AMERICA'S GAS TANK

The High Cost of Canada's Oil and Gas Export Strategy

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Over the past decade, surging demand from the United States for Canadian fossil fuels has coincided with deregulation of the energy industry and increasing control of Canadian energy companies by U.S. interests. The resulting oil and gas free-for-all in Canada is causing profound environmental problems, all in the service of turning Canada into America's gas tank.

Government deregulation of the Canadian energy sector began in the mid-1980s and led a decade later to energy provisions in the North American Free Trade Agreement (NAFTA). In the name of free markets, Canada has limited its capacity to influence energy production and consumption and fostered a takeover of much of the Canadian energy industry by U.S. companies. Today, the majority of oil and gas produced in Canada is exported to the United States, and many of the key extraction and production decisions affecting Canadians and the Canadian environment are made in U.S. board rooms.

The environmental costs of this oil and gas boom are massive and, if current trends continue, will only worsen. Canada's wilderness faces an onslaught of oil and gas development that is right now destroying and degrading habitat for endangered species. Greenhouse gas emissions from Canada are escalating rapidly, largely because of the fossil fuel industry, and in particular because of oil production in Canada's tar sands. Canadian companies are also helping to increase greenhouse gas emissions outside of Canada by selling fossil fuels that are burned beyond Canada's borders. Canadian citizens, particularly those living in rural areas, face serious health threats from the environmentally hazardous air emissions of the industry. Canada has a weak or non-existant legal framework for protecting endangered species and controlling carbon emissions or air pollution. As a result, Canada currently has no legal remedies for these high environmental costs.

To reverse this damage, Canadian federal and provincial governments will have to take concerted action to shift their policies away from the current tilt to fossil fuel production and toward renewable energy production instead.

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The U.S.-Driven Oil and Gas Boom

The United States consumes more oil and gas than any other nation on the planet. Although it accounts for less than 5 percent of the world's population, it consumes about one-quarter of the world's energy.[1] More and more, the United States is turning to other countries to meet its seemingly insatiable energy demands. But many U.S. citizens would be surprised to know that Canada, and not Saudi Arabia, is the country's single largest foreign supplier of oil and gas.[2]

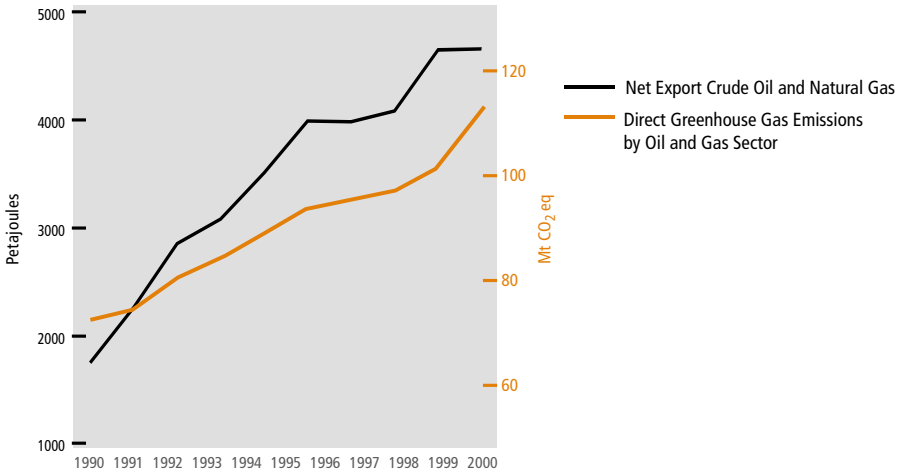
Indeed, the past decade has seen a genuine boom in oil and gas drilling in Canada. At the same time, Canada has deregulated its energy sector, with the result that American corporations have taken over many Canadian oil and gas companies.

In 2001, Canada produced 803 million barrels of oil and 6.5 trillion cubic feet of gas, making it the world's 14th largest oil producer and 3rd largest gas producer.[3] Since 1990, Canadian oil production has increased by fully 47 percent, while gas production increased by 69 percent. Most of what is drilled from Canadian soil is exported—59 percent of oil and 57 percent of gas—and nearly all of it to the United States. Indeed, Canada now supplies the fuel for 15 percent of overall U.S. gas use and 9 percent of overall U.S. oil use.[4] Canadian oil is burned in the U.S. transportation sector, while the majority of Canadian gas sent to the United States is used to make industrial chemicals, with an increasing percentage being burned by gas-fired power plants.[5, 6]

Rising Emissions

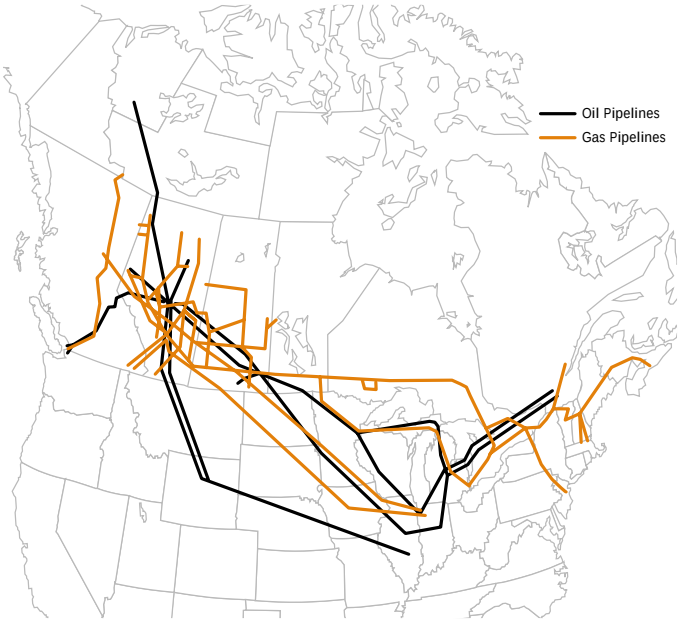
As exports of Canadian oil and gas have grown, so have greenhouse gas emissions from the sector.

SOURCE: NEB Canada



Major Crude Oil and Natural Gas Pipelines

SOURCE: Pembina Institute



PIPELINES THROUGH PRISTINE PLACES

In 2001, oil and gas companies drilled more than 18,000 wells in Canada, a combined drilling distance of 19 million meters, or about five times the diameter of the planet.[7] The rapid growth in natural gas production has made Canada the world's largest gas producer, even though it has just 1 percent of the world's gas reserves.[8]

Most of Canada's oil and gas travels through a massive North American network of pipelines. Three-quarters of Canada's oil exports travel along the 14,000-kilometer Enbridge pipeline, which delivers 1.7 million barrels of oil from Edmonton to refineries in the Chicago area.[9]

On the Pacific coast, the Trans Mountain Pipeline carries oil from Edmonton over the Canadian Rocky Mountains past the city of Sumas, Washington, and then on to Puget Sound. Also in the west, the Express Pipeline delivers oil from western Canada to Casper, Wyoming, and then on to Wood River, Illinois, just across the Mississippi River from St. Louis, Missouri.

On Canada's east coast, the 1,050-kilometer Maritimes and Northeast Pipeline runs from Nova Scotia to within 50 kilometers of Boston, Massachusetts, along the New Hampshire border. El Paso Corporation's proposed Blue Atlantic Pipeline would be a 1,200-kilometer offshore pipeline capable of transporting up to 1 billion cubic feet of natural gas per day from the Scotian Basin to points in New York and New Jersey.

To meet the ever-growing U.S. demand for gas, U.S. and Canadian companies recently invested more than $20 billion Canadian in six new north-south pipeline projects. The Alliance pipeline, one of the largest, has the ability to ship 1.3 billion cubic feet a day to the Chicago area.[10]

The U.S. Energy Information Administration expects U.S. natural gas consumption to continue growing over the next two decades, from 22 trillion cubic feet in 1999 to 34 trillion cubic feet by 2020.[11] To meet

CLIFF WALLIS / AWA

Mackenzie Pipeline Threatened by Climate Change

Climate change threatens the proposed gas pipeline through Canada's Mackenzie Valley. The Mackenzie area has already warmed by 1.7 degrees over the last century, leading to melting of the permafrost and associated soil instability. It is unclear whether the proposed 2,200-kilometer pipeline could even be built on such unstable ground. But in a tragic irony, Alberta Premier Ralph Klein said recently that gas from the pipeline is needed to fuel oil production in Alberta's tar sands, the fastest growing source of Canadian greenhouse gas emissions.[12]

the increased demand, the United States expects to increase Canadian gas imports from the current 3.5 trillion cubic feet per year to 5.8 trillion cubic feet. Most of the new imports are expected to come from existing gas fields in Alberta, with significant quantities from British Columbia and Sable Island, Nova Scotia.[13]

A consortium led by ExxonMobil has proposed a 2,200-kilometer pipeline through the Mackenzie Valley, one of the last great wild river systems in North America.

To meet this new demand, 200,000 more gas wells would have to be drilled in Alberta, British Columbia, Yukon, and the Northwest Territories within the next decade.[14] The British Columbia government proposes to double oil and gas production in its Northeast Peace River region by 2008 and to end a 30-year moratorium on offshore drilling.[15] By contrast, Florida and California are taking steps to end offshore drilling along their coastlines.[16]

The energy industry is also taking increased interest in coal-bed methane production in western Canada. Methane is the principal ingredient of gas and is found in and around coal seams. To access the methane, water from coal seams must first be pumped out. Coal-bed methane production is new to Canada, but in the United States it already accounts for 7.5 percent of gas production.[17] The U.S. experience bodes ill for Canada: In Wyoming, for example, tens of thousands of liters per day per well of salty water can be discharged onto the surrounding landscape and into local aquifers.[18]

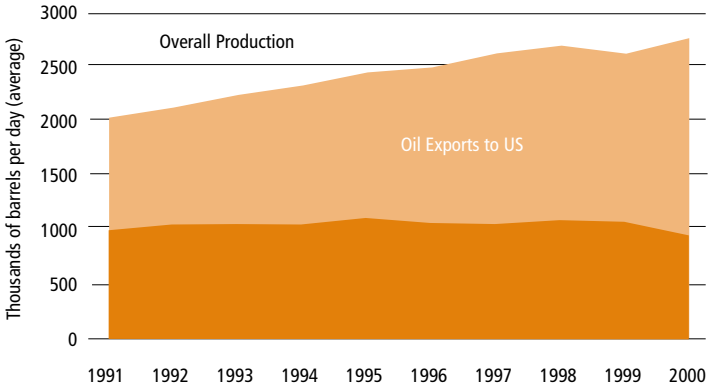
Canada's north is another target for the energy industry. A consortium led by ExxonMobil has proposed a 2,200-kilometer pipeline through the Mackenzie Valley, one of the last great wild river systems in North America. The U.S. government estimates that this northern wilderness may contain 24 trillion cubic feet of gas, enough to satisfy U.S. consumption for one year.[19] The Canadian government has streamlined its regulatory oversight of the proposed pipeline, merging the approval processes of more than a dozen agencies into a single review.[20]

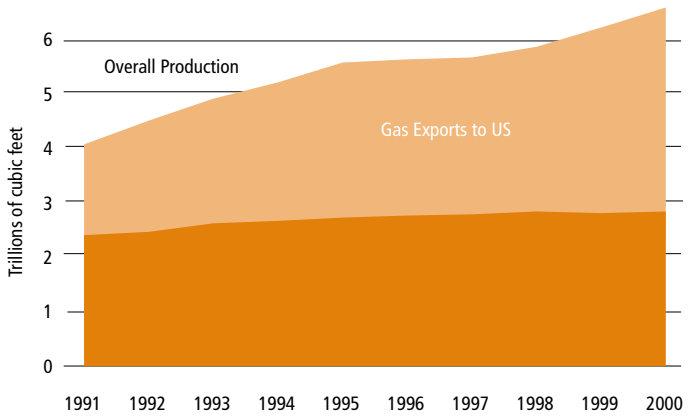
Oil and gas production in Atlantic Canada is also booming. U.S. companies plan to spend nearly $1 billion Canadian exploring for natural gas in the next five years off the coast of Nova Scotia.[21] The Canada-Nova Scotia Offshore Petroleum Board has granted 7.7 million hectares of exploration licenses since 1996,[22] including controversial licenses near the shores of Cape Breton.[23]

Rising Production, Rising Exports

Over the past decade, there has been an oil and gas boom in Canada, driven by U.S. demand.

SOURCE: U.S. Energy Information Administration





DEREGULATION AND NAFTA

Since the mid-1980s, Canada has deregulated its energy sector to facilitate the free flow of Canadian oil and gas into the United States, culminating in the energy provisions of the North American Free Trade Agreement. The agreement created a North American market for oil and gas. In return for unrestricted access to Canada's oil and gas resources, the United States gave Canada unrestricted access to its energy markets.

Under NAFTA, Canada can neither give preferential treatment to Canadian resource production, nor intervene to raise prices on energy exports to encourage conservation or protect energy supplies. NAFTA also requires that, in the event Canada wishes to reduce exports, it must nevertheless provide the United States with the same proportionate share of oil and gas it supplied over the previous 36 months.[24] Unlike Canada, Mexico did not sign NAFTA's "proportionality" clause.

The provision is particularly relevant to Canada's gas industry because new drilling in Alberta has failed to replace gas produced on an annual basis since 1982. New wells typically yield smaller daily volumes of gas and are exhausted more quickly. So, for example, gas production in Alberta, home to most of Canada's gas supplies, is expected to drop by 2 percent per year over the next five years.[25]

According to the Canadian Gas Potential Committee, a group of senior geoscientists, Canada simply does not have enough gas to meet U.S. demand. While U.S. energy

The Campaign Against Esso/ Exxon

Dozens of organizations have launched a global campaign against ExxonMobil and its subsidiaries, among them Canada's Imperial Oil, owner of Esso gas stations. The company has been targeted for leading the fight against efforts to reduce greenhouse gas emissions. Esso also makes Canada's dirtiest gas, containing smog-causing sulphur at levels many times the level allowed in California. ExxonMobil is the world's largest fossil fuel corporation, with more than $23 billion Canadian in profits in 2001. For more information see: www.stopesso.ca and www.stopexxonmobil.org

forecasters expect Canada to supply the United States with an additional 2 trillion cubic feet of gas every year of the next decade, that gas may not exist, even when currently untapped northern and offshore supplies are included.[26]

THE AMERICAN TAKEOVER

Another important factor is at work as well. The Canadian government's decision to remove barriers to the passage of Canadian fossil fuels to the United States, as well as to U.S. ownership of Canadian resources, has touched off an aggressive takeover of the Canadian oil patch by American companies. American-based energy giants, including Duke and Devon, have bought more than $28 billion Canadian worth of natural gas companies over the past few years. Conoco bought Gulf Canada for $7 billion Canadian, and Burlington bought Canadian Hunter for $3.3 billion Canadian. Afterward, a review by Ernst and Young concluded that, "There simply isn't much left to buy!"[27]

Decision-making on the future of Canadian oil and gas reserves has moved from Canada to corporate offices in Denver, Oklahoma City, and Houston.

One significant result of the Americanization of the Canadian oil patch is that decision-making on the future of Canadian oil and gas reserves has moved from Canada to corporate offices in Denver, Oklahoma City, and Houston. "Once you lose head offices, you become a branch office town," noted Dick Haskayne, chairman of TransCanada PipeLines Ltd.[28]

Canadian exports of energy from fossil fuel may also be taking the form of coal-fired electricity plants in Canada, with the power flowing to the United States. EPCOR and TransAlta have proposed new Alberta-based coal-fired plants that would create a power surplus in the province—thus permitting sale of excess energy to the United States.[29] Meanwhile, Ontario's Hydro One is proposing to build a new transmission line under Lake Erie that could provide Pennsylvania and Ohio with power from the company's coal-fired Nanticoke plant, Canada's largest source of air pollutants.[30]

Canadian Taxpayers Promote Climate Change

The Canadian government uses the public's tax dollars to promote fossil fuel production and associated climate change through subsidies, tax breaks, and low royalties. From 1977 to 1999 the Canadian federal government alone gave the oil and gas industry $40 billion Canadian in subsidies.[31] Provincial governments have provided even more.

Moreover, incentives often favor the worst kind of projects. That is the case with the tar sands production, where royalties are reduced from 25 percent to 1 percent (about $1 Canadian per barrel) until the company recovers its capital costs. In addition, companies pay no federal income tax until the tar sands project has written off its capital costs.[32]

Newfoundland's Hibernia offshore oil project will earn $1.5 billion Canadian for taxpayers during its life span—less than the amount the governments of Canada and Newfoundland invested to support the project.[33]

The Cost to Canada: Environmental Degradation

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The environmental harm from the sudden surge in drilling is felt across Canada, from Alberta's once-pristine wilderness areas and British Columbia's forests to Canada's northern, eastern, and western coastlines. The combined effects of exploration, drilling, and infrastructure construction are laying waste to Canada's natural wonders and contributing to global warming.

DRILLING AWAY THE CANADIAN WILDERNESS

Oil and gas exploitation has had a disastrous effect on Canadian wilderness areas. In their search for oil and gas deposits, companies cut paths through the forest along which they plant dynamite charges. These paths are called "seismic" lines, and thousands of kilometers of them are cut each year, typically with bulldozers. The sound waves from the exploded dynamite charges are measured to find out whether oil or gas is present underground. After exploration comes construction of roads and well sites, followed by pipelines, all causing further environmental harm. All told, oil and gas exploration destroys and degrades habitat for such rare and endangered species as grizzly bears and woodland caribou and brings further industrialization by human settlement and loggers.[34]

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RICHARD SCHNEIDER

The Boreal Forest Under Siege

The Boreal forest circles the northern part of our planet, from Alaska through Canada, Scandinavia, Russia, and back to Alaska. In its pristine parts, it is home to healthy populations of wildlife, including grizzly bears and caribou. Like the Amazon, it is also one of the world's "lungs," breathing in carbon dioxide and exhaling oxygen into the atmosphere.

But the Boreal forest is in crisis. The oil and gas industry has cut millions of kilometers of exploration lines, roads, and pipelines through the Boreal, degrading or destroying wildlife habitat. Extensive clearcutting by logging companies and flooding by hydroelectric companies is also taking its toll on the forest. In 1999 Canada's Senate reported that, "The world's boreal forest, a resource of which Canada is the major trustee, is under siege."

Threatened Canadian wilderness

Mackenzie Valley

The 1,800-kilometer Mackenzie River is one of the last great wilderness river systems in North America, situated at the northernmost portion of the Great Plains of North America and flanked by the Rocky Mountains. The valley's 11 major drainage basins are home to grizzly bears, muskox, and caribou. The river drains into Arctic waters where beluga whales and narwhal swim. A proposed 2,200-kilometer pipeline through the valley would industrialize the area.

Threatened by ExxonMobil (Esso) and others
More information **www.carc.org**

IAN MCALLISTER / RAINCOAST

Offshore British Columbia

British Columbia's largely pristine coastline provides habitat for orca whales, wild salmon, eagles, hundreds of varieties of seabirds, and thousands of varieties of fish. The area also supports a commercial and sports fishery and a healthy tourism industry, all dependent upon the clean marine environment. A moratorium on oil and gas development has protected the British Columbia coast for 30 years, but now the government is pressing to lift the moratorium. To make matters worse, the British Columbia coastline is earthquake-prone and subject to violent storms, making oil and gas development especially dangerous.

Threatened by Chevron and others
More information **www.oilfreecoast.org**

Mackenzie Valley

R.P. PHARIS

The Bighorn

The Bighorn is one of the last remaining large intact wilderness areas along the eastern slopes of the Canadian Rockies. The foothills and sub-alpine grasslands are a critically important wildlife habitat for grizzly and black bear, wolf, cougar, bighorn sheep, mountain goat, wolverine, elk, native bull and cutthroat trout, and many bird species.

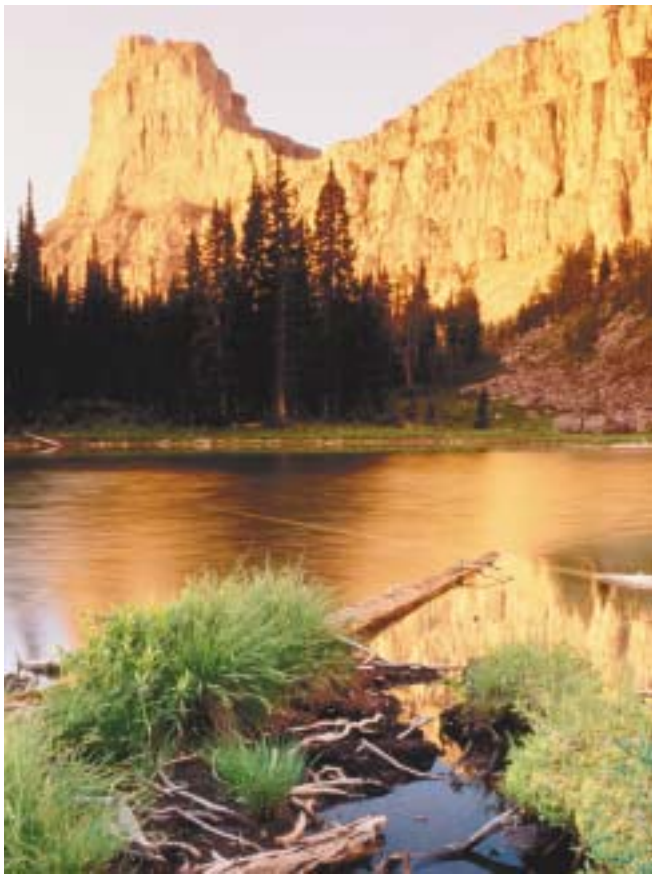
Threatened by Murphy Oil and others
More information **www.albertawilderness.ca**

Offshore Cape Breton

Famous for its abundant wildlife and for the Cabot Trail, Cape Breton may soon be marred by shoreline oil and gas drilling. Minke, grey, and pilot whales, as well as harbor seals and dolphins, swim in Cape Breton's waters, and seabirds are found in great if shrinking numbers. Cape Breton also has a large population of rare Atlantic puffins, now within the boundaries of an oil lease. Oil and gas production threatens tens of thousands of people in fisheries and hundreds more in tourism.

Threatened by Hunt Oil and others
More information **www.sierraclub.ca**

NEAL LIVINGSTON



CHARLES TRUSCOTT

The Castle Wilderness

North of the Glacier and Waterton Lakes national parks on the Canada-U.S. border, the Castle Wilderness is home to incredible species diversity. It also hosts critical movement corridors for large carnivores including grizzly bears, wolves, and cougars. The migration of these animals and the resulting genetic exchange between isolated populations are critical to the long-term survival of these species in the U.S. and Canadian Rockies. The Alberta government has awarded oil and gas leases in this area.

Threatened by Shell and others
More information **www.castlewilderness.ca**

Continued from page 7

Jeb Bush for BC Premier!

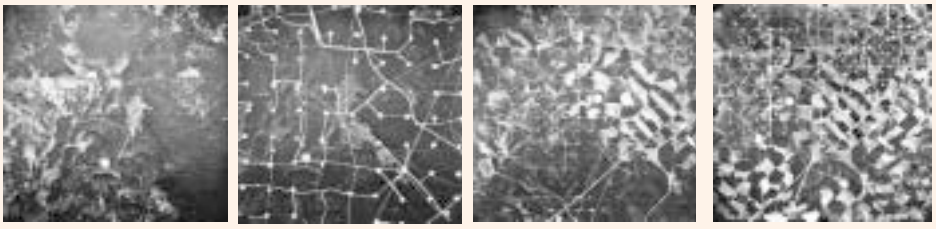
The current battle over proposals to open the British Columbia coast for the first time to offshore drilling is reminiscent of a recent conflict in Florida. A year before President George W. Bush committed to buy back oil leases off the coast of Florida, his brother, Florida Governor Jeb Bush, wrote to him: "I am confident that the new administration will recognize the need to protect sensitive natural resources located both offshore and along Florida's coastline for the benefit of the entire nation."

This environmental degradation is on a massive scale. By 1995 oil and gas companies had cut 1.8 million kilometers of seismic lines through Alberta, or four times the distance from the earth to the moon.[35] In some parts of Canada's northern forest, seismic activity now cuts as many trees as the forestry industry, leading to timber shortages.[36] Alberta alone has more than 150,000 kilometers of oil and gas roads slicing through the forest. One study found that just 50 percent of stream crossings were constructed properly.[37] All in all the industry has done harm to more than 65 percent of Alberta's landbase. Even Alberta's parks are not safe; one park has about 100 active well sites within its borders. The result of all this activity is that just 9 percent of Alberta's boreal forest can still be called wilderness.[38]

The Alberta experience is being repeated in northeast British Columbia. In the early 1990s, about 400 wells per year were drilled in the province's Peace region; today, more than 800 are drilled each year, with the provincial government calling for a doubling of activity in the area. In the late 1990s, between 8,000 and 10,000 kilometers of new seismic lines and between 1,900 and 3,200 kilometers of new roads were being pushed through the region by the oil and gas industry.[39] In busy years, the oil and gas industry has taken more trees than have British Columbia's loggers in two out of three forest districts. A 2001 audit by British Columbia government agencies found that 74 of 169 inspected stream crossings were in "major non-compliance" with regulations and that 57 percent of hazardous waste spills were not reported, as required by law.[40]

Analysts predict that another 200,000 wells could be drilled in Alberta, British Columbia, Yukon, and the Northwest Territories over the next decade—each with associated seismic lines, roads, and pipelines. Canada's terrestrial wilderness is vanishing under the oil and gas onslaught.

While Canada has a shorter history with offshore oil and gas development than other countries, experience elsewhere has amply demonstrated the profound damage to marine ecosystems. The best known example is the Exxon Valdez spill in Alaska.



1949 1964 1982 1991

These aerial photos show how an area becomes fragmented by oil and gas activity and other industry that follows. From 1949 to 1991, Alberta's Swan Hills changed from a roadless wilderness to an intensely fragmented landscape. By 1964, activities included oil and gas exploration, well sites, and roads. By 1982 and then 1991, clearcuts from logging and more roads were visible. The area is 35 kilometers north of Whitecourt, Alberta. White stars in the photographs indicate the same reference point of 54° 27'N, 11° 15' 36".

SOURCE: Alberta Environmental Protection, *Prospects for Protection: the Foothills Natural Region of Alberta* (Edmonton: Alberta Environmental Protection, 1996), pp.63-67. PHOTOS: compiled by Richard Thomas

CLIFF WALLIS / AWA

Fragmentation in Swan Hills, Alberta.

That environmental disaster prompted new research demonstrating that microscopic traces of oil have long-term devastating impacts on salmon and herring.[41] Other sea life, including cod and seabirds, are also negatively affected, even by small quantities of oil. Beyond the potential harm from leaks and spills, the search for fossil fuels at sea can do great damage. Seismic testing at sea uses batteries of high-pressure air guns, a practice that can reduce local catches of fish and disrupt activities of whales as far as 260 kilometers away.[42, 43] These effects must be fully grasped by decision-makers as Canada contemplates offshore development along its east, west, and north coasts.

Adverse effects on wilderness areas also take the form of climate change caused by the burning of fossil fuels. The World Wildlife Fund reports that seven Canadian provinces and territories have more than 50 percent of their territories at risk of losing existing habitat due to shifts in climatic zones.[44] Already, Canada's polar bears are experiencing climate change–related weight loss, the product of fewer hunting experiences on diminishing ice-flows.[45] Scientists predict that the glaciers of the Rocky Mountains could melt away within 20 to 30 years, reducing water flows into nearby ecosystems.[46]

© CORBIS DIGITAL STOCK

Polar bears are already feeling the adverse effects of climate change as ice-flows melt and hunting opportunities diminish.

SKYROCKETING GREENHOUSE GAS EMISSIONS

Canada must face up to a massive contradiction. Polls indicate that Canadian citizens genuinely want to address climate change, but their politicians continue to promote expanded fossil fuel production.[47] As a result, Canada is not only the world's second largest greenhouse gas–emitting nation per capita, but it also does more than any other nation to fuel greenhouse gas production by the United States, the world's leading emitter.

From 1990 to 2000, greenhouse gas emissions in Canada increased from 612 to 726 million metric tonnes. This almost 20 percent increase in emissions coincided with

Canada committing to *reduce* its emissions under the United Nations Framework Convention on Climate Change. The exploration, development, and transport of fossil fuels all generate greenhouse gases. Canada's tar sands project is particularly egregious and at current trends will constitute the single largest contribution to future increases in greenhouse gas production.[48] Canada now emits twice as much greenhouse gas per person as the European Union or Japan.[49]

If the fossil fuel industry is allowed to proceed with its current plans, emissions in Canada will grow to 827 million tonnes of greenhouse gases in 2010. This would be 44 percent beyond what Canada is permitted under the Kyoto Protocol, the international agreement to reduce greenhouse gas emissions, and a far cry from the 60- to 80-percent reductions that scientists say are essential to stabilizing the climate.[50]

Canada's greenhouse gas impact also extends beyond its borders: Its exported fossil fuels are burned by their importers. The carbon dioxide potential alone—not counting the greenhouse gases methane and nitrous oxides—of exported fossil fuels from Canada in 2001 amounted to 470 million tonnes.[51]

Indeed, like other nations, Canada must face up to the fact that much of its fossil fuels are best left under ground. If the world burned all of Canada's estimated fossil fuel deposits, just this one country's production would raise *global* concentrations of carbon dioxide in the atmosphere by about 20 percent beyond 1990 levels.[52]

Government Headed in Wrong Direction

All that notwithstanding, the Canadian federal government is now seeking to shield its fossil fuel industry from cutbacks, even as it pursues ratification of the Kyoto Protocol.

Syncrude's refinery in Canada's tar sands
Tar sands projects are the fastest-growing addition to Canada's greenhouse gas emissions.

Canada's Tar Sands—the World's Worst Oil

The oil industry is banking on the Alberta tar sands to supply the vast majority of Canadian oil. A thick oil called bitumen is found there, mixed in with sand, clay, and water. While Canada's conventional oil supplies are rapidly diminishing, the tar sands could hold more than 300 billion recoverable barrels of oil. As a result, Suncor and other companies have invested tens of billions of dollars in the area. The tar sands currently account for 26 percent of Canada's oil production, but by 2025 that figure could grow to 70 percent.[53]

Because of the massive amounts of energy needed to extract and refine the bitumen, however, oil from the tar sands ends up producing two-and-a-half times the greenhouse gases of conventional oil production, making it the world's most harmful type of oil for the atmosphere.[54] Tar sands projects are projected to be the single largest addition to Canada's greenhouse gas emissions, even without accounting for the carbon emissions that result from burning the end product. Tar sands mining also causes extensive land degradation and water pollution. Tar sands oil is currently delivered to a number of U.S. markets, including the Twin Cities: Minneapolis-St. Paul, Minnesota.

Indeed, Canada has already negotiated a loophole in the Kyoto Protocol—a credit for claiming its forests as a carbon "sink"—that allows Canada to avoid some emissions reductions. The government is now seeking another loophole for what it calls "cleaner energy exports," whereby it would get more credits for theoretically displacing more carbon-intensive fuels—coal, for example—in the United States with Canadian gas and hydro power.

Canada's cleaner energy exports argument fails on a number of fronts. First, the double-counting problem: If Canada receives credit for displacing fossil fuels in the United States, then the Americans should not. Neither should Canada receive credit for installing Danish-made windmills, for example, because those credits rightly belong to Denmark. Such an interpretation would throw the Kyoto framework into chaos. Further, Canada cannot argue successfully that Canadian energy is in fact displacing U.S. fossil fuels. Indeed, coal consumption in the United States is projected to *increase* by more than 20 percent by 2010.[55] Finally, it is inconsistent for Canada to seek credits for its natural gas exports without drawing penalties for the "dirty energy exports"—oil and coal—that it plans to continue.

Canada's Carbon Merchants

Greenhouse gas polluters are usually measured in terms of the amount of greenhouse gases they themselves generate by the burning of fossil fuels, but these fossil fuels are in turn supplied by corporations that profit from the trade in carbon. The following table ranks Canada's largest carbon merchants by the approximate amount of carbon dioxide their products would generate if burned, based on 2001 production within Canada.[56, 57] In the table, ExxonMobil Canada and Imperial Oil are combined into a single entity, reflecting shared ownership by ExxonMobil.

	Company	Products	Approximate CO^2 Potential of Products (million tonnes)
1	ExxonMobil / Imperial	Oil & gas	85
2	EnCana	Oil & gas	76
3	Luscar	Coal	67
4	Fording	Coal	54
5	Canadian Natural Resources	Oil & gas	44
6	Husky	Oil & gas	40
7	Devon	Oil & gas	33
8	Burlington	Oil & gas	28
9	Petro-Canada	Oil & gas	26
10	Talisman	Oil & gas	26
11	Suncor	Oil & gas	24
12	Shell	Oil & gas	21

Health Threats and Other Local Effects

HARVEY LOCKE

About 30 percent of Canada's gas is "sour," containing poisons with qualities similar to cyanide.

The environmental and health hazards of Canada's current path are local as well as global. Oil and gas production causes toxic air and water pollution. Industry commonly burns off, or "flares," gas to test a well's potential, when facilities malfunction, or to separate gas from oil deposits. Flare emissions contain more than 250 toxic compounds, including sulphur dioxide, a lung and heart irritant; benzene, a known carcinogen; nitrogen oxide, a known asthma trigger; and toluene, a reproductive toxin.[58] In addition, about 10 percent of all flares also contain radioactive particles.[59]

To make matters worse, flare pollutants can travel 300 kilometers downwind, where they can affect the health of people and livestock far removed from a drilling site.[60] Conflict is growing as oil and gas operations and people get closer together. In 1974, Alberta was home to 24,000 wells and 1.7 million people, but since then, the population has doubled and the number of wells has increased six-fold.[61]

In Alberta and parts of British Columbia and the Northwest Territories, 30 percent of gas is "sour," meaning it contains large amounts of hydrogen sulphide, a gas with qualities similar to cyanide. Hydrogen sulphide can rust fences, peel paint, and acidify water. Not surprisingly, it also has adverse health effects for humans, targeting the brain and lungs. Indeed, even in tiny concentrations, hydrogen sulphide can rob a fetus of oxygen, inducing a miscarriage. In larger concentrations, it can kill people instantly.[62]

In the last 30 years, sour gas leaks have killed more than 35 oil and gas workers in Alberta and three in British Columbia. Hundreds of other workers have been permanently crippled or have suffered brain damage caused by sour gas exposures.[63]

In addition, hundreds of people have reported health problems associated with sour gas exposure, ranging from nausea to memory loss, bleeding noses, skin rashes, headaches, insomnia, lung ailments, depression, and asthma. Sour gas may also be related to multiple sclerosis. Finnish research indicates that air pollution can exacerbate the symptoms of the disease.[64] Alberta has the highest rate of multiple sclerosis in North America, with Turner Valley, home of the continent's oldest sour gas field, having the highest rate in the world.[65]

As companies exhaust the supply of "sweet" wells, as many as 60,000 new sour gas wells could be drilled in Alberta, British Columbia, and the Northwest Territories over the next decade.[66] Regulators continue to approve sour wells even near cities—Calgary, for example—and in Alberta's provincial parks.

CLIFF WALLIS / AWA

HARVEY LOCKE

Air emissions from Canadian coal-fired electricity plants targeting the U.S. market contain large amounts of dioxins and furans, mercury and other heavy metals, hydrogen chloride, and sulphuric acid.[67] Many of these substances are toxic, carcinogenic, or both, and persist in the environment for long periods. In fact, the Ontario Medical Association warns that "air pollution is a public health crisis in Ontario," with the two largest polluters in the province being the coal-fired electricity plants at Nanticoke and Lambton.[68]

Spills from pipelines and other oil and gas facilities are routine. In 2001, Alberta alone spilled more than 35,000 barrels of oil onto the landscape.[69] The yearly number of gas pipeline leaks is on the increase as well: In Alberta leaks grew from 178 in 1992 to 296 in 2001.[70] Making matters worse, half of all federally regulated oil pipelines and a quarter of federally regulated gas pipelines are more than 30 years old, raising concerns about even higher failure rates in the future.[71]

Finally, the Canadian oil and gas industry is contributing to the depletion of Canada's fresh water supplies. As companies exhaust oil and gas reserves, they are increasingly using "enhanced recovery" methods that involve pumping water into wells to extract oil and gas, or using steam to derive bitumen from the tar sands. As much as 10 barrels of water are used to obtain a barrel of oil, with the Alberta industry now using half as much water as the city of Calgary.[72] When water is pumped deep into the ground, much of it is lost to the water cycle forever, straining local lakes and aquifers and, in turn, farming operations.

Conclusion

More than a decade ago, Canada put itself on the path to becoming America's gas tank. Since then, oil and gas deliveries to the United States have increased dramatically, American companies have largely taken over Canada's oil patch, and severe environmental harm has been done, all legally and with the encouragement of Canadian governments through a variety of subsidies and incentives.

The Canadian wilderness is vanishing under the onslaught of oil and gas development that now extends east from Newfoundland, west to British Columbia, north to the Mackenzie Delta, and south to the U.S. border. Canada's greenhouse gas emissions are growing rapidly, not shrinking as Canada's commitment under the Kyoto Protocol demands. Canadian companies are responsible for hundreds of millions of tonnes of greenhouse gases from the fossil fuels they extract and export. Moreover, Canadians are experiencing health effects related to toxic emissions caused by the extraction process. And, from a larger perspective, Canada must inevitably reverse the upward trend of its fossil fuel production because most of Canada's fossil fuels must be left securely underground in order to stabilize the concentration of heat-trapping greenhouse gases in the atmosphere at safe levels.

Canadians, then, face a series of stark choices. Will Canada continue to feed its southern neighbor's unchecked fossil fuel appetite and accept the resulting environmental destruction, or will it instead develop a vibrant renewable energy industry strong enough to earn export revenues? Will Canada permit the ongoing destruction of its wilderness areas by the oil and gas industry, or will it protect its remaining pristine places for future generations? Will Canada continue to fudge its climate change commitments, or will it take meaningful action to reduce its greenhouse gas emissions? And, will Canada continue to expose its rural population to dangerous air emissions, or will it provide protection for its public through prudent regulation of the industry?

As a matter of practicality, default answers to these and similar questions are already in place. In the absence of affirmative steps by Canadians and their governments, the energy industry will continue to ignore renewable forms of energy and instead pump record quantities of fossil fuels from under Canadian soil and coastal areas, causing extensive environmental damage and endangering Canadians' health.

The wiser choice is to move aggressively toward renewable forms of energy and, in the interim, take sensible steps to protect Canadians' health and Canada's environment. The technology for renewable energy has already been tested and proved. Three

European countries—Germany, Denmark, and Spain—have installed wind turbines that produce sufficient energy to meet the domestic needs of more than 4 million of their people, and the European Wind Energy Association aims to expand European production to serve an additional 70 million people before the decade is out.[73] Scientists can help design protected area networks that not only keep oil and gas destruction out, but also help species migrate to adapt to climate change. The Canadian government's own reports show how Canada can reduce its greenhouse gas emissions while maintaining prosperity, and Canada's energy workers are already designing ways to achieve a "just transition."[74, 75] Finally, the methods and technology already exist to protect Canada's public from dangerous air emissions, but governments must legislate their adoption.[76]

The key to such changes is political will. The people of Canada must decide whether to continue to support leaders who want Canada to remain America's gas tank or to back candidates with a more sustainable vision of the future.

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ABOUT NRDC

The Natural Resources Defense Council is a non-profit organization of scientists, lawyers and environmental specialists dedicated to protecting public health and the environment. For more than a decade, NRDC has taken an active role in protecting threatened natural resources in Canada, working in close cooperation with citizen groups and indigenous peoples. Founded in 1970, NRDC has more than 500,000 members.

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The Sierra Club has been active in Canada since 1969. The Sierra Club of Canada's national office opened in Ottawa in 1989. Its mission is to develop a diverse, well-trained grassroots network working to protect the integrity of global ecosystems. The national office works closely with its chapters in British Columbia, the Prairies, Eastern Canada, and Atlantic Canada.

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