October, 2008 in Technology | 0 comments | Post a comment

The Hidden Dangers of Geoengineering

Geoengineering is a seductive idea. Maybe too seductive

By The Editors

Matt Collins

Earth is absorbing too much solar energy and heating up. Rather than fiddling with hybrid cars and funny-looking lightbulbs, why not just build a planet-size parasol to shade us? Or a forest of carbon scrubbers to cleanse heat-trapping gases from the air?

Such grand schemes for "geoengineering" our way out of the climate crisis appeal to the dreamer in us all. If technology got us into this mess, maybe technology can get us out of it [see "A Sunshade for Planet Earth," by Robert Kunzig]. Once considered fringe science, geoengineering gained respectability with an essay two years ago by chemist Paul J. Crutzen, who is something of an environmentalist hero—it was his Nobel Prize–winning work on the ozone hole that led to the ban on Freon and other ozone-destroying chemicals.

There are just a few problems. The first is the side effects. The best-studied proposal, to pump sulfate aerosols into the upper atmosphere to block sunlight, would cause its own troubles. The sulfates would slow or reverse the recovery of the ozone layer; they might also reduce global rainfall, and the rain that did fall would be more acidic. And those are just the foreseeable effects. Aerosols are the least understood aspect of the climate system.

Second is cost. The priciest geoengineering scheme, putting a giant sunshade in space like some astronomical beach umbrella, comes with an astronomical price tag: $5 trillion-plus. Arrays of carbon scrubbers are not much better: $1.6 trillion-plus. Cheaper schemes—feeding iron to ocean plankton, launching fleets of automated ships that spray saltwater aerosol—are less assured of success and still amount to tens of billions of dollars a year.

Third is the false sense of security that such geoengineering could encourage. Suppose a sunshade were built and actually worked. It would take the heat off politicians; emissions reductions would seem less urgent. Yet carbon dioxide would continue to build up in the atmosphere—breaching the level of 450 parts per million by volume (ppmv) that most climatologists now recommend as an upper limit, then passing the 550 ppmv mark that is the goal of many current policy initiatives, and eventually reaching 1,000 ppmv, a level not seen on Earth since the days of the dinosaurs. If we let our maintenance of that sunshade slip even briefly—because of war, economic depression or simple apathy—the shade would lift and a century's worth of warming would hit us.

Proponents recognize this risk and see geoengineering merely as a stopgap measure to buy time for emissions reductions, which may take decades to achieve. But what is the point of buying time? Every year that we put off those reductions makes our job that much harder. The logic of compounding argues for focusing on emissions *first* and keeping geoengineering projects in reserve—rather than the other way around.

The possibility that international collective action might not be entirely reliable brings up the fourth and perhaps most intractable barrier to geoengineering: the geopolitics. Imagine if, say, Chinese-produced clouds of sulfuric acid blew across the Pacific or if American efforts to reduce flooding on our shores triggered drought in Central Asia. How would nations respond to such provocations as anything but an act of war?

High cost, unintended consequences, uncertainty, short attention spans, international bickering: if these problems sound familiar, it is because climate skeptics have made the very same criticisms of plans to cut emissions, such as the Kyoto Protocol. The difference is that geoengineering is even worse. Emissions cuts may be challenging, but the science is well established, most of the technology already exists, the costs can be spread over the natural capital-replacement cycle, public awareness is high, and international institutions such as carbon markets are taking root. The time to act is now.

PAGE 1 | 2 | Next»

FURTHER READING

A Sunshade for Planet Earth