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Can a Technofix Save the Planet?

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We have reached the end of the epoch of climate stability that allowed human civilisation to flourish, and the end of the era of 'progress'. Like an angry beast woken from a long slumber, climate instability is dangerous and resists efforts to control it. What if there were a magic bullet to fix our ailing planet? What if it meant seizing control of Earth's climate? In his characteristically lucid and passionate style, Clive Hamilton spells out the implications for all of us.

This year the concentration of carbon dioxide in Earth's atmosphere broke through the 400 parts per million barrier for the first time in three million years. If you are not frightened by this fact then you are not listening to the climate scientists.

Relentlessly rising emissions, and the fear that the Earth might cross a tipping point into a climate emergency from which there would be no return, have prompted many climate scientists to conclude that we urgently need a Plan B.

Geoengineering—deliberate, large-scale intervention in the climate system designed to counter global warming or offset some of its effects—may mean humanity mobilizes its technological power to seize control of the planet's climate system, and regulate it in perpetuity.
But is it wise to play God with the climate?

While some proposals, such as launching a cloud of mirrors into space to deflect some of the Sun's heat, sound like science fiction, the more serious schemes require no great technical feats. Two or three leading ones rely on technology readily available and could be deployed within months.

Some geoengineering technologies, such as making biochar and painting roofs white, are relatively benign, but probably ineffective. Another prominent scheme, extracting carbon dioxide directly from the air, is not too harmful in itself, as long as we can find somewhere safe to bury enormous volumes of it for a thousand years.

But each standard-sized coal-fired power plant would need 30 kilometres of air-sucking machinery and six chemical plants, with a footprint of 6 square kilometres, and an additional network of pipes and equipment to transport and store the waste underground.

The idea of building a vast industrial infrastructure to offset the effects of another vast industrial infrastructure (instead of shifting to renewable energy) only highlights our unwillingness to confront the deeper causes of global warming—the power of the fossil fuel lobby and the reluctance of wealthy consumers to make even small sacrifices.

Even so, the greater anxieties arise from those geoengineering technologies designed to intervene in the functioning of the Earth system as a whole. They include the headline climate engineering schemes known as ocean iron fertilization and sulphate aerosol spraying, each of which now has a scientific-commercial constituency.
How confident can we be, even after extensive research and testing, that the chosen technology will work as planned? After all, ocean fertilization—spreading iron slurry across the seas to persuade them to soak up more carbon dioxide—means changing the chemical composition and biological functioning of the world's oceans. In the process it will interfere with marine ecosystems and affect cloud formation in ways we barely understand.

Enveloping the Earth with a layer of sulphate particles—the climate engineering scheme attracting most attention—would cool the planet by regulating the amount of solar radiation reaching the Earth's surface. One group of scientists is urging its deployment over the melting Arctic now.

Plant life, already trying to adapt to a changing climate, would have to deal with reduced sunlight, the basis of photosynthesis. A solar filter made of sulphate particles may be effective at cooling the globe, but its impact on weather systems, including the Indian monsoon on which a billion people depend for their sustenance, is in doubt.

Some of these uncertainties can be reduced by research. Yet if there is one lesson we have learned from ecology, it is that the more closely we look at an ecosystem the more complex it becomes. Now we are contemplating technologies that would attempt to manipulate the grandest and most complex ecosystem of them all—the planet itself. Sulphate aerosol spraying would change not just the temperature but the ozone layer, global rainfall patterns and the biosphere too.

Spraying sulphate particles, the method of climate engineering most likely to be implemented, is classified as a form of "solar radiation management", an Orwellian term some advocates have attempted to reframe as "climate remediation".

Yet, if the "remedy" were fully deployed to reduce the Earth's temperature by, say, 2°C it's estimated (by climate scientist Alan Robock) that at least ten years of global climate observations would be needed in order to separate out the effects of the solar filter from other causes of climatic variability.

If after five years of filtered sunlight a disaster occurred—a drought in India-Pakistan, for example—we would not know whether it was caused by global warming, the solar filter or natural variability. And if India were suffering from the effects of global dimming while the United States enjoyed more clement weather, it would matter a great deal who had their hand on the global thermostat.

So who would be turning the dial on the Earth's climate? Research is concentrated in the United States, Britain and Germany, although China

recently included geoengineering among its earth science research priorities.

Some geoengineering schemes are sufficiently cheap and technically uncomplicated to be deployed by any middle-sized nation, or even a billionaire with a messiah complex.

Widespread concerns about unilateral action are perhaps exaggerated for now, but we can imagine a scenario 30 years hence in which the Chinese Communist Party's grip on power is threatened by chaotic popular protests triggered by a devastating drought and famine in the north of the country.

If the alternative to losing power were attempting a rapid cooling of the planet through a sulphate aerosol shield, how would it play out? A US President may publicly condemn China's plans but privately commit not to shoot down their planes, or to engage in "counter-geoengineering", especially if North America were itself under severe climate stress.

Little wonder military strategists are taking a close interest in geoengineering. Anxious about Western geopolitical hubris, developing nations have begun to argue for a moratorium on experiments until there is agreement on some kind of global governance system.

Yet engineering the climate is intuitively appealing to a powerful strand of Western technological thinking that sees no ethical or other obstacle to total domination of nature. And that is why conservative think tanks that have for years rejected climate science, such as the American Enterprise Institute, now support geoengineering, the solution to a problem they said does not exist.

All of which points to perhaps the greatest risk of research into geoengineering—it will erode the incentive to curb emissions. Think about it: no need to take on powerful fossil fuel companies, no need to tax petrol and electricity, no need to ask consumers to change their lifestyles.

In short, while climate change threatens to destabilize the system, geoengineering promises to save it.

In the end, how we think about geoengineering depends on how we understand climate disruption. If our failure to cut emissions is due to the power of corporate interests, the fetish for economic growth and the comfortable conservatism of consumer society then resorting to climate engineering allows us to avoid facing up to social dysfunction, at least for as long as it works.

So the battlelines are being drawn over the future of the planet. While legendary Pentagon "weaponeer" and geoengineering enthusiast Lowell Wood bullishly proclaims: "We've engineered every other environment we live in—why not the planet?", a more humble scientist, MIT's Ron Prinn, asks: "How can you engineer a system you don't understand?"

Clive Hamilton is an Australian author and public intellectual. In June 2008 he was appointed Professor of Public Ethics at the Centre for Applied Philosophy and Public Ethics, a joint centre of Charles Sturt University and the University of Melbourne. He is based at Charles Sturt University's Canberra campus.

For 14 years, until February 2008, he was the Executive Director of The Australia Institute, a progressive think tank he founded.

He has published on a wide range of subjects but is best known for his books, a number of which have been best-sellers. They include *Growth Fetish* (2003), *Requiem for a Species: Why we resist the thruth about climate change* (2010) and *Earthmasters: The dawn of the age of climate engineering (*2013).

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Change of Era

The Momentum Institute met for the first time on the 10th of March 2011, the day before an earthquake struck Japan and unleashed the nuclear catastrophe we know as Fukushima.

The starting point of the Momentum Institute is based on the awareness that today we are living at the end of the period marked by the greatest material wealth human history has ever known – a wealth that is founded on cheap, concentrated, temporary energy sources that made everything else possible. Just as the most important sources of energy for this material wealth are entering irreversible and inevitable decline, we are embarking on a period of generalised economic contraction.

The Momentum Institute is dedicated to responding to the challenges of our era: how can we organise the transition to a post-growth, post-fossil fuel, climate-altered world? How can we understand and act on the issues of the Anthropocene? What are the emergency exits? What will resilient societies look like in the time of the triple crisis: energetic, economic, and ecological?

The post petrol, post-nuclear, post-coal transition means completely redesigning and rethinking the infrastructures of society and alongside this, working to achieve a new social imaginary by envisaging a near future without petrol and without non-renewable energy. The objective of our approach is to establish a community of contributors made up of citizens engaged in the major areas of transition.

The contributors to the Momentum Institute intervene in their area of expertise, in relation with the thinking on transition. They produce diagnostics, analyses, scenarios, and original proposals regarding strategies of transition and resilience. The Momentum Institute is there to encourage them and to make them known, to individuals, to businesses, to local and national governments. We are also concerned with providing visibility to emerging solutions that are already put into practice by towns in transition, such as energy cooperatives, AMAPs (organic local produce cooperatives), non-profit businesses, social employment, and eco-districts.

If we manage to disseminate them, the initiatives and contributions for imagining and creating the post-petrol world will spread – both locally and globally. They will come to represent the status quo and the efforts that we go to today will not be unusual tomorrow. In the meantime, we have a chance, and it is perhaps our last chance, to step back from the precipice. A challenge, a singular moment, a window of opportunity: Momentum.