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A realistic response to the climate wake-up call

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Leaders across the world raised the alarm in response to the latest assessment of climate change by the Intergovernmental Panel on Climate Change (IPCC). Christiana Figueres, the former executive secretary of the UN Framework Convention on Climate Change said, "This is a massive wake-up call that is sounding yet another alarm bell." Al Gore warned "There is no time left to waste," and UN Secretary-General Antonio Guterres said, "A code red for humanity."

IPCC reports have often been labeled a "wake-up call" by leaders and environmental advocates, such as in 2018, 2014, 2007 and 2001. The critical question is how we should respond to such an alarm. Thus far, hope has triumphed over experience. The usual response is to call to redouble our efforts to cut greenhouse gas (GHG) emissions, without noting that prior calls have not been heeded.

An unprecedented, global emissions-cutting program is urgently needed; we agree. But that would be far from sufficient. We must also confront some exceedingly uncomfortable facts. While rhetoric has soared; the policy has flopped. Since the nations of the world agreed on a climate change treaty after the first IPCC report, global carbon dioxide emissions have increased 60 percent. The most ambitious emissions-cutting scenarios imaginable will be insufficient to avoid extreme human suffering in the coming decades, and beyond.

Meeting net-zero emission goals could avoid the worst consequences of climate change, but massive losses to life, health and property would persist. A realistic response to climate change, one that could significantly curb consequences to human wellbeing, requires objective assessment and a new policy direction. The world must get serious, urgently, about solar geoengineering.

Solar geoengineering — such as the injection of aerosols in the stratosphere to block sunlight and thereby cool the planet — first received attention as a climate change strategy in a 1965 report to President Johnson. Since these aerosols typically fall back down to the Earth's surface over months to a year or so, the injections would have to be repeated over a considerable period of time. It is not a prevention strategy, like cutting emissions. What solar geoengineering does do is reduce warming for whatever level of GHGs has accumulated in the atmosphere. Given that carbon dioxide and most other GHGs decay significantly over centuries, solar geoengineering may be the only feasible strategy for combatting the massive climate change losses associated with the human-caused emissions that have already occurred.

Solar geoengineering has two major appeals. First, volcanic eruptions have served as natural experiments enabling scientists to learn how injecting small particles high in the atmosphere cools global temperatures. Second, the development of specialized aircraft to deliver particles into the atmosphere is feasible, and its costs would be minimal relative to the damages of climate change.

For decades, some scientists, environmental advocates and policymakers have opposed even considering research on solar geoengineering. A common claim is that solar geoengineering would tilt the balance of nature and would represent an experiment with the only planet we have. Unfortunately, humans have already put that balance off tilt. The past century of fossil fuel combustion and other human sources of greenhouse gases have already massively affected what was the natural environment. Through acts of omission and commission, we will be managing planet Earth for the foreseeable future.

That solar geoengineering deployment will bring unintended consequences is a second basis for objection. The presence of any such risks is labeled a decisive concern. This is the Delaney Clause approach to food risk: no substance, however small its risk, could be added to the food supply, however great the benefits. The potential for unintended consequences is significant, we agree. But we need research to better understand them. Possibly, they can be controlled; possibly solar geoengineering should be abandoned. But given the earth-shaking risks of climate change, a significantly ameliorating technology deserves to be assessed on a risk-reduced versus risk-created basis.

The third objection to solar geoengineering is the fear that it would diminish incentives to reduce GHG emissions. The rather dismal record of cutting emissions — in the absence of solar geoengineering — suggests that emission-cutting incentives are already weak. Indeed, pursuing solar geoengineering might serve as an awful action alert that galvanizes the public's attention to the seriousness of climate change. If so, it would draw greater support for all strategies — reducing emissions, investing in resilient infrastructure, deploying solar geoengineering — to mitigate the immense risks posed by a changing climate.

Last year, Congress appropriated $4 million for research on solar geoengineering. The National Academies recently called for $100-$200 million in solar geoengineering research spending. These are tip-toe steps toward a realistic response. Beyond an up ramp in research and development spending, we need to begin conversations among policymakers, stakeholders and the worldwide public about solar geoengineering as a strategy worthy of investigation.

A changing climate will create immense losses. This year's floods in Europe, droughts in the Western U.S., intense cyclones in the Pacific and unprecedented forest fires around the globe are modest precursors. Any tool with the potential to mitigate these losses merits consideration. Solar geoengineering would be a measure to tame these harms and buy time until we approach a decarbonized world.

Time ticks, the planet warms and the losses mount. An ambitious research program on solar geoengineering is an urgent priority. Realism requires that we determine whether it should be implemented and if so how.

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