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Northern exposure

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As the Arctic melts, vast deposits of oil and gas may be opened up for exploration. Will an Arctic without ice only prolong our dependence on fossil fuels?

By Drake Bennett | February 18, 2007

Fifty-five million years ago, the Arctic was riotous with life. With average temperatures in the mid-70s, it had palm trees, crocodiles, and mosquitoes, as one scientist has put it, "the size of your head." For reasons that are still unknown, the planet as a whole was much warmer then, and sea levels were as much as 20 feet higher.

With the world again warming -- this time almost certainly because of human activity -- the Arctic's subtropical past may soon play a role in shaping its climatic future: All of those animals and plants and microbes dying in swampy soil, sinking beneath layers and layers of mud and eventually being cooked by the heat and pressure deep beneath the surface, millions of years later became fossil fuels.

The presence of abundant stores of oil and gas near the North Pole is hardly a secret. The United States Geological Survey estimates that a quarter of the world's remaining oil and gas reserves are in the Arctic. The problem has always been getting to them, and getting their contents out of the ground. Drilling operations in the far north have to deal with subzero temperatures, marauding ice floes, violent seas, and the logistical difficulties that come with transporting oil and gas from remote, often offshore locations. The \$10 billion cost overrun at the mammoth oil and gas project being built along the coast of Sakhalin, an island off Siberia, give some taste of what working in the Arctic entails.

But the Arctic is changing, and faster than many climatologists expected. Indeed, parts of the Arctic and Antarctic are warming faster than anywhere else on Earth. Whole swaths of the Arctic Ocean that used to be solid ice year-round are now open water in the summer, freeing up formerly inaccessible potential drilling sites and new routes for tankers. A report published in 2004 by the Arctic Council, an intergovernmental body made up of the United States, Canada, Russia, and the Scandinavian nations, predicted that reduced sea ice in the Arctic is "likely to make trans-Arctic shipping during summer feasible within several decades" and "likely to allow increased offshore extraction of oil and gas, although increasing ice movement could hinder some operations."

According to most oil and gas industry analysts, such projections are still speculative, and the melting Arctic has yet to have much impact on the strategies of the major oil and gas companies. At least in the near term, says David Victor, director of Stanford University's Program on Energy and Sustainable Development, "it's not a game-changer." Recent years have seen newfound interest in the far north -- along with the Sakhalin complex, there are two new major oil and gas projects in the frigid Barents Sea -- but that, most analysts say, has been due more to the political barriers to drilling in regions such as the Middle East, combined with improved ice-drilling technology and oil prices high enough to make such complex projects profitable.

Still, the prospect of newly available oil and gas has set off a scramble among polar nations such as the United States, Canada, Russia, and Norway to lay claim to land under the Arctic Ocean, and the shipping lanes through it. The extent to which those resources can be tapped remains to be seen, but if warming at the North Pole does lead to the opening of new oil and gas deposits for exploitation, it would make for an odd irony. As the Arctic ice melts, increasing the supply of the very fossil fuels believed to be causing climate change in the first place, it may create a feedback loop that only hastens the planet's warming.

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There is today no consensus among geologists and oil economists over how close we are to exhausting the world's supply of recoverable oil. But there is little dispute that a combination of factors -- among them

political instability in the Middle East and in oil-rich African nations, unfriendliness to foreign investment in countries such as Venezuela and Iran, and high demand from China and India -- are keeping supply stubbornly tight and prices high.

The resulting sense of oil scarcity and insecurity has strengthened the hand of environmentalists and those climatologists most vocal about the dangers of climate change. High oil and gas prices mean that alternative forms of energy such as wind, solar, and biomass, which don't emit greenhouse gases, become more economically competitive, and make the political case for transition more compelling. And while such measures don't come close to covering the 70 to 80 percent reductions in global carbon emissions that some climatologists say are necessary to prevent further warming, they're the sort of incremental steps that environmentalists hope are the first steps toward a less carbon-dependent future.

To environmentalists, then, the prospect that the Arctic -- thus far the place where climate change has been most dramatic -- might yield significant oil deposits, thereby loosening the market, bringing down oil prices, and forestalling further movement toward alternative fuels, is particularly galling.

Daniel Lashof, a climate change analyst at the environmental advocacy group the Natural Resources Defense Council, says the danger is twofold. Arctic oil and gas exploration "is a real threat to the circumpolar ecosystems." There's the risk of spills, and the fragmentation of bird, fish, and whale habitats that comes with the industrialization of what was formerly wilderness.

But there's also, as he puts it, "the great irony that global warming could, by causing the Arctic to be ice-free during the summer, increase access to the very fossil fuels that are driving global warming."

The leaders of the so-called Arctic nations, though, are less interested in this irony than in the possibility that a warming pole might translate into a measure of energy security and resource wealth.

Recent years have seen a scramble to claim parts of the Arctic in the hopes of locking up what may be buried beneath. Norway and Russia are still struggling to resolve a decades-old dispute over ownership of a 60,000-square-mile patch of the Barents Sea. Canada and the United States are squabbling over whether Canada owns the Northwest Passage, a sea lane across the top of North America that, before the polar ice began to recede, existed only in the dreams of 17th and 18th century explorers. (Canada claims its primary concern is the potential environmental impact of tanker traffic through the passage.)

And Denmark and Russia are arguing over whether the Lomonosov Ridge, an 1,100-mile-long underwater mountain range, is part of Siberia or part of Greenland -- international law allows a country to claim underwater territory beyond the normal 200-mile limit if it can be shown to be an extension of its landmass.

It's still too early to tell how all this political jockeying will pay off for the countries involved. For one thing, a warming Arctic will not affect all aspects of oil and gas exploration in the same way. Some Arctic oil and gas deposits, including some in Alaska's Prudhoe Bay and the hotly disputed Arctic National Wildlife Refuge, are onshore, and any work there will be hurt more than helped by warming temperatures. Permafrost, the permanently frozen subsoil characteristic of the Arctic, actually makes for an ideal surface for the sort of heavy trucks and machinery crucial to oil and gas projects. Already, warming on the north slope of Alaska has halved the number of days work can be done there. "The industry finds that it's easier to work on ice than in mud," says Michael Lynch, head of the Winchester-based energy consulting firm Strategic Energy & Economic Research.

Offshore, however, the thinning and disappearance of the formerly permanent pack ice could open up new opportunities for exploratory drilling. "The exploration, mapping, and doing geophysical surveys is extremely awkward in the ice," says Orson Smith, a professor of Arctic Engineering at the University of Alaska, Anchorage. "It's just a matter of wear and tear on ships, having to use icebreakers versus open-water travel, the stress from ice on exploratory drilling platforms."

"It creates a certain amount of expense and risk," Smith says. With the warming of recent years, though, he adds "it's gotten much easier. All of the energy companies could really take a renewed interest as we see the open water increasing in the Arctic Ocean."

Less ice in the Arctic Ocean could also mean shorter shipping routes. In the summer of 2001, a Russian

research ship was the first vessel to reach the North Pole without the aid of an icebreaker. An Arctic Ocean ice-free for part of the year would mean that tankers carrying oil and gas from Europe's Barents Sea, say, could conceivably have a direct shot at the west coast of North America. If it were ice-free, the Northern Sea Route over Russia would be nearly 40 percent shorter than the current Asia-to-Europe shipping route through the Suez Canal, opening up new markets for remote northern oil and gas projects.

Once found, though, the difficulty of getting the oil and gas out of the ground and to market -- in what are still quite inhospitable conditions -- remains considerable. Richard Nehring, head of the oil and gas consultancy NRG Associates, believes there's no question about the potential of the Arctic, but to be economically feasible to drill, "it has to be high quality oil in good reservoirs." The USGS's assessment of the Arctic's considerable reserves, he goes on, "tells us nothing about those sorts of issues."

Nonetheless, Amy Myers Jaffe, an energy expert at Rice University's Baker Institute, points out that Arctic oil and gas deposit finds don't have to rival those of the Middle East to bring down global prices -- and make certain non-carbon-emitting fuels less competitive. Jaffe points to how the development in the 1980s of oil projects in Alaska and the North Sea, neither of them anywhere near the size of Saudi Arabia's reserves, helped ensure low gas prices for years.

And history has shown that scarcity is a powerful spur in the oil industry. Despite the technological hurdles to be cleared and the political disputes to be untangled, if current trends continue, we may come to see the warming Arctic as an energy opportunity sooner rather than later. High oil prices, whatever the reason for them, says Nehring, "always seems to create a certain amount of ingenuity on the part of engineers."

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