

# Geo-engineering -- a bad idea whose time has come?

Deborah Zabarenko, Reuters, 12-12-11

WASHINGTON -- The mainstream approach to climate change does not seem to be working so some scientists and policymakers say it may be time to look into something completely different: re-engineering Earth's climate.

Variouly called geo-engineering, climate remediation and planet hacking, the idea is to do on purpose what industry and other human activities have done inadvertently, which is to change the amount of climate-warming greenhouse gases in the atmosphere, and as a result, cool it down.

The concept has been around for nearly a century, from about the same time scientists and engineers noted the warming effect carbon dioxide emissions had on climate. Until quite recently, the notion has been relegated to the fringes of debate. Global climate talks have focused instead on curbing future emissions of greenhouse gases, known as mitigation.

But in the lead-up to the latest round of U.N. climate negotiations in Durban, South Africa, there have been serious examinations of what it might take to start countering the effects of increasing carbon dioxide in the air.

The Bipartisan Policy Center, a Washington think tank that takes on the kind of gnarly issues most other organizations will not touch, released a national strategic plan on "the potential effectiveness, feasibility and consequences of climate remediation techniques" in October.

## HOW GEO-ENGINEERING MIGHT WORK

Harvard University offered a discussion paper in November on how climate engineering might be governed. Its author, Daniel Bodansky of Arizona State University, started with a question that sums up how some skeptics feel about the United Nations' tactics to curb climate change:

"How much are we willing to bet that countries will succeed in preventing dangerous climate change by cutting their emissions of carbon dioxide and other greenhouse gases?"

The unspoken answer is, not much. So exploring research into geo-engineering may make sense, the author argues.

In research published in October in the journal *Energy and Environmental Science*, climate experts used computer models to determine what type of tests might work in the future to figure out geo-engineering's risks and effectiveness.

Geo-engineering refers to either keeping warmth from getting into the atmosphere by cutting down on sunlight, or taking climate-warming carbon dioxide out of the atmosphere.

Solar radiation management might be accomplished by whitening the clouds to make them reflect more sunlight, injecting sulfur aerosol particles to do roughly the same thing, or using space-based methods.

Carbon dioxide removal could be done by sucking it out of the air with structures called mechanical trees, by fertilizing the deep ocean with it, or through a process called enhanced weathering. This involves digging up rocks that absorb carbon dioxide, pulverizing them and spreading them around.

## "THE MOST SCARY THING"

The prospect sends a chill through scientists and policymakers because:

- \* It could be implemented unilaterally but could have global effects;
- \* Once in place, solar radiation management would have to be kept up for centuries;
- \* Even if it worked as designed, it would not reverse the effects of climate change, and might discourage efforts to reduce greenhouse gas emissions or adapt to a warmer world;
- \* The potential for unintended consequences is considerable.

However frightening this may be, it is important to know what geo-engineering might do, said Steve Hamburg, chief scientist at Environmental Defense Fund and co-chair of the Solar Radiation Management Governance Initiative.

"I would no way go close to even saying we have a conversation about deploying it," Hamburg said by telephone. "But we won't be able to ensure that someone doesn't take action ... We could easily come to a climate tipping point, some kind of climate surprise, unprepared, without the information to make an informed decision about what our options are. That's the most scary thing."

### **IS IT WORTH THE RISK?**

Ken Caldeira, a climate expert at the Carnegie Institution for Science, also has urged examining what could be learned from computer models and other tests.

He discounted concerns that go-it-alone actors might deploy geo-engineering techniques but he did not think international treaties would prevent a leader from using geo-engineering if the leader's political survival demanded it.

Caldeira said "a wise and gradual deployment" of geo-engineering could cut the risk from greenhouse gas emissions but "given the large potential for political and military conflict resulting from a geo-engineering deployment," he reckoned it might not be worth the risk.

Eli Kintisch, who literally wrote the book on this subject, titled "Hack the Planet," suggests this may be a bad idea whose time has come because doing nothing is untenable.

Instead of cutting greenhouse gas emissions in the two decades since the 1992 U.N. Earth Summit in Rio, they have risen 49 percent. U.N. negotiations this week aimed at mitigating global warming are unlikely to reach a deal to do that anytime soon.

"It's a combination of caution, fear and curiosity that's driving scientists to explore a field which five years ago was really off the radar for mainstream climate scientists," Kintisch said by telephone.

Caldeira, emailing from a research site on One Tree Island off the Australian coast, offered a blunt assessment on geo-engineering: "I think we should all stop worrying about this and spend this time thinking about how we might reduce greenhouse gas emissions."