

## New Opportunities & Challenges

### A Warming Climate in the Context of Increased Energy Demand and Rising Prices

The Arctic is one of the least disturbed regions on Earth, but it is also one of the most susceptible to both natural and human-induced climate change (Overpeck, 1997). Decreases in the extent and thickness of sea ice, thawing permafrost, and shifting distributions of Arctic species caused by climate change are apparent and real (ACIA, 2005) creating new opportunities for the exploitation of oil and natural gas. These shifting conditions coupled with increasing global energy demand and rising prices has sparked new commitments to improve transportation infrastructure, finance extraction projects, and act as an economic engine for Northern economies (World Business Briefing, 2005).

Yet, new challenges have emerged with these developments, for example, thawing permafrost makes drilling more complicated and threatens the integrity of oil and gas pipelines across the region (Overpeck, 1997). More extensive winter runoff also creates new challenges for controlling pollution as it travels across ever larger expanses (Elberling, 2007). Simply the increased human presence related to these projects profoundly impacts the Arctic. Humans accelerate climate change by emitting greenhouse gasses and destroying the stability of the permafrost through the physical actions of oil and natural gas extraction as well as maintaining the infrastructure needed to transport these resources to Southern markets.

The Arctic's natural processes are extremely delicate and interconnected. For example the more infrastructure built through the Boreal forest, the faster the this valuable carbon sink will disappear (Rayback, 2010). In this way, climate change creates new opportunities for oil and natural gas extraction, but also political, social, and economic challenges. The question is whether the Canadian government will have the capacity to handle these issues.

## Its Not Just Oil & Natural Gas!

### Canada's Other Resources

#### Minerals

Canada is one of the world's leading exporters of both raw and finished mineral products. In 2008, this accounted for over twenty percent of Canada's domestic exports (Natural Resources Canada). Extracted minerals include: uranium, nickel, zinc, gold, copper, diamonds, salt, and potash. The aerial photo to the right is Diavik diamond mine; it captures the massive scale of Arctic mining projects.



[http://www.diavik.ca/documents/Diavik\\_Fact\\_Booklet.pdf](http://www.diavik.ca/documents/Diavik_Fact_Booklet.pdf)

#### Forestry

Canada holds over ten percent of the world's forests and in 2008 became the world's largest exporter of forest products. In that same year, the forest industry accounted for two percent of Canada's Gross Domestic Product (GDP). The photo to the right portrays clear cutting which is an example of a forestry technique that has harmful environmental impacts (Natural Resources Canada).



<http://www.cst.co.nz/opinion/opinion/11037/forestry-prospects-bright>

#### Ocean Energy

The ocean's kinetic and potential energy is an interesting source of electricity which has been mostly overlooked. Ocean energy can be extracted through wave conversion, tidal barrage conversion, and ocean thermal conversion (OTEC). Wave systems are powered by the vertical and linear movement of waves; tidal barrage systems use turbines or propellers under the ocean or in rivers and streams; and OTEC systems are based on temperature gradients of twenty degrees Celsius in areas no more than one thousand meters deep (Natural Resources Canada).



<http://www.gizmag.com/wave-power-owe/111122/picture/70090/>

## New Opportunities and Challenges: Extracting Canada's Natural Resources





## Oil and Natural Gas Production

Since 1990, Canadian oil production has increased forty-seven percent and natural gas production sixty-nine percent. Over half of these resources are exported to foreign markets with the United States being Canada's most significant customer. This rise in production has significantly increased Canada's greenhouse gas emissions and contribution to global warming.

The U.S. Energy Information Administration expects U.S. natural gas consumption to continue growing over the next two decades, from twenty-two trillion cubic feet in 1999 to thirty-four trillion cubic feet by 2020 (Price, 2002). Projections also indicate "If Americans want to keep filling their gasoline tanks at a reasonable cost, they will need the oil sands industry to push ahead on its expected path of doubling, tripling and even quadrupling production in coming years." (ibid.). This is significant because if oil sand production increases, the effects of climate change will be compounded. Oil sand production emits two and a half times more greenhouse gases compared to conventional oil production (ibid.).

## Environmental Impacts and Effected Species

Canada has experienced economic benefits from extracting resources to meet southern demand, but this has also affected local communities and environments negatively. The Canadian wilderness is especially affected: "The oil and gas industry has cut millions of kilometers of exploration lines, roads, and pipelines through the Boreal Forest, destroying wildlife habitat." (BENNETT). The Common Eider, Arctic Cod, Northeastern Mainland Caribou, Peary Caribou, Shore Birds and various whale species have all been affected by its destruction (Circum-Arctic Flora).

*One of the most controversial resources to extract is the country's oil sands. Extraction requires open pit mining and its associated methods produce extreme devastation (Oil Sands).*



Alberta Tar Sands  
Alberta Tar Sand: <http://www.cnr1.com/media-center/historical-horizon-photos/2005-photo-archives/q3.html>

*In order to build the Fort McMury Oil Sand Mine, Canadian Natural had to relocate the Athabasca river which had a serious impact on local fish populations (Hessedal. 2009).*

### Effected Species

The Mackenzie Valley is one example of an area that is threatened. A proposed 2,200-kilometer pipeline through the valley would industrialize the area and interrupt the movement of the caribou. (Price).



Caribou: [http://homestudy.itea.com/wildlifeID/tws\\_caribou.jpg](http://homestudy.itea.com/wildlifeID/tws_caribou.jpg)



Harbor Seal: <http://www.montereyinfocenter.com/images/harbor-seal.jpg>

Potential shoreline oil and gas drilling in Cape Breton is threatening pilot whales, seals and dolphins that swim in its waters (Price).

The concentration of pollutants through biomagnifications in polar bears can negatively affect their immune systems, hormone regulation, growth patterns, reproduction and survival rates (Bralovich).



Polar Bear: <http://www.globalshift.org/2010/01/consider-the-polar-bear/>



Common eider: <http://commons.wikimedia.org/wiki/File:Bristol.zoo.common.eider.arp.jpg>

The most common way that oil can kill sea birds is through the break down of the birds' waterproofing on their feathers. Oil destroys the coat by clogging it, allowing cold water to soak into the down and reach skin. A spot no bigger than a quarter may be enough to kill it (Brown).

## Energy Stakeholders

### The Federal Government's Relationship with U.S. Companies

The Canadian government has been deregulating its energy sector since the mid-1980s, culminating with the North American Free Trade Agreement (NAFTA). 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" (BENNET, Price, 2002). This has provoked numerous aggressive takeovers of oil and natural gas firms by U.S. companies seeking large profits. (ibid.). The federal and provincial governments benefit from this arrangement through corporate taxes, royalties, and license fees (ibid.).

### First Nations People

Over the past thirty years, the settlement of Aboriginal land claims has given First Nations groups a stake in resource development (Bone). This has played a pivotal role in changing aboriginal attitudes towards resource extraction. Those with settled land claim agreements eagerly anticipate resource projects due to the economic growth and opportunity to diversify local economies associated with such projects (ibid.).