WE CAN'T COUNT ON GEOENGINEERING TO SAVE US FROM CLIMATE CHANGE, SCIENTISTS WARN

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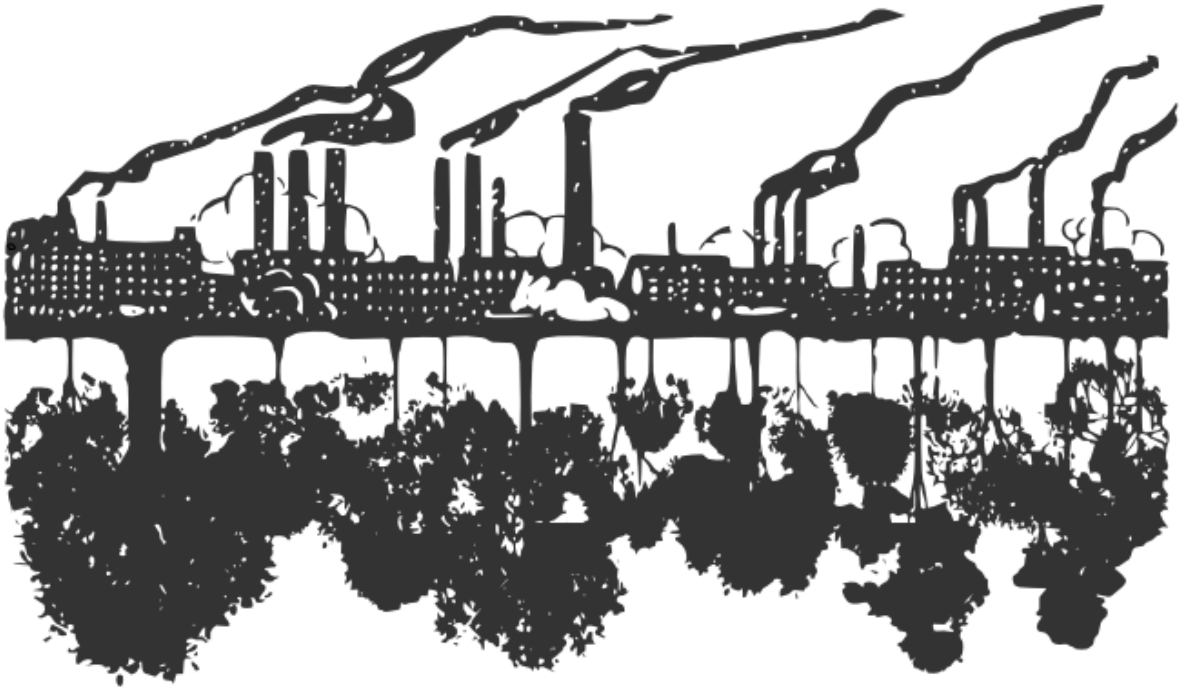
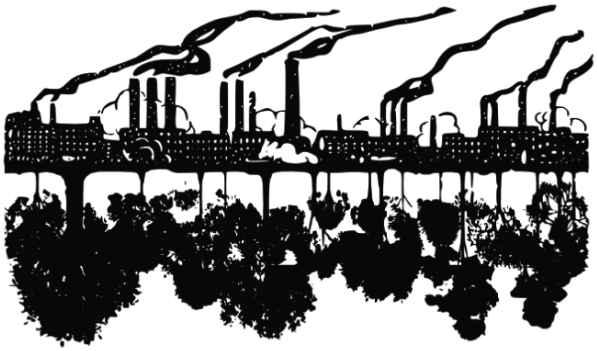


by Stephen Buranyi (Motherboard)



In December, governments around the world got together and grandly agreed to limit global warming to below 2℃ above pre-industrial levels—with a preference for keeping it below 1.5℃. The Paris Agreement recognizes that, if we fail, the outcome will be disastrous. But talk is cheap, and some scientists believe these goals will be nearly impossible to accomplish. They say we won't be able to cut our carbon emissions enough to succeed.

We're on track for a world that's at least 2.7℃ warmer by 2100. Schemes that were once derided as unrealistic and dangerous are now being quietly put on the table, some scientists warn. Just ten years ago, technologies that can actively suck carbon from the atmosphere—for example, by turning over huge amounts of land to biofuel crops and capturing the carbon released by burning them, known as BECCS—were dismissed as unrealistic at best, and dangerous "'geoengineering'" that could destabilize the planet at worst.

Now, with the carbon clock ticking, and new ambitious targets post-Paris, approaches that were once unthinkable fantasies increasingly underlie the very models that climate negotiators rely on, some researchers warn. Kevin Anderson of the UK's Tyndall Center for Climate Change Research calls them "exotic Dr Strangelove options." Many activists and scientists alike are wary that we're learning to love the bomb.

“A lot of assumptions about how we’ll stay under 2 degrees are relying massively on negative emissions,” Teresa Anderson of the London-based NGO ActionAid told an assembled panel at the latest UN climate meeting, in Bonn, Germany, in May.

“It’s going to be a different world”

She was referring to the fact that, when the UN considers scenarios that could keep the world under a 2-degree warming target, most of them assume we start removing carbon from the air in huge quantities sometime around 2050. This would require either an entirely new technology to capture and stably store the carbon, she argued, or the expansion of largely untested technologies to an enormous scale.

Not only are they untested. They could have disastrous consequences.

It’s easy to see why it makes some people nervous. “Negative emissions technology” is a pretty benign phrase, but it’s referring to the reversal of nearly 100 years of burning fossil fuels at a breakneck pace. Getting all this carbon back into the earth may be even more difficult than getting it out in the first place, and we don’t have an entire century to do it.

“Incremental shifts from business-as-usual don’t get us anywhere near where we need to be,” Pete Smith, leader of the Environmental Modelling Group at the University of Aberdeen, told me.

“It’s going to be a different world,” he said.

Smith and his colleagues are modellers. Their work isn’t about discovering and developing new technologies, but looking at if and how those technologies would work in the world as it is.

In a 2016 paper in *Nature Climate Change*, Smith and others calculated the amount of land, water, energy, and money required for the carbon removal scenarios considered by the UN.

The paper points out that using BECCS—the method used in most of the scenarios the UN has examined, and the one ActionAid is specifically worried about—to counter our current level of carbon emissions would require 380-700 million hectares of biomass crops like switchgrass or rapeseed. That’s somewhere between about half the size of Australia, and all of it. It would also require just under half the volume of lake Ontario each year for its irrigation, and some USD $138 billion per year in investment.

It’s “like offering liposuction for the climate. We wouldn’t be able to help ourselves”

Other studies project that large parts of the midwestern United States—corn and cotton country—as well as southern Europe will be used for these new crops, but most assume the action will center across Africa and Asia, where huge swaths of land around the equator could be filled up. ActionAid has argued that these changes will drive food insecurity and land grabs.

Other technologies are currently less developed, and may present their own issues of scale. For example, facilities that capture carbon directly from the air via chemical process—essentially a robotic tree—are promising, but currently only exist as demonstrations that capture around one ton of CO_2 a day; we release about 40 gigatons (that’s 40 billion tons) per year.

‘It all requires a fundamental shift in the way the world produces and consumes energy,” said Sabine Fuss, an economist at the Mercator Research Institute on Global Commons and Climate Change, in Berlin, who contributed to the *Nature Climate Change* report. “There’s not really any precedent for something like this.”

The future described here strains against the bounds of reality. There’s never been any transformation like it in modern history, and it counts on decision-making from the same world powers that have been holding climate meetings since 1992, without ever once agreeing to reduce overall carbon emissions.

Smith said that the report was written as a “finger-wag” to politicians, to ensure they knew exactly what a future that relied on negative emissions technology looked like, and how disruptive it could be. Its closing sentence notes that because of the enormously damaging impacts on land, food, and energy, “‘plan A’ must be to immediately and aggressively reduce [carbon] emissions.”

> ***If we fail to meet our current emissions goals, who knows what will start to seem like a reasonable next step?***

“People were saying we shouldn’t use negative emissions. Now we’re committed to a world where we have to use negative emissions technologies: we’re not going to get to 1.5 degrees with emission reduction [alone],” he said.

Visions of a future that relied on us making purposeful and potentially irreversible changes to the natural world used to draw comparisons to the ambitions of Bond villains, or Mr. Burns. In 2009, The Royal Society released a report that discussed BECCS and other carbon capture techniques alongside plans like seeding clouds to block out the sun. The latter is still not considered a viable idea, but if we fail to meet even our current modest emissions goals, who knows what will start to seem like a reasonable next step?

Even wilder ideas for cooling the planet down, like reflecting the sun’s radiation back into space by seeding clouds, or even by zapping them with lasers, are waiting at the fringes of the climate debate.

“[Scientists] were scared that if you started to say you could remove carbon dioxide from the atmosphere, that was like offering liposuction for the climate. We wouldn’t be able to help ourselves,” said Jack Stilgoe, a lecturer in the department of Science and Technology Studies at University College London, who has written a book about the politics of geoengineering.

He thinks that the scientific dialogue around negative emissions, especially at the UN, has gone a long way towards legitimizing the idea.

As we get closer to blowing past our own self-imposed carbon targets, solutions that once seemed crazy are starting to look like the only way to keep our promises. Scientists don’t endorse negative emissions technologies, but they are researching them as a last-ditch solution. And governments are all too aware aware there’s a shortfall between the emissions cuts they’ve talked about, and the cuts they’ve actually delivered. It will have to be made up somehow to keep us under 2℃.