year, current Premier Ed Stelmach suggested that to reduce greenhouse gases, Albertans would have “to stop breathing.” Despite widespread public opinion that the pace of development in the oil sands needs slowing and even in the face of sentiment among a consortium of industry players asking for the same thing (though largely for reasons of labour shortages and cost control, rather than environmental protection), the provincial government has vowed, in Stelmach’s words, to not “touch the brake.” Further, the Stelmach government’s recent plan on climate change has been roundly criticized as meaningless, in that it does not call even for a levelling off of emissions until 2020, which will ultimately result in a paltry 14 percent reduction in 2005-level emissions by 2050.

In many ways, says Dyer, the oil-sands industry (which is now largely foreign-owned) is not even necessarily to blame for being sometimes less than zealous in pursuing new and better technologies to reduce greenhouse gases, or any other area, unless it’s going to save or make money. Yes, there are ways to do better, from tailings to emissions to reclaiming the massive land disturbance caused by the mining operations, but most of this is unlikely to happen if the deciding factor remains the goodness at the heart of a multinational corporation. “They’re just doing what companies do,” he says. “It is government — federal and provincial — that needs to step up, because the necessary regulatory environment simply does not exist here.”

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SCOTT KINNEE TURNS our helicopter south. Directly beneath us is the Millennium Mine, an open pit perhaps 40 square kilometres in area, though it is hard to gauge through the miasma. Shovels are working away at a mine face, and a procession of trucks, each weighing close to 650 tonnes when full, makes its way like an ant army back and forth from the mine-face shovel to the hopper dump. I lose count at 38 trucks. A vast tailings pond appears directly beneath us. “Another sludge pond,” says Kinnee, pointing straight down. A blackish slime oozes into a stream that fingers out across the snow and ice, steaming as it goes. We drop another 50 metres, and I look across the river, perhaps a kilometre to the west, where the Suncor plant burns and smokes and steams. The sun, to the extent we can make it out, is now drooping low in the sky.

Our energy destination, if we leave the oil-sands industry alone at the wheel, is unclear at best. To fully arrest all development, to argue against prosperity, is foolish, but to pull out all the stops would be a kind of deferred suicide, which means the only pertinent question is, How can we engineer a socio-economic matrix that intersects the most efficient exploitation of the resource with the smallest environmental cost? That intersection exists, somewhere, but we’re not using the right map by which to navigate. The current approach is so badly flawed, says University of Calgary’s David Keith, “that whether you look at this from an economic perspective or an environmental perspective, we’re walking toward a cliff here.”

“So let us not talk falsely now,” sang Bob Dylan, “the hour is getting late.” Much of the talk in Alberta remains rhetoric and sophistry, despite the fact that environmentalists such as Simon Dyer can provide rather practical starting points for making the industry and the landscape cleaner. Industry, if you were to accept its spin, has more feel-good positions than the Kama Sutra, but the only position it truly cares for is the one it’s legally bound to pursue, and that’s how best to turn oil sands into money. And for the past decade at least, the Alberta government has shown, through both manifest incompetence and a not-very-well camouflaged capitulation to domestic and foreign corporate interests, that it can’t be trusted to handle a backyard sandbox, let alone a sandbox the size of Japan. “We need to tighten up in terms of regulation,” says Murray Gray. “We

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need to look at ecosystem impact and region management, and the province has not been active enough in that regard. It's been lagging, and to my mind, there's no excuse."

"Mismanagement is the word that comes to mind," says Dyer.

Even industry veterans believe the industry could use more guidance. "Make the approvals rigorous," says Eric Newell, because "industry needs to be more proactive than it is, I'll allow that. We've got some good stories to tell, but we have a long way to go."

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"The weak link is the provincial government," says Keith. "This is not a government capable of dealing with the bigger picture. I think it's paralyzed. Some of them might not even believe the science of climate change, and the ones who do are paralyzed. Almost all their legislation is utterly hollow. And there needs to be a conversation about where to slow production, instead of this government's hands-off policy, which makes no sense on any grounds. We have a kind of global responsibility, an exciting possibility, really, to think about how to manage what's happening with unconventional hydrocarbons and higher emissions, because Alberta is one of the leading places in the world where that's happening. This conversation has to happen, because, trust me, there isn't going to be a slowdown or any help for the climate because of a lack of supply. There is a huge amount of fuel out there, dirty fuel. We have 10,000 gigatonnes of carbon on this planet and we've burned only 1,000. We've got enough to turn the planet into Venus if we want to."

The hour is getting late, indeed.

My flight is nearly over. Kinnee circles once, then touches down back at the hangar at the Fort McMurray Airport. As we'd passed the confluence of the Athabasca and Clearwater rivers, the day had reverted back to its previous condition. The sun now shines in the west, as if freed of its hood, and the sky overhead is a robin's egg blue. There is no wind, no cloud, no smoke. The air tastes clean, though I know that is nothing to put my faith in. As the rotor winds down and we remove our headsets, I realize there is nothing I want more than to be home in Edmonton, away from the stacks, the emissions, the tailings, the mines. But with one foot back on the ground, it strikes me that, of course, this is home.

Curtis Gillespie is a writer based in Edmonton. Garth Lenz lives in Victoria and is a member of the International League of Conservation Photographers, the world's premier association of wildlife and nature photographers committed to conservation.

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Canadian Geographic June 2008

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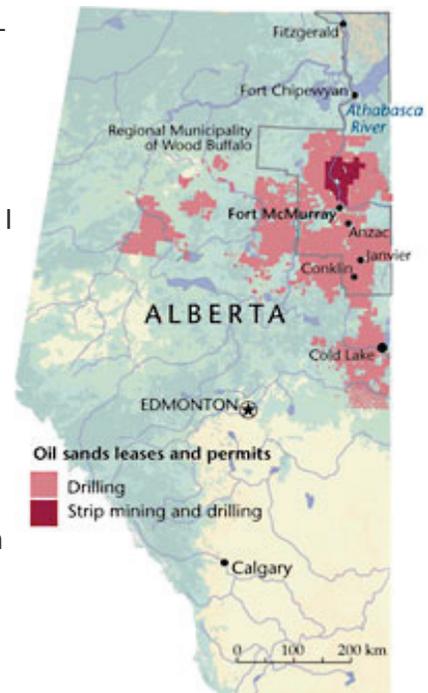
The amount of water the oil-sands plants use is equal to about 40 percent of Toronto's yearly water consumption.

"WATER IS THE ENEMY OF WHAT WE DO," says Alan Fair, the manager of research and development at Syncrude's Edmonton Research Centre. "I've spent most of my working life on tailings, and how to manage them, and there's a real understanding now that we need to take a more pro-active approach to managing tailings. If we could remove water from every single aspect of what we do, I couldn't be happier."

The overall amount of water used by the oil-sands companies is currently estimated to be just under 200 million cubic metres, including groundwater and surface runoff. That's the equivalent to about 40 percent of the yearly water consumption of the City of Toronto.

About half of the total water the oil-sands companies use is drawn directly from the Athabasca River. Given the projected rate of expansion of oil-sands production, those withdrawals will double, at minimum, and could easily quadruple. During low-flow seasons, that could amount to as much as eight percent of the river's volume — and this with the recycling efforts already under way at the plants.

The amount of water required is vast because of the scale of operations (currently, between two and five barrels of water are used to produce one barrel of oil), and because the essential technology simply hasn't deviated that much from its infancy — you still have to wash the oil out of the sand. That takes enormous amounts of water when you are an industry that scrapes an estimated 5,000 tonnes of material, both overburden and sand, off the Earth's surface every single minute of every single day. This scale leads to tailings ponds that cover nearly 50 square kilometres in area, and with a volume that will, according to the Oil Sands Tailings Research Facility, reach one billion cubic metres by 2010. Right now, the world's largest man-made dam, in terms of material volume, is the Syncrude tailings pond. Tailings, a mix of water, fine clay and toxins such as naphthenic acids, are a by-product of the process used to extract the bitumen from the sand. They are one of



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the industry's greatest headaches, because the minuscule clay particles resist settling and remain suspended in the water for decades, making the tailings ponds vast pools with the consistency of watery porridge.

The oil-sands industry is aware of the public concern about its water withdrawals and is nervous about what it's going to do with tailings. "Managing tailings is clearly something the industry has not come to grips with," says Gray at the COSI, which is partially funded by Imperial Oil. "Our view here at the centre is don't try and fix the problem after you've made it, but try to avoid the headache to begin with."

In addition to their concern about the volume of water extracted from the river, many critics of the oil-sands industry are worried about toxic seepage into the Athabasca River and its impact on downstream communities. The tailings ponds, some of which are within mere metres of the river, are not plastic-lined, and industry does not dispute that seepage occurs. But Gray says there isn't really anything present in the tailings ponds that isn't biodegradable. "Toxins are there, for sure. But the water would detoxify over time, if left alone. Now I'm not saying that a significant leakage from the tailings ponds wouldn't be catastrophic. I'm just saying that if you're talking about leakage through the groundwater, at a certain rate, it's not a problem. If Suncor's dikes burst and poured sludge into the river, it would have a major impact. It might not kill Lake Athabasca 250 kilometres downstream, but it would kill the river ecosystem. But it's not the toxins that worry me — it's the clay."

Industry's goal is to move to a system of dry tailings or no tailings at all, completely removing water from the extraction process. Gray's team is working with solvents and chemicals to "get out of the tailings box and avoid them in the first place." And a number of private companies have realized some success with compounds to release the bitumen from the sand with a surfactant to keep the components separate once they've been released. One company, Earth Energy Resources, has pioneered a process using an environmentally friendly organic agent and water emulsion as its releasing agent. The resulting by-products are bitumen, sand, water and the recovered organic agent. The water is recyclable, and there are no tailings. Other companies are developing waterless technologies in which the conditioning agent changes the magnetic charge between the hydrocarbon molecule and the inorganic material to which it clings. These new "dry" technologies have yet to be commercialized at scale for a variety of reasons, one being that the extraction facilities would need to be refitted and the other being that no one's forcing them to do it.

As for water extractions from the Athabasca River, there is divided opinion on precisely how much water the industry actually uses. No one disputes that a great deal of the water is recycled (some estimates are up to 90 percent), although increases in production will clearly mean a raw-amount increase, regardless of how much water is recycled. Alan Fair claims that Syncrude has never even come close to utilizing its allotted water ration from the Athabasca River, but one of the warranted misgivings environmentalists have is about industry's water withdrawal during the winter's low-flow season. During summer's peak flow, there is less impact on the river, but in winter, when the water dips into the "red zone," environmentalists would like to see industry refrain altogether from drawing from the river.

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“What many people think needs to happen,” says Gray, “is that they should just use the river during peak flow and fill up an abandoned mine, then use that water in the winter. It’ll even out the water consumption. The province simply needs to be much more active than it’s been in the past, ensuring water quality and that flow is sufficient for the downstream ecosystem. It’s basically just a simple engineering fix. But I still think the best solution is for the industry to use less water in the first place.”

SCOTT KINNEE TURNS our helicopter south. Directly beneath us is the Millennium Mine, an open pit perhaps 40 square kilometres in area, though it is hard to gauge through the miasma. Shovels are working away at a mine face, and a procession of trucks, each weighing close to 650 tonnes when full, makes its way like an ant army back and forth from the mine-face shovel to the hopper dump. I lose count at 38 trucks. A vast tailings pond appears directly beneath us. “Another sludge pond,” says Kinnee, pointing straight down. A blackish slime oozes into a stream that fingers out across the snow and ice, steaming as it goes. We drop another 50 metres, and I look across the river, perhaps a kilometre to the west, where the Suncor plant burns and smokes and steams. The sun, to the extent we can make it out, is now drooping low in the sky.

Our energy destination, if we leave the oil-sands industry alone at the wheel, is unclear at best. To fully arrest all development, to argue against prosperity, is foolish, but to pull out all the stops would be a kind of deferred suicide, which means the only pertinent question is, How can we engineer a socio-economic matrix that intersects the most efficient exploitation of the resource with the smallest environmental cost? That intersection exists, somewhere, but we’re not using the right map by which to navigate. The current approach is so badly flawed, says University of Calgary’s David Keith, “that whether you look at this from an economic perspective or an environmental perspective, we’re walking toward a cliff here.”

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“So let us not talk falsely now,” sang Bob Dylan, “the hour is getting late.” Much of the talk in Alberta remains rhetoric and sophistry, despite the fact that environmentalists such as Simon Dyer can provide rather practical starting points for making the industry and the landscape cleaner. Industry, if you were to accept its spin, has more feel-good positions than the Kama Sutra, but the only position it truly cares for is the one it’s legally bound to pursue, and that’s how best to turn oil sands into money. And for the past decade at least, the Alberta government has shown, through both manifest incompetence and a not-very-well camouflaged capitulation to domestic and foreign corporate interests, that it can’t be trusted to handle a backyard sandbox, let alone a sandbox the size of Japan. “We need to tighten up in terms of regulation,” says Murray Gray. “We need to look at ecosystem impact and region management, and the province has not been active enough in that regard. It’s been lagging, and to my mind, there’s no excuse.”

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“Mismanagement is the word that comes to mind,” says Dyer.

Even industry veterans believe the industry could use more guidance. “Make the approvals rigorous,” says Eric Newell, because “industry needs to be more proactive than it is, I’ll allow that. We’ve got some good stories to tell, but we have a long way to go.”

‘We’ve got enough dirty fuel out there to turn the planet into Venus if we want to.’

“The weak link is the provincial government,” says Keith. “This is not a government capable of dealing with the bigger picture. I think it’s paralyzed. Some of them might not even believe the science of climate change, and the ones who do are paralyzed. Almost all their legislation is utterly hollow. And there needs to be a conversation about where to slow production, instead of this government’s hands-off policy, which makes no sense on any grounds. We have a kind of global responsibility, an exciting possibility, really, to think about how to manage what’s happening with unconventional hydrocarbons and higher emissions, because Alberta is one of the leading places in the world where that’s happening. This conversation has to happen, because, trust me, there isn’t going to be a slowdown or any help for the climate because of a lack of supply. There is a huge amount of fuel out there, dirty fuel. We have 10,000 gigatonnes of carbon on this planet and we’ve burned only 1,000. We’ve got enough to turn the planet into Venus if we want to.”

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My flight is nearly over. Kinnee circles once, then touches down back at the hangar at the Fort McMurray Airport. As we’d passed the confluence of the Athabasca and Clearwater rivers, the day had reverted back to its previous condition. The sun now shines in the west, as if freed of its hood, and the sky overhead is a robin’s egg blue. There is no wind, no cloud, no smoke. The air tastes clean, though I know that is nothing to put my faith in. As the rotor winds down and we remove our headsets, I realize there is nothing I want more than to be home in Edmonton, away from the stacks, the emissions, the tailings, the mines. But with one foot back on the ground, it strikes me that, of course, this is home.

Curtis Gillespie is a writer based in Edmonton. Garth Lenz lives in Victoria and is a member of the International League of Conservation Photographers, the world’s premier association of wildlife and nature photographers committed to conservation.

Scar sands

Canadian Geographic June 2008

More than a million barrels of crude flow out of Alberta's oil-sands plants every day. Environmentally, it's a disaster zone. There's no turning off the tap, but improvements in five areas could limit the staggering scale of the ecological damage.

By Curtis Gillespie with photography by Garth Lenz

"HARD TO BELIEVE, HEY?" says Scott Kinnee, the helicopter pilot flying me over the Athabasca oil sands north of Fort McMurray, Alta. "You don't really get a sense of the scale of things unless you come up top." Up top being 500 metres above ground level, high enough to see 70 to 80 kilometres in any direction; that is, until the sky closes over as we near the dozens upon dozens of emissions towers and flare stacks of the Suncor, Syncrude and Albian Sands plants. The limpid winter sunshine we'd had at the airport hangar 30 kilometres to the south is gone, and the sun is now a dull white bulb wobbling unsteadily behind a motionless sooty haze. "Yeah," says Kinnee, nodding as I remark upon the sun's enervation. "These plants are so huge, they basically create their own weather system."

'There are five major things that the oil sands companies need to do if they really truly do care about the environment and the amazing thing is that all five are achievable, not all that expensive, and all use already existing technology.'

- 1 Carbon capture and storage
- 2 Dry tailings instead of wet
- 3 Reducing the overall water usage of the plants
- 4 Clamping down on the level of acidifying emissions
- 5 Establishing large areas of boreal forest that are off limits

The beauty of the boreal forest that surrounds Fort McMurray and covers most of northern Alberta lies in its magnitude, but once you arrive at oil-sands central, what you see is a landscape erased, a terrain stretching in a radius of many hundreds of square kilometres that is not so much negatively impacted as forcibly stripped bare and excavated. Dominating this landscape are half a dozen giant extraction and refining plants with their stacks and smoke and fire, disorienting wide and deep mines, and tailings ponds held in check by some of the world's largest dams. As a panoramic vision, it's all rather heartbreaking but, if one is forced to be honest, also awe-inspiring, such is the energy and the damage produced by human ambition.

Yet despite how important, and how environmentally divisive, the oil sands have become in today's politically charged energy domain, the early and even fairly recent days of this resource were decidedly humble. In fact, although it's been a century or so since people first began trying to exploit the resource, it wasn't until the mid-1990s that the Athabasca oil sands were launched on today's bitumen mega-arc, bitumen being the thick, tarlike hydrocarbon extracted from the sands and refined into synthetic crude oil.

Predictions vary slightly, but production is expected to at least quadruple to four or five million barrels of refined oil a day by 2020. From the start of the major expansions that kicked off in 1996 to the conclusion of current planned construction in 2011, close to \$100 billion will be spent by industry on the Alberta oil sands. All of this is staggering given that in the early 1990s, not a single dollar of new investment was planned for the region and that oil was selling for less than \$20 a barrel. As this issue went to press, it was going for \$119 a barrel.

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But in the early 1990s, Eric Newell, the former CEO of Syncrude and now Chancellor of the University of Alberta, saw a different future for the oil sands. It was Newell who spearheaded the formation of the National Oil Sands Task Force in 1995, which issued a report that year calling for a new vision and scope in exploiting the sands. Newell and his task force made the case, in Edmonton, Ottawa and Washington, D.C., that it was a resource in which it was worth investing. "We pulled together a vision of what we thought was possible," says Newell. "And that was to triple production in 25 years and invest \$21 billion to \$25 billion." He stops and chuckles. "I'd stand up and say that, and a lot of people thought I was smoking something funny. We were a bit off! It took only eight years to triple production, and the industry spent \$30 billion. And now another \$70 billion of investment is on the books, with production projected for 10 times what it was then. None of us saw that happening, that's for sure."

It was a broad spectrum of unforeseeable conditions that allowed for today's large-scale exploitation of the resource: high oil prices, dwindling conventional oil, increasing worldwide demand and rising market instability (call it the Chávez Factor, after Venezuelan President Hugo Chávez). As a result, Alberta now sits atop one of the world's most sought-after resources, though the seat is hardly comfortable. Questions of national self-determination, controversies over royalty rates and profound environmental concerns have made the oil sands one of Canada's touchstone issues.

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Former Premier Ralph Klein once told an audience that greenhouse gases were ‘dinosaur farts.’

The questions are many. Are the environmental criticisms focused enough to engender change? Is the current level of scientific and technological research deep enough to improve efficiency and ease the environmental impact of the industry? And do Alberta’s regulators have the steel, and transparency, to maintain the province’s economic advantage while remaining well placed to one day heal the ragged scar being left on the planet?

If this were a poker game of Texas Hold ‘Em, you would say that every player is all in. There is so much oil, and it’s worth so much money, and so many people want it that it would be politically impossible to shut off the taps. Yet it is so environmentally troubling — both on the ground and as a symbol of where we’re headed — that it’s becoming ever more obvious the current business model will eventually fail us all. Does a path exist to lead us away from this end-game?

“THERE ARE FIVE MAJOR THINGS that the oil-sands companies need to do if they really truly do care about the environment,” says Simon Dyer, director of the oil sands program for the Pembina Institute, a respected environmental research and education non-profit organization based in Calgary. “And the amazing thing is that all five are achievable, not all that expensive, and all use already existing technology.”

Dyer rhymes them off: (1) Carbon capture and storage; (2) making a move to dry tailings instead of wet tailings; (3) reducing the overall water usage of the plants, particularly during winter’s low flow, for the sake of the ecological health of the Athabasca River and for downstream communities; (4) clamping down on the level of acidifying emissions released through the stacks; (5) establishing large areas of boreal forest that are off limits, which even some oil companies themselves have called for in recent months.

“Don’t get me wrong,” says Dyer, “there are many, many more things I could list. But these five would demonstrate a huge commitment on industry’s part toward the environment.”

A simple fix, perhaps, not unlike Simon Dyer’s other top five items — reducing acid-rain-causing emissions and creating a “no-go” boreal forest zone, both of which are within reach today. In terms of acidifying emissions, the industry is not forced to use the most stringent pollution controls, such as those required in California which call for selective catalytic reduction and ultra-low-nitrogen-oxide burners to reduce emissions. “These are well-recognized and effective technologies,” says Dyer. “But NO_x emissions in the Fort McMurray region are predicted to increase significantly and could really adversely impact the environment. It would just take some leadership in emission reduction to get companies to use the best available technologies, that’s all.”

The industry scrapes 5,000 tonnes of material, both overburden and sand, off the Earth’s surface every single minute of every single day.

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As for creating a no-go zone for the boreal forest, that's even more straightforward. It's just making a sustainable-forest management decision to legally declare parts of Alberta's boreal forest free from industrial activity. Currently only eight percent of the forest in the Regional Municipality of Wood Buffalo is protected. Many industry players recognize the merit of such an idea and support it. "It's part of industry's maintaining its 'social licence,'" says Dyer.

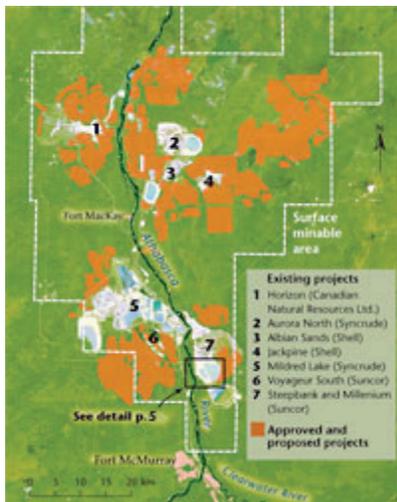
In February, the Cumulative Environmental Management Association (CEMA), which is made up of industry members and other community stakeholders and was initiated by the Alberta government, asked the province to temporarily freeze the biweekly land auctions for leases in potential conservation areas so that a detailed land management plan could be completed. The province responded in writing in March, urging CEMA to continue to develop land management recommendations and deferring the request for a moratorium on land auctions. Provincial officials later said that the request for a freeze wasn't unanimous — several company representatives who are members of CEMA are opposed to the idea of a moratorium. Meanwhile, since CEMA made its request, the Stelmach government has leased for oil-sands developments another 257,000 hectares of the boreal forest, an area half the size of metro Calgary.

"Albertans will be left scratching their heads when they read the government's response," says Dyer, "especially considering it was made by representatives of industry, First Nations, Metis and environmental organizations working together to develop a forest conservation plan."

THE ONE PIECE of legislation that explicitly marries the complex interplay of environmental damage with the expectation placed upon industry to repair that damage is the Environmental Protection Security Fund (EPSF), which is essentially a damage deposit being held by the Alberta government in case oil-sands companies fail to clean up their mess.

The oil-sands plants are clustered along both banks of the Athabasca River, which they draw upon as a major source of processing water.

"A workable method for dealing with something like the tailings ponds doesn't even exist yet," says David Thompson, a research associate at the University of Alberta-based Parkland Institute. "So the real question is, has the Alberta government set up a system to calculate and pay in advance for the full environmental liabilities which hopefully do not arise but very well might? The answer is 'No.'"



In its 2007 annual report, Alberta Environment stated that it had just under \$633 million for oil-sands security in the EPSF, all in the form of Letters of Credit. There is no cash or securities, merely the letters, which are provided to Alberta Environment by the financial institutions of the oil-sands companies. Chris Powter, an environmental assessment team leader with the department, says that the companies typically pay anywhere from one to three percent of the total amount of security as a fee to the bank.

Here is where things get curious. The amount in the EPSF is determined by the very companies the fund is insuring against. In their applications for approval to operate, the companies submit an EPSF recommendation to the regional approvals manager. The manager, whose job is secured via ministerial appointment, can decide to amend the amount, but it remains a fact that a single political appointee relies almost exclusively on information provided by the same companies he or she is potentially protecting Albertans against.

As to the question of whether \$633 million of financial instruments is adequate to cover even one adverse event, deeper context is warranted. To begin with, says Dyer, “what’s in the EPSF might, might, fix one tailings pond if it ruptured.” If the amount in the EPSF still seems abstract, here’s a comparison. The Sydney Tar Ponds, in Nova Scotia, is a 33-hectare toxic site left behind by the now defunct Sydney Steel Corporation. It is going to take \$256 million to remediate the tar ponds, or about \$7.75 million a hectare. Alberta’s \$633 million EPSF covers approximately 42,000 hectares — the area disturbed by mining — which amounts to \$15,000 per hectare.

Yet even that is worrying for reasons beyond the dollar amount. It turns out that the money covers leases only in the mined oil sands, not the plant sites.

“In our legislation,” says Powter, “there are specifics about what we can and can’t collect reclamation security for. We can’t collect for plants. That’s not part of our legislation. Nobody collects security on plant sites. That’s an artifact of the legislation. That’s one reason the EPSF isn’t higher, because it doesn’t cover plants. Another reason it’s not higher is that some companies’ earlier mines — the

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Syncrude Mildred Lake Mine and the original Suncor Mine, for example — were grandfathered in at the old rate we used to collect security at, three cents per barrel of production, and that’s the rate they’re still paying on those mines.”

What all this means is that the Alberta government has exempted the oil-sands mining companies from having to provide security for their pipelines, processing plants, tailings ponds and sulphur piles. If a company goes bankrupt, leaving behind derelict plants, pipelines, housing camps, rusting equipment and tailings ponds visible from space, the Alberta government will not have a penny set aside to clean up the mess, and the cost will fall exclusively to taxpayers. A wildly unlikely scenario, perhaps, but you don’t buy fire insurance for your house because you’re expecting to see it go up in flames.

Essentially, the Alberta government has no mechanisms in place to pursue industry for environmental problems that may arise related to oil-sands plants, tailings ponds, pipelines or the entirety of conventional and in situ oil-sands exploration, drilling, extraction or upgrading. Alberta Environment’s website does state its expectations for remediation, but these expectations are empty given that they are not backed up in legislation. “If there’s a problem, somebody is going to be left holding the environmental and financial bag at the end of the day,” says Thompson of the Parkland Institute, “and it doesn’t look like it is going to be the industry.”

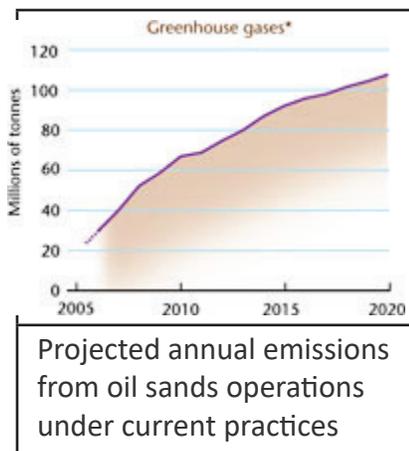
The rich irony in all this, despite regular industry claims of success in landscape reclamation, is that until March of this year, there had not been a single square metre of land certified by the Alberta Government as reclaimed. (Although Alberta Environment has frequently reimbursed companies for reclamation work done “in stages,” it claims not to know, or even track, how much it has reimbursed industry to date).

Industry executives will tell you, not without some justification, that the negligible certification rate is because the government, as Eric Newell says, “is so darned conservative, it just doesn’t want to give us a certificate.” The “conservative” defence is frequently used to rebut the environmentalists’ accusation that for all the industry’s claims of being environmentally sensitive, even the proudly un-reconstructed Alberta government won’t side with industry and recognize the reclamation work. “It’s because industry is doing a terrible job” is the refrain of the environmentalists. “It’s because the government is playing it safe,” says industry. Newell says that Syncrude is reclaiming land faster than it’s using it —and here he’s largely referring to the planting of grass and trees on overburden sites, which is where companies dump the topsoil they strip off the land. Of course, this brings the definition of reclaimed into play, since it’s defined in Alberta’s Environmental Protection and Enhancement Act as returning disturbed areas to an “equivalent land capability” that is “similar” but not “identical” to the original state, a definition equal in clarity to the rest of the act. Scientists in the field, people like Murray Gray at COSI, see both sides. It’s not going to hurt government to play it safe, if that’s what it’s doing, says Gray, but on the other hand, “one criticism I have of industry is that it has yet to successfully close out an active mine and remediate it, and it has yet to successfully close out an active tailings pond and remediate it. Until it does, it’s going to have a hard time convincing people that it

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can do it.”

Gray’s criticism, made by many others, was not muted by Syncrude’s successful application in March: a square-kilometre section known as Gateway Hill was formerly a low-lying muskeg bog but is now a hilly area rising up to 40 metres in spots and is simply an overburden dump, as opposed to a mine site or tailings area.



Regardless of the site, however, the question remains as to whether the government needs to be quicker in approving reclamation applications. Powter at Alberta Environment acknowledges that this is possible but adds, almost as an afterthought, that it wasn’t as if the glacial pace of issuing the first approval was due to an avalanche of applications. When asked earlier in the year, prior to the first approval in March, how many applications for reclamation there have been in total from all the oil-sands companies, his reply was brief. “One.” He paused, though it was hard to tell whether it was for effect. As of April, there were zero applications for reclamation on the books.

Of course, Powter continues, it is possible that Syncrude and the other companies were simply waiting to see what happened with the inaugural application so that they would have, he says, “process certainty.”

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