Arctic Climate and Energy

Robert Gardner

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Melting ice and technological advances are opening up the Arctic.

The Arctic is the region of the world most dramatically transformed by the effects of a warming climate, caused by the burning of fossil fuels for energy.

The region’s rapid warming (more than twice as fast as the rest of the world) poses long term regional and global environmental challenges.

As the Arctic Ocean’s sea ice thaws, bordering nations are preparing to tap vast energy resources held beneath the Arctic Ocean: about 22% the world’s undiscovered fossil fuels. Drilling in the American Arctic is scheduled to begin this summer, but there are still many technical and political challenges to drilling below the Arctic seabed.

As the U.S. pursues its interests in the Arctic, policymakers should weigh the economic benefits of energy excavation against the environmental impact of potential oil spills and further oil consumption.

**Arctic Climate Change**

- Climate change is drastically transforming the Arctic environment.
- Heat trapping atmospheric gasses, mainly CO$_2$ created from the burning of fossil fuels, are causing a rapid rise in temperatures in the region.
- Since 1951, Greenland has warmed 1.5°C, roughly twice as much as the global average of 0.7°C.$^1$
- In 2007 Arctic sea ice extent fell to record lows, far below projected rates. Ice has not come back to previous trends.$^2$
- From 2000 to 2011 there was a 62% loss in the summer minimum volume of Arctic Sea ice.$^3$
- Arctic water, darker than ice, is absorbing more heat from the summer sunlight, a ‘feedback’ effect that is accelerating warming and ice melting.
- If the Arctic ice loss continues at the pace of the past three decades the Arctic could be seasonally ice free by 2025.$^4$

Robert Gardner is a Adjunct Junior Fellow at the American Security Project
The Effects of Climate Change

• The effects of climate change in the Arctic have global implications.

• The melting of Arctic ice on land, most of which is in Greenland, will contribute to global sea-level rise.5

• If temperatures continue to increase in the Arctic, scientists predict permafrost thawing could release 1.7 trillion tons of carbon (two and a half times as much carbon as is currently in the entire atmosphere) into the atmosphere causing a “positive feedback loop” that will accelerate the rise of global temperatures.6

• The Arctic ecosystem and its species are threatened from climate change, with a large number of Arctic species on the endangered species list. 7

• Recent evidence shows that the osculating Polar Vortex winds that normally trap cold Arctic air are being disrupted by Arctic warming, causing cold air and extreme winter weather patterns to shift southward into North America, Europe and Asia.8
Arctic Map of Permafrost and Ground Ice

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**Navigation**

- The melting of Arctic ice is leading countries to the open Arctic sea lanes, including Canada's Northwest passage and Russia's Northern Sea Route, to travel.  

- Once it is navigable, the Northern Sea Route over Russia will reduce travel from Shanghai to Hamburg by 4,000 miles, and travel from Shanghai to New York by 4,300 miles.

**Energy Resources**

- Due to thinning ice and advancements in technology, deep seabed drilling for oil and natural gas in the Arctic is now a technical possibility.

- The U.S. Geological Survey (USGS) estimates that the Arctic holds 22% of the world’s undiscovered energy resources.

- Arctic resources includes 13% of the world’s undiscovered oil (90 billion barrels of oil) and 30% of its undiscovered gas (50 trillion cubic meters of natural gas and 44 billion barrels of natural gas liquids).

- 84% of these Arctic resources are expected to occur off shore.

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Source: National Snow and Ice Data Center 2001

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U.S. Arctic Resources

- Of the undiscovered resources, America’s Arctic, encompassing northern Alaska and the adjacent continental shelf, is estimated to hold **29.96 billion barrels of oil and 72 billion barrels of natural gas** (about 33% of oil and 18% of technically recoverable gas in the Arctic) - not including unconventional oil and gas deposits.\(^{15}\)

- There are an estimated **2 billion barrels** of oil and **80 trillion cubic feet** of gas in source rock reserves in the Alaskan North Slope (Alaskan Arctic).

Arctic National Wildlife Refuge (ANWR)

- Drilling onshore in ANWR has been a political controversy since 1977 due to the potential harm to wildlife and sensitive ecosystems.

- Bills permitting exploration in ANWR have been blocked in Congress.\(^{16}\)

- The production potential in ANWR is unknown. USGS estimates that between **5.7 and 16 billion barrels of recoverable oil exist in ANWR** based on neighboring geological formations, but closer analysis has been prohibited.\(^{17}\)

- The 2012 House-Passed energy bill includes allowing exploration in ANWR but is unlikely to receive a vote in the Senate.\(^{18}\)

Offshore Issues

- The U.S. has limited international legal jurisdiction over exploration in the Arctic because it is not party to the [United Nations Convention on the Law of the Seas](http://www.un.org/en/unclos/) (UNCLOS).\(^{19}\)

- To date 162 nations are party to the UNCLOS, making it the accepted international authority on Arctic management and maritime law.\(^{20}\)

- Under UNCLOS, no country may claim legal ownership of the Arctic Ocean, but countries can claim exploration rights.\(^{21}\)

- UNCLOS establishes that the five nations bordering the Arctic: Russia, the United States, Canada, Norway and Denmark (via Greenland), are granted [Exclusive Economic Zone’s](http://www.un.org/en/unclos/) (EEZ) of 200 nautical miles off their coasts.\(^{22}\)

- EEZ’s gives the coastal states the right to exploit, develop, manage and conserve all resources within the zone.\(^{23}\)
Potential U.S. Claims: Deep Seabed- 200 Plus miles off shore

- Without being a party to UNCLOS the U.S. cannot secure international legal titles to sites more than 200 miles off the coast.

- Further U.S. rights could be extended into the Arctic if the U.S. were to submit claims to the seabed extending off of its continental shelf as a member of UNCLOS. 24

- The U.S. has not ratified UNCLOS and, therefore, cannot file an official claim to its extended continental shelf. 25

- The U.S. currently has overlapping territorial claims with Canada in the Arctic.

- If ratified, the U.S. could gain recognized international rights to 600 miles of extended continental self off the north shore of Alaska and could influence international Arctic management policy. 26

Arctic Claims

Source: Central Intelligence Agency 2011 27

- The Commission on the Limits of the Continental Shelf, the convention’s body that considers territorial rights, is currently considering states exploration jurisdiction. 28

- As ASP Fellow Andrew Holland noted in “Race for Arctic Energy Resources Shows Need for U.S. to Ratify Law of the Sea Treaty” and Robert Gardner noted in “U.S. Must Ratify Law of Sea Convention”, the ratification UNCLOS is a needed policy prescription for US energy development in the Arctic.
Future Exploration

Off Shore

- There have been a total of 30 exploratory wells in the Beaufort Sea and 5 exploratory wells in the Chukchi Sea, mostly drilled in the mid 1980s and early 1990s.

- There has been no drilling activity offshore of Alaska since 2002-2003. There has never been substantial commercial production from American offshore Arctic.

- Applications for further exploratory drilling permits are being filed in the Chukchi and the Beaufort Seas by both Shell and ConocoPhilips.

- As of July 25th, Shell has been unable to meet emission standards needed for an air-quality permit issued by the Environmental Protection Agency and is still building an oil spill containment barge needed for drilling exploratory wells.

- While Shell’s well blowout containment capabilities have been tested and approved in a “real-life scenario” in the Gulf of Mexico, no test has been competed in the Arctic.

- Shell believes just two out of 10 wells planned for the Beaufort and Chukchi seas are likely to be completed this year.

North Slope Shale Reserves

- South of Prudhoe Bay the oil company Great Bear Petroleum is drilling test wells to see if Alaska’s shale formations can be tapped economically.

- Great Bear has secured approximately 500,000 acres of land and has set up 6 exploratory wells this summer. If tests go well they expect to drill about 200 “fracking wells” next year.

Infrastructure

- The Alaskan North Slope is lacking in infrastructure, deep water ports, airstrips, and housing, for large scale production, yet the region has the advantage of the Trans Alaskan Pipeline System (TAPS) to transport oil to an ice-free port.

- TAPS has experienced declining volumes for over twenty years. Now, it is approaching the point where the pipeline could experience considerable transportation problems due to low volumes.

- Without new production coming online, TAPS transportation problems could threaten the shutdown of North Slope oil production in a few decades.

- The pipeline is currently the only method of transportation from the Alaskan North Slope oil fields. It carries 11% of US domestic oil production.
Oil and Gas Basins

Source: The National Ocean and Atmospheric Administration (NOAA)

Environmental Response Management Application - A GIS tool that assists both emergency responders and environmental resource managers.38

Technical and Logistical Complications

- The remote locations of drilling sites, the hazardous climate and the technical difficulties associated with deep sea drilling all pose risks for oil spills.39

- The seas off the north shore of Alaska are dominated by lingering sea ice, extreme storms, reduced visibility and sub-zero temperatures in the winter.

- Despite measures taken by Shell, the Government Accountability Office noted in a report in February 2012 that the region does not have the infrastructure needed to contain an oil spill.40

- The ability of operators to have the containment capabilities of a subsea deep water spill in the Arctic is unproven.41
Key Take Always

- The negative environmental and economic impacts of climate change in the Arctic, due to the burning of fossil fuels, needs to be seriously weighed against the economic benefits of further oil production.
- U.S. ratification of the UNCLOS would overcome legal barriers to Arctic exploration and would allow for full U.S. participation in Arctic management.
- Arctic drilling has large economic impacts on the nation and especially Alaska.
- Large logistical and technical hurdles must be overcome to ensure safe drilling practices in the Arctic.

Robert Gardner is a Adjunct Junior Fellow at the American Security Project
Endnotes


11. Ibid.


13. Ibid.

14. Ibid.


17. Ibid.

18. Ibid.


20. Ibid.

21. Ibid.

22. Ibid.

23. Ibid.
24 Ibid.
24 Ahnode, Arctic Claims. Available at http://commons.wikimedia.org/wiki/File:Arctic-claims.png

25 To read all of Secretary Clinton’s Testimony before the Senate Foreign Relations Committee, see http://www.foreign.senate.gov/imo/media/doc/REVISED_Secretary_Clinton_Testimony.pdf (accessed June 1, 2012).

26 Ibid.

28 Ibid.

30 Ibid.


34 Great Bear Petroleum LLC, “Our Activities,” Available at http://www.greatbearpetro.com/core-areas.html

36 Ibid.

38 NOAA, Environmental Response Management Application, Available at https://www.erma.unh.edu/arctic/erma.html#x=-154.52551&y=70.61457&z=6&layers=12912+12742+13185+12923+13333+12920+13330+12913.


40 Ibid.
41 Ibid.
Building a New American Arsenal

The American Security Project (ASP) is a nonpartisan initiative to educate the American public about the changing nature of national security in the 21st century.

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