

# Writers, Scientists, and Climate Experts Discuss How to Save the World from Climate Change

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## EMBRACE GEOENGINEERING

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Imagine a doctor refusing to administer chemotherapy to a stage III lung-cancer patient out of fear that it would reduce his incentive to cut his smoking habit from two packs to one pack a day. That, in a nutshell, is the morally obtuse thinking that has undermined humanity's best bet to curb climate change: solar and carbon geoengineering.

The first scientific fact to know about climate change is that carbon is (almost) forever. Suppose I pump out a ton of carbon dioxide by flying across the Atlantic. The additional warming from my trip rises over a few decades and then remains constant for more than a century. A millennium hence, about a fifth of my ton will still be in the atmosphere causing climate change, unless humanity does something to remove it.

Many scientists regard geoengineering as the only viable method to roll back—not just delay—carbon's climate impacts. Solar geoengineering technologies could partially and temporarily reduce climate risks by reflecting some sunlight back to space, imperfectly offsetting the heat-trapping effects of greenhouse gases. Carbon geoengineering technologies could remove carbon dioxide from the atmosphere and transfer it back to geologic reservoirs, reversing the geologic footprint humanity causes by extracting coal, gas, and oil.

Solar geoengineering is fast and cheap but also risky and impermanent. Carbon geoengineering, on the other hand, is slow and expensive, but once humanity cuts emissions by switching to carbon-free energy sources like solar or nuclear, it could allow future generations to put the carbon genie back into the bottle.

But geoengineering's vanishingly small role in this year's major climate talks is a classic case of sacrificing scientific approaches at the altar of policy orthodoxy. Policymakers fear the public will only back emissions cuts if they're deemed the sole answer. Even advocates for climate geoengineering present it as a last-ditch response. In the words of science writer Eli Kintisch, geoengineering is "a bad idea whose time has come."

Emissions must be cut, but I fail to understand how the only policy that could plausibly enable a major reduction in climate risks this century is a bad idea. Even if the world

succeeds in cooperating on aggressive emissions reductions, the carbon cycle's inertia means that—at least for a long human lifetime—cutting emissions will only stop making the problem worse. Furthermore, nothing about solar geoengineering changes the need to cut emissions. The only pathway to a stable climate is to bring the net emission of greenhouse gases to zero. But a combination of solar geoengineering and reduced emissions would allow the world to reduce climate change over a single human lifetime. To stop sea level rise. To reverse the increase in extreme precipitation and heat waves.

Our descendants could use carbon geoengineering to gradually restore the world's carbon balance. The amount of solar geoengineering needed to stabilize the climate would decrease as carbon was reduced, and the climate could eventually be restored to a reasonable approximation of its preindustrial state.

Critics like Naomi Klein paint geoengineering as a tool of technocratic capitalism that serves only to distract from the social reforms needed to address the "root causes" of climate disruption. Some on the right are already using geoengineering as an excuse for inaction, just as news of new cancer drugs emboldens smokers to keep smoking. But this fear of moral hazard should not drive our entire policy.

It will be hard to build a shared vision around a long, patient road to climate restoration using both emissions cuts and geoengineering. It may be harder still to build the international institutions to manage these technologies. Nevertheless, working toward this goal may leave a better legacy for the next generation than the current see-no-evil injunction against researching geoengineering for fear that it will tempt us away from emissions cuts as the only path to salvation.

The just-say-no dictum has not been a successful path for drug use or teen pregnancy. Why would it work for climate change?

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