

Arctic Climate and Energy

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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.

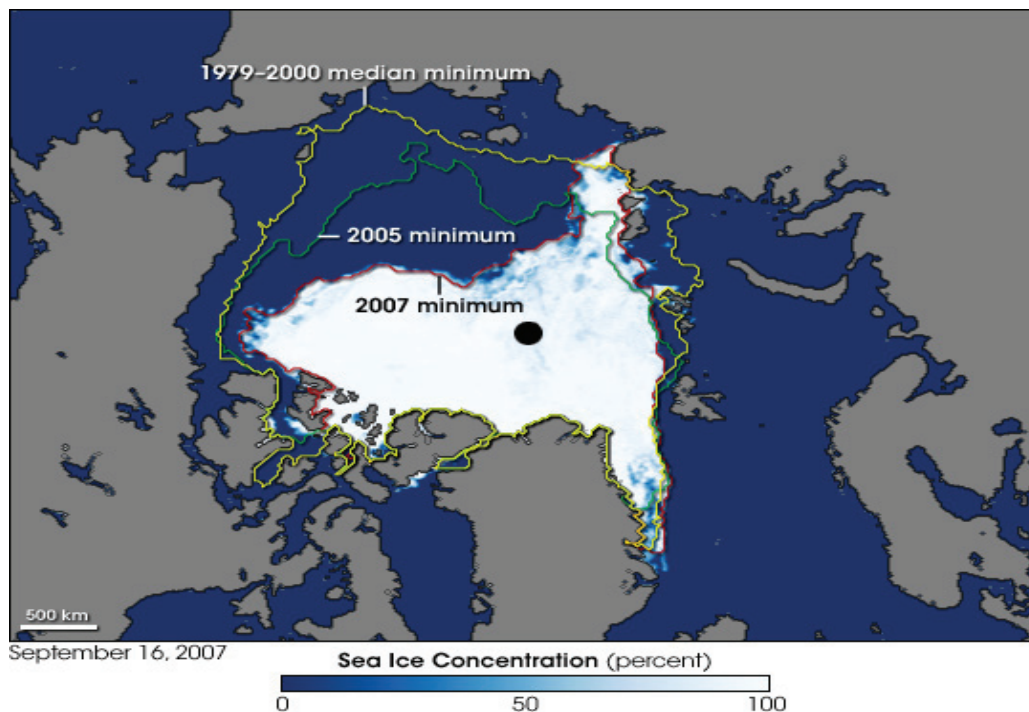
As the U.S. pursues its interests in the Arctic, policymakers should weigh the economic benefits of energy excavation against the environmental impact of potential oil spills and further oil consumption.

Arctic Climate Change

- Climate change is drastically transforming the Arctic environment.
- Heat trapping atmospheric gasses, mainly CO₂ 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](#).

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Arctic Sea Ice Concentration



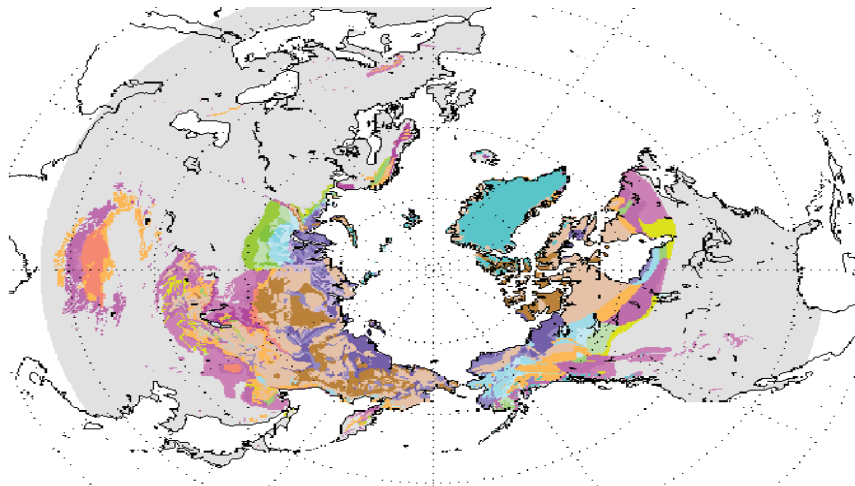
Source: *National Aeronautics and Space Administration* (NASA)


image created by Jesse Allen September 2007⁴

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 oscillating 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



Permafrost Extent (percent of area)	Ground Ice Content (visible ice in the upper 10-20 m of the ground; percent by volume)				
	Lowlands, highlands, and intra- and intermontane depressions characterized by thick overburden cover (>5-10m)			Mountains, highlands, ridges, and plateaus characterized by thin overburden cover (<5-10 m) and exposed bedrock	
	High (> 20%)	Medium (10-20%)	Low (0-10%)	High to medium (>10%)	Low (0-10%)
Continuous (90-100%)					
Discontinuous (50-90%)					
Sporadic (10-50%)					
Isolated Patches (0-10%)					
Ice caps and glaciers					

Source: [National Snow and Ice Data Center 2001](#) ⁹

Navigation

- The melting of Arctic ice is leading countries to the open Arctic sea lanes, [including Canada's North-West passage and Russia's Northern Sea Route](#), to travel. ¹⁰
- 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. ¹¹

Energy Resources

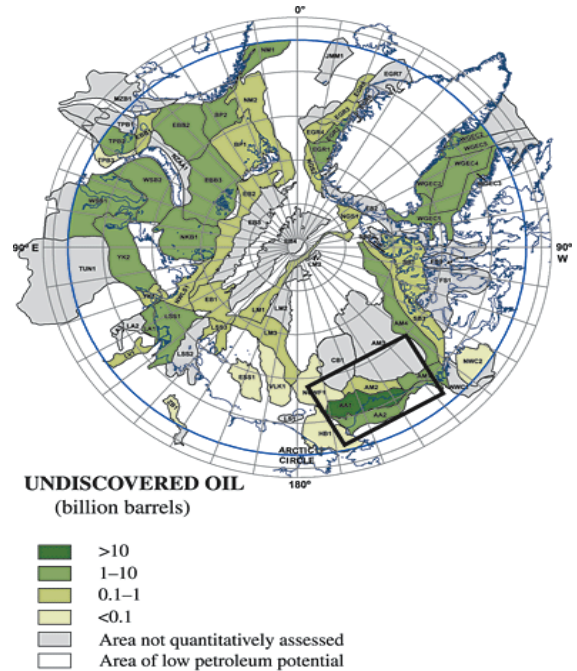
- Due to thinning ice and advancements in technology, deep seabed drilling for oil and natural gas in the Arctic is now a technical possibility.
- The U.S. Geological Survey (USGS) [estimates](#) that the Arctic holds 22% of the world's undiscovered energy resources. ¹²
- Arctic resources includes 13% [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](#). ¹³

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



Source: [USGS](#) March 2010

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](#) (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](#) (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* 2011²⁷

- 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.²⁹
- [Applications](#) for further exploratory drilling permits are being filed in the Chukchi and the Beaufort Seas by both Shell and ConocoPhillips.³⁰
- 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.³¹
- 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 completed in the Arctic.³²
- Shell believes just [two out of 10 wells](#) planned for the Beaufort and Chukchi seas are likely to be completed this year.³³

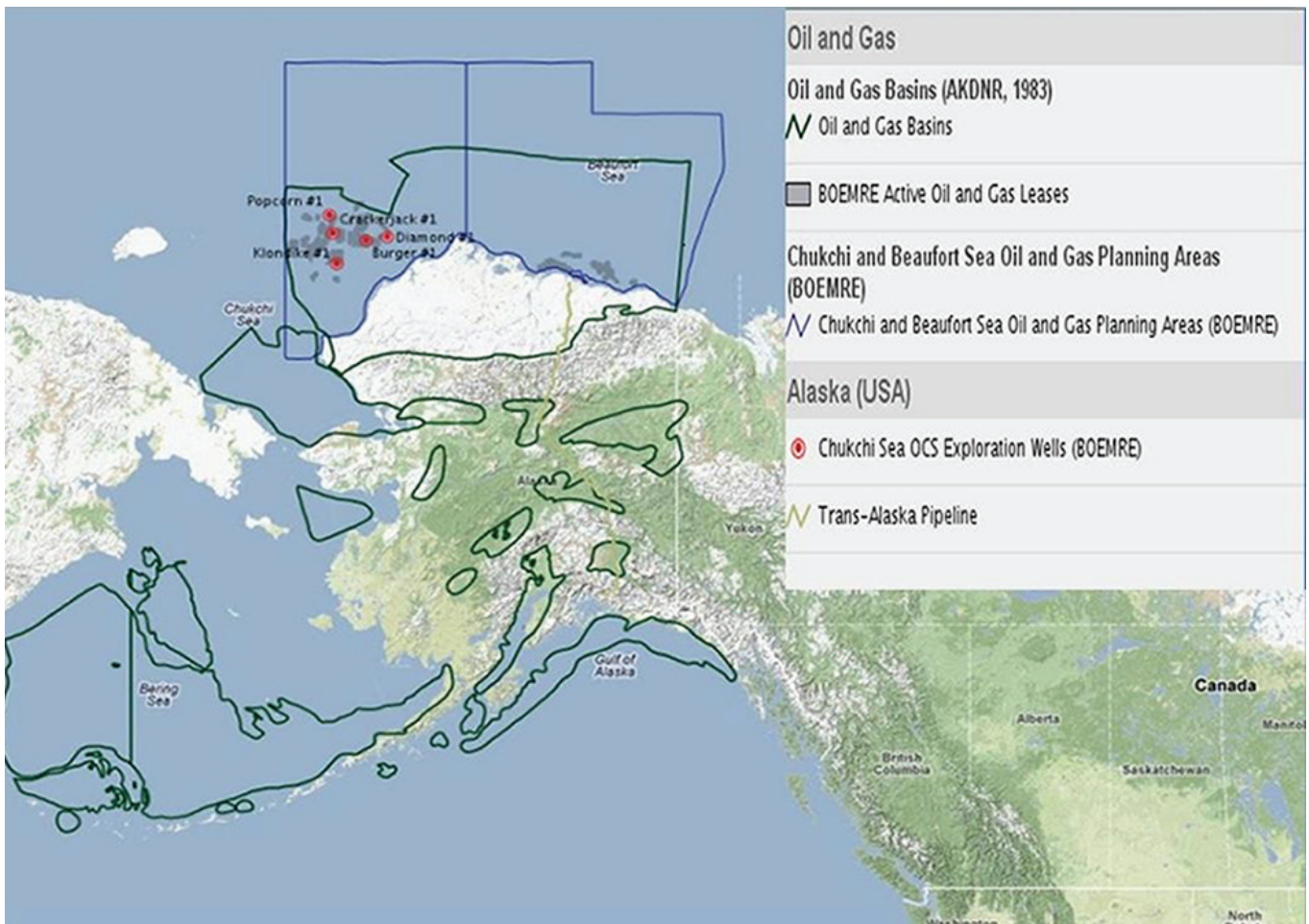
North Slope Shale Reserves

- 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.³⁴
- 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](#).³⁵
- Without new production coming online, TAPS transportation problems could threaten the [shutdown](#) of North Slope oil production in a few decades.³⁶
- The pipeline is currently the only method of transportation from the Alaskan North Slope oil fields. It carries [11% of US domestic oil](#) production.³⁷

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.

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Endnotes

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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.

Gone are the days when a nation's strength could be measured by bombers and battleships. Security in this new era requires a New American Arsenal harnessing all of America's strengths: the force of our diplomacy; the might of our military; the vigor of our economy; and the power of our ideals.

We believe that America must lead other nations in the pursuit of our common goals and shared security. We must confront international challenges with all the tools at our disposal. We must address emerging problems before they become security crises. And to do this, we must forge a new bipartisan consensus at home.

ASP brings together prominent American leaders, current and former members of Congress, retired military officers, and former government officials. Staff direct research on a broad range of issues and engages and empowers the American public by taking its findings directly to them.

We live in a time when the threats to our security are as complex and diverse as terrorism, the spread of weapons of mass destruction, climate change, failed and failing states, disease, and pandemics. The same-old solutions and partisan bickering won't do. America needs an honest dialogue about security that is as robust as it is realistic.

ASP exists to promote that dialogue, to forge consensus, and to spur constructive action so that America meets the challenges to its security while seizing the opportunities the new century offers.



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