

# The planet-hackers are coming

**Posted: Wednesday, April 07, 2010 7:25 PM by Alan Boyle**

Should we put more pollutants into the air to keep Earth's temperature down? How about covering polar ice with reflective panels to cut down on melting? Or putting a giant umbrella in space to shade the planet?

Some of the ideas for [easing Earth's warming trend](#) may sound crazy - but in a newly published book titled "[Hack the Planet.](#)" Eli Kintisch says scientists may have no choice but to give them a try.

"The only thing crazier than geoengineering is what we're doing now to the atmosphere by continuing to dump carbon dioxide into it," he told me.

Kintisch, a staff writer for the journal Science, delves into the flip side of the global climate issue: If we're in the beginning stages of a radical warm-up in global temperatures, caused in part by greenhouse-gas emissions, what can we do about it?

One part of the answer is to reduce those emissions. Scientists, engineers and policymakers are working on strategies to do that. We could see cleaner cars, less carbon-intensive energy sources, and perhaps carbon-curling legislation as well. But some researchers say that still won't be enough. Some of the less crazy ideas for hacking the planet might still have to be put into effect. That's why Kintisch calls geoengineering "a bad idea whose time has come."

"Scientists are in a similar position to the researchers who went to the Manhattan Project in the 1940s," he said. "They desperately don't want to study these radical ways of altering the planet, but they feel as though they must. And here's why: Even if we stopped all our carbon emissions tomorrow, the planet would continue to heat up, the ocean would continue to heat up, because carbon dioxide lasts for thousands of years in the atmosphere."

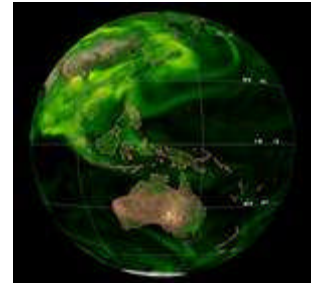
University of Calgary physicist David Keith once observed that scientists studying the geoengineering issue tend to join either the "Blue Team" (who are inclined to invent ways to alter the atmosphere) or the "Red Team" (who are generally skeptical of geoengineering and try to find flaws in the Blue Team's work). Right now, the Blues appear to be in the ascendancy, Kintisch said.

"Since I wrote the book, the number of scientific organizations and prominent scientists who have called for research into geoengineering has only broadened," he said. Legislative hearings are being held, [in Washington](#) and [in London](#). Task forces [are being set up](#). Conferences [are being conducted](#). And [protests](#) are being [organized](#) as well.

## How to hack the planet

The strategies for hacking the planet generally involve adding something to the landscape ... or the seascape ... or the atmosphere ... or even outer space. Here are just a few of the ideas floating out there:

- **Seed the atmosphere with sulfur compounds** - yes, the kind of compounds that are put out by industrial smokestacks. Scientists realized [years ago](#) that such compounds tend to brighten clouds and make them more reflective. Those clouds block sunlight, reducing the greenhouse effect. It's thought that such "[global dimming](#)," sparked by emissions from Mount Pinatubo in the Philippines, counteracted global warming trends in the 1990s. Kintisch says experiments using sulfate aerosols to whiten clouds



NOAA

[Click for gallery:](#) This map charts the thickness of sulfate aerosols, which may have a cooling effect. Click on the image for more on geoengineering.

are "probably closest to fruition" in the geoengineering realm, but some researchers warn that the strategy could have [nasty side effects](#).

- **Fertilize the sea with iron.** The idea here is that dropping loads of iron dust into the world's oceans would stimulate the growth of phytoplankton. Those tiny marine critters would consume carbon dioxide through photosynthesis, then die and sink to the seafloor, effectively "locking up" the carbon. Some iron-fertilization experiments have been conducted already, but they [weren't as effective as scientists hoped](#).
- **Whip up a mess of "microbubbles."** Harvard physicist Russell Seitz has suggested pumping compressed air like Jacuzzi jets into wide areas of the world's oceans. The [tiny bubbles](#) would make the water whiter and more reflective. Sunlight would be reflected away from the ocean surface, reducing sea temperatures. Seitz's climate modeling suggest that the strategy could cool the planet by as much as 5 degrees Fahrenheit (3 degrees Celsius), but the technical difficulties would be daunting.
- **Cover up the ice.** Several engineers are trying to develop silica-filled panels that could be placed over polar and glacial ice to slow down the melting process. The project, known as [Ice911](#), has gone through a small-scale test in California's Sierra Nevada mountains - but it's not clear whether the "planetary band-aid" would work on a larger scale.
- **Build artificial trees:** Earth's vegetation does a great job of soaking up carbon dioxide and turning it into oxygen. ["Artificial trees"](#) are devices that could chemically extract CO2 for storage, perhaps in [underground reservoirs](#).
- **Shield the planet from space.** The ultimate fix would involve launching millions of mirrors to the gravitational balance point between Earth and the sun. It's an idea that was suggested [nine years ago](#), somewhat tongue in cheek - but the concept continues to serve as a prime example of ["smoke and mirrors"](#) in the geoengineering debate.

The space-mirror idea just might make sense "if money wasn't an issue, and money is always an issue," Kintisch said. Not one of these ideas is ready for prime time ... yet ... but some of them are being taken seriously enough to cause a stir.

"There's going to be a big fight coming on field tests for geoengineering," Kintisch predicted. "It may be two years from now. It may be five years from now."

### Regulating geoengineering?

Heading off a future policy battle over bioengineering was the motivation behind a meeting held last month at the Asilomar Conference Center in California. Thirty-five years ago, scientists gathered at Asilomar to work out the guidelines for [conducting recombinant DNA research](#). The 1975 meeting marked a milestone - not only for genetics, but also for the regulation of potentially risky science.



[Asilomar 2.0](#) was aimed at setting similar guidelines for geoengineering experiments. Those in attendance generally saw the conference as a good start, but only a start. Nature's Jeff Tollefson noted that the gathering "[came up short on their stated goal](#)" of developing research guidelines. Environment360's Jeff Goodell, who is coming out with his own book about geoengineering titled "[How to Cool the Planet.](#)" said he felt as if he was witnessing the birth of "[the conscience of a geoengineer.](#)"

"Hack the Planet" delves into climate uncertainties and possible remedies.

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Kintisch said Asilomar 2.0 had to address uncertainties that were far murkier than the ones facing Asilomar 1.0. He noted that the earlier meeting was sponsored by the National Institutes of Health, "so the government wanted scientists to come up with regulations" for genetic research.

"This is different," Kintisch said. "Here you have scientists coming up with voluntary guidelines for geoengineering research. They know that, in the end, governments will decide what research happens. ... This is scientists way out ahead of governments, and it's unclear what nations are going to want to do about geoengineering tests."

It's also unclear how much the public will permit when it comes to hacking the planet, particularly in light of [recent questions raised about the behavior](#) of some climate researchers.

"What some people call 'Climategate' is actually going to be a central problem for scientists studying geoengineering, and for all climate scientists," Kintisch said. "They're doing a very poor job of communicating climate science to the public. ... Since geoengineering is such a radical and controversial idea, that trust deficit could be a major problem."

As crazy as it sounds, figuring out how to hack the planet may turn out to be the easy part. The hard part will be convincing the public that the planet-hackers really know what they're doing.

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*Check out [this interactive graphic on geoengineering](#), and feel free to weigh in with your comments in the message box below. For a planetary tale that's completely different, check out my book, "[The Case for Pluto.](#)" The next event on the book-tour schedule is my talk at the National Academy of Sciences' [Marian Koshland Science Museum](#) in Washington at 6:30 p.m. on April 15. In the meantime, you can join the Cosmic Log corps by signing up as my [Facebook friend](#) or hooking up on [Twitter](#)*