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CENTRAL INTELLIGENCE AGENCY



DIRECTORATE OF INTELLIGENCE

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Climate Geoengineering: A Growing Foreign Policy and Public Perceptions Challenge, but Currently a Low Technical Threat [redacted]

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Weather Modification: Related Technology

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At least 24 countries, including China and Russia, have weather modification programs, according to a World Meteorological Survey done in 1999,^{90,91,92} and these technologies and expertise could probably be applied to some geoengineering techniques. If a country felt weather modification was a practical or public relations success, this could build confidence for investments in geoengineering research.

- During the Cold War, Russia researched weather modification for both peaceful and hostile uses, such as inducing tsunamis or floods [redacted]

- Chinese bloggers accused the government's weather modification program of causing or exacerbating unusually early and heavy snowfall in 2009, according to press reporting.⁹⁹ China publicly touts the program as ensuring good weather for key national events such as the 2008 Olympics.^{100,101}

- Only a few scientists and economists argue that geoengineering would be an inexpensive complement or alternative to pricier greenhouse gas mitigation and clean energy measures.^{103,104,105,106}
¹⁰⁷ However, most experts argue that geoengineering should be considered only in the event of a "climate emergency,"^{108,109} and as a short-term option it cannot replace greenhouse gas reductions in mitigating climate change risks.^{110,111}
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- A small geoengineering-focused Canadian NGO railed against geoengineering events at the 2009 Copenhagen meeting, saying industrialized countries cannot be trusted to attempt a climate

"techno-fix" that would have remotely equitable impacts, and arguing that voluntary scientific self-regulation is inadequate and preempts a public discussion about whether geoengineering should be pursued at all.¹¹⁶

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- The UK National Environmental Research Council (NERC) held several open forums on geoengineering in 2010 attended by capacity audiences who had low initial awareness of the issue, were broadly opposed to intentional interference with the climate, but who ultimately gave cautious support for research and engaged constructively in discussions about appropriate governance and regulations, according to the NERC report [redacted]

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Possible Motivations for Geoengineering [redacted]

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If research progresses to reduce some of the uncertainties currently endemic to the field, countries or nonstate actors could be motivated to develop a program to reverse damaging climate change, or as a publicity stunt to try to galvanize the international debate about climate change mitigation. Worsening climate conditions—including recurring weather shocks or pending climate tipping points such as the Asian monsoon—could drive any of the more technically advanced nations to accelerate geoengineering research and development.

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- A country that feels under mortal threat from climate change—such as a small island state—may grow desperate if it perceives global emissions reductions are inadequate and might independently attempt a program or partner with a wealthy nation or donor in a public relations bid to push the international community toward more aggressive climate actions. [redacted]

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[redacted] on geoengineering limits our ability to assess military interest or involvement in the issue. While we have some information on Russian interest in targeted hostile weather modification, open

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information on global-scale geoengineering techniques suggest it would be difficult to predict outcomes or direct these measures against any specific adversary.

- Russian military newspaper articles in 2006 and 2009, including one by a retired general, discussed the military potential of weather modification and other geophysical weapons.^{119 120} We lack further insights into the program but assess any efforts are probably nascent and would almost certainly aim to develop targeted rather than global-scale weapons.
- The 1976 Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification prohibits any military or hostile weather modification that causes widespread, long-lasting, or severe effects as a means of injury to any party, and has been signed by 75 nations, including China, Japan, Russia, and the UK.^{121 122} The definition of environmental modification could encompass some geoengineering techniques, although the Convention permits environmental modification for peaceful purposes. [redacted]

International Governance Under Discussion

[redacted]
Calls for governance of geoengineering are growing from governments concerned about the issue, researchers seeking legal guidance for further work, and activists opposed to geoengineering. Some experts suggest that modification of existing environmental protection treaties will be the most feasible route for international governance initiatives, possibly using multiple instruments to cover different types of geoengineering technologies.^{123 124 125}

- The Convention on Biological Diversity (CBD) and the London Convention/Protocol on Marine Dumping both hosted contentious debates regarding regulation of ocean fertilization in meetings in 2008 and 2010. [redacted]
[redacted] The 2008 nonbinding CBD resolution was widely viewed as a de facto moratorium on ocean

Reporting Sparse; Opportunities Exist To Gain Insights on Geoengineering Programs [redacted]

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Reporting on worldwide geoengineering research and development currently is limited to open-source and [redacted] If geoengineering

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programs go beyond computer modeling to the testing stage, technical collection may detect some signatures of climate or atmospheric changes. Because of the difficulty in distinguishing geoengineering research from closely related climate research, collection on a country's plans and intentions would be crucial to early detection of undisclosed programs.

- National Aeronautics and Space Administration (NASA) and National Oceanic and Atmospheric Administration (NOAA) resources that monitor climate signatures and atmospheric conditions may provide the first indications of testing. Imagery analysis could identify large, specialized structures deployed on the ground or water for geoengineering purposes.
- Tipoffs for future geoengineering research and procurement might include monitoring markets for chemicals and specialized materials to discern price movements that indicate large-scale acquisitions that could be used in geoengineering projects. [redacted]
- Collection of gas, liquid, or solid samples from space, airborne, or ground-based sensors could indicate geoengineering testing. [redacted]

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fertilization and oceanographers were concerned this could effectively restrict scientific research, but US diplomats assessed 2011 CBD language would not restrict US research interests.^{135 136}

- The 2010 Asilomar Conference—attended by 165 experts in the field—concluded that transparency, public and intergovernmental engagement, and governmental oversight are essential to responsible conduct of geoengineering research.¹³⁷ The UK Royal Society likewise noted in 2009 that there is no international treaty or institution with a

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