Cool idea or hi-tech madness?

Janos Pasztor on the need for a rule book before we mess about with the stratosphere

As the threat from climate change looms ever larger, growing attention is being paid to proposals that sound as if they come straight from a sci-fi novel. One idea is to spray the stratosphere with particulates to reflect sunlight, thus reducing the temperature of planet Earth.

Stratospheric Aerosol Injection, known as SAI, is one form of solar radiation modification, a family of technologies also known as solar geoengineering.

It aims to mimic the temporary cooling that follows a volcanic eruption, bringing temperatures back down to pre-industrial levels. It would not replace the need to cut CO_2 emissions, but scientists suggest it could buy more time, or help to reduce the temperature rise beyond the internationally agreed goal of 1.5C-2C.

Aerosol injection is only one of several proposed solar geoengineering approaches. Others include marine cloud brightening – a technique that makes clouds reflect more sunlight back into space – and the artificial restoration of ice in polar regions. It is, however, the most controversial because of the nature, scale and uncertainty of its effects. A Harvard University research project could begin outdoor experiments this year and there is growing concern over where this line of inquiry might take us.

Its supporters suggest aerosol injection, if it proves feasible, could become part of our toolkit to limit the worst effects of

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A revolutionary method proposed for fighting climate change is to release particulates into the stratosphere to reflect the Sun's heat

global warming. Its opponents reject it as a dangerous techno-fix to what they see as a socio-economic problem.

For the moment, however, the world simply doesn't know enough to decide. It doesn't even know how it should go about making such a decision, how to research solar radiation modification, or even whether to consider the possibility of deployment at all.

Deciding how to decide

The Carnegie Climate Geoengineering Governance Initiative, known as C2G2, was launched in 2017 because policymakers need to start grappling with the governance of solar radiation modification now, before events overtake their capacity to respond effectively and responsibly.

Creating rules for a technology that does not yet exist, in a world where many countries are rejecting a rules-based international order, is a profoundly challenging proposition.

Yet the risks of not doing so could threaten our very existence. And technology has a way of forging ahead despite our concerns: the longer we delay writing the rule book, the higher the chance that some country, corporation or even a wealthy individual will go ahead on their own.

With interest in research rising anew, we need guidelines that assess the risks of both action and inaction in a dangerously warming world.

So what defines solar radiation modification research projects? And who would regulate them and under what aegis? We don't have the answers, but we believe society needs to start asking these questions.

Whether to deploy or not?

Looking further ahead, the governance required for any eventual deployment would be monumental.

The risks of deploying aerosol injection include unequal impacts in different regions – how unequal, and at what levels, is still being studied – potential impacts on the ozone layer and the so-called termination effect, whereby stopping aerosol injection abruptly could lead to a rapid and devastating temperature rise.

If countries disagreed on how to proceed, geopolitical tensions could rise and this could even lead to conflict.

On the other side of the ledger would be the potential avoidance of harm caused by temperature rise. On our present course,

'We need guidelines that access the risks of both action and inaction in a dangerously warming world'

even if all the 2015 Paris Agreement pledges are fulfilled, the world is heading towards a 3C+ rise by the end of this century, with potentially devastating results.

Added to this complex equation are unknown risks that are not yet imagined. It may not even matter whether aerosol injection is the physical cause of negative effects or not: the simple perception that it could be might result in geopolitical instabilities.

Who should decide whether to deploy the technology or not, and when? Who should be consulted and how? How would we address different risks in different parts of the world and tackle issues of liability, compensation, public information and consent? Who should hold the patents for these technologies? What systems are needed to ensure adequate monitoring and to guarantee against premature termination?

It may turn out that the technology is not a viable option for either scientific or governance reasons, and can never be deployed. Policymakers need to keep this possibility in mind and gauge their current policy action accordingly.

Between a rock and a hard place

Given such uncertainty, in normal times no one would even consider any form of solar geoengineering. But these are not normal times. Three years after the Paris Agreement, the prognosis on the world's collective ability to avert catastrophic climate change is bleak.

According to the UN Environment Programme's 2018 Emissions Gap Report, global greenhouse emissions show no signs of peaking, and if government commitments to reduce them are not increased before 2030, 'exceeding the 1.5C goal can no longer be avoided'.

Even at 1C warming, the world is seeing a marked increase in damaging climate impacts, attributed with increasing confidence to human activity. And a special report by the Intergovernmental Panel on Climate Change in 2018 warned that 'climate-related risks to health, livelihoods, food security, water supply, human security and economic growth are projected to increase with global warming of 1.5C and increase further with 2C.'

It is in this environment that aerosol injection might, to some, start to seem a little less crazy – terrifying but perhaps necessary. When comparing an unknown risk on the one hand, with the known risk of runaway warming on the other, it is not impossible that an actor – or group of actors, or even the world as a whole – might consider it to be the lesser of two evils.

One recent paper suggested that the direct costs of using this technology could be 'remarkably inexpensive, at an average of around $2 billion to $2.5 billion a year over the first 15 years'. Given the potential costs of transition to a low-carbon economy, this estimate may appear to some like a dangerously seductive alternative.

Meanwhile, the consequences of a temperature overshoot are becoming more apparent. Faced with catastrophic climate impacts, the voices arguing for stratospheric aerosol injection are likely to get stronger.

Dealing with moral hazard

Some critics claim that using strategic areosol injection – or even talking about it – would lessen the pressure on governments to move towards a zero-carbon economy. This is known as the moral hazard argument.

To avoid that, the world needs to address the economic needs of countries whose development depends on fossil fuels, to allow that transition to take place. Governance frameworks would insist that any solar geoengineering projects are tied to clear guarantees that emissions reductions would continue.

There is also a danger in overselling the potential of a technology that does not yet exist – and may never exist. Simply talking about a potential insurance policy might give the impression that there is one, and lead governments to behave accordingly.

At the same time, there is a hazard in assuming emissions reductions alone will be sufficient to avoid a crisis.

How do we decide which hazard is greater, and whether even to proceed with this conversation? In our view, governance frameworks that enable broad participation would help decide which proposals should be on or off the table, and that requires a lot more learning.

To declare before we know more that stratospheric aerosol injection, or any other approach, should be included or excluded, or that its discussion should be kept behind closed doors, would be to take decisions on behalf of others who have not even begun to consider it. It has to be recognized that deployment would affect everyone in the world, including people not yet born.

An impartial platform for debate

C2G2 neither advocates for solar radiation modification, nor opposes it: that is a choice for society to make. But we do believe that the time has come for a broader cross-section of society to engage in this discussion.

Until now, much of the debate has been dominated by academics, mostly men, based in western countries. Governance itself has been piecemeal, with limited aspects tackled in national and international forums, but there is no overarching framework that ties these disparate elements together.

This discussion needs to expand to a broader cross-section of society, including policymakers, civil society, religious groups and the private sector, from all corners of the world.

One important step will be under consideration at this year's UN Environment Assembly in Nairobi in March. The Swiss government has proposed a resolution that calls for a much-needed global assessment of the science and governance of geoengineering – both carbon dioxide removal and solar radiation modification – to be completed by the end of 2020. We hope it succeeds.

In the longer term, this issue will also need to be considered by the UN General Assembly, as every country would be affected. There should an agreement that no one deploys solar geoengineering techniques unless the world has acquired a greater knowledge of the risks and potential benefits, and agreed on appropriate governance. The risks of ungoverned deployment are just too high.

We have some time left, but maybe not as much as we like to think. As the climate crisis deepens, difficult decisions are already upon us. We now need the courage to confront them.

Janos Pasztor is a former Assistant United Nations Secretary-General on climate change, and currently Executive Director of the Carnegie Climate Geoengineering Governance Initiative

Capitalism with a conscience

Laura Manna on how investors are seeking a better future through sustainable finance

Up until the late 1990s, the primary focus of investment decisions was a better financial return. Now, with the advent of sustainable finance, that focus is widening with the aim of providing not only better financial returns but a better world.

Today an ever-widening range of issues such as global warming, child welfare, human rights, transparency and bribery have become part of the equation for financial investors. Against this background, Environment, Social and Governance considerations (ESG) are increasingly relevant, driven by an enhanced awareness in society and regulatory changes. Many investors used to claim that the integration of such criteria into investment decisions reduced financial returns, but today there is general agreement that they enable higher performance.

What the financial community refers to as ESG criteria, companies generally call Corporate Social Responsibility, or now more pointedly just 'Corporate Responsibility'. Both amount to much the same thing – a societal rather than merely financial approach to doing business and to investing. For example, a growing number of companies have signed up to initiatives such as the Carbon Disclosure Project, the United Nations Global Compact or the Climate Action 100+, all of which encourage compliance with ESG criteria.

ESG investing is now growing rapidly, despite a lack of harmonization in the evaluation of its practices and a clear understanding of how to quantify its impact on a company's value. Several ESG rating agencies exist, such as Vigéo and Sustainalytics, which evaluate a company's practices to drive investors' decisions.

ESG affects especially those financial players known as institutional investors, including pension funds and insurance companies. Indeed, because pensions and insurance have long-term horizons, institutional investors are interested in the sustainability of their investments, which most often consist of companies' stocks. Today, a growing number of institutional investors believe in environmental and social performance as indicators of corporate value.

International agreements, such as the 2015 Paris Accord on climate change or the UN Sustainable Development Goals, are fostering greater awareness of ESG worldwide. Governments in several countries have introduced detailed regulations requiring institutional investors to disclose information about how they

embed these criteria in their investment choices. At the European level, France has developed the most far-reaching ESG requirements with its 2015 Energy Transition Law, which requires institutional investors to explain on the basis of ESG principles how they choose the companies they invest in.

Research into this sector, carried out in partnership with INDEFI, a Paris-based sustainable strategy consulting company, reveals that the demand and the supply sides of the ESG market present two very different levels of maturity. While for institutional investors ESG is still a new concept, most companies already have a well-established policy of Corporate [Social] Responsibility and are conscious of their environmental impact.

Analyzing all the ESG-related information published by the 160 largest institutional investors operating in the main European countries – France, Italy, Spain, Belgium, Germany, the Netherlands, Switzerland and the Nordics – three main considerations emerge.

First, there is no agreement on how investors should integrate ESG into their decision-making, and the regulatory framework concerning ESG practices is far from complete. For instance, many investors state that they do not invest in the stocks of companies operating in sectors not deemed in line with their ethical standards. In fact they just exclude those investments forbidden by law. Other investors claim that they measure the carbon footprint of their portfolios, but do not publish any numbers making it impossible to judge their actual level of environmental commitment.

Second, there is no common rule about how to release this information publicly, leading to differing levels of transparency.

Lastly there exist important geographical differences in the way institutional investors integrate ESG criteria in their investment decisions. In France and the Nordic countries, where legislation imposes stricter requirements, institutional investors show a high level of expertise on the subject and publish detailed ESG reports every year, while in other countries such as Italy, Spain, Belgium investors lag behind.

As for the supply side – meaning the companies selling their shares on financial market – our research focuses on France, which offers the most complete ESG regulatory framework for institutional investors. Interviewing the directors of investor relations of 23 French listed companies provides an understanding of how they perceive the investors' attitudes to ESG.

First, companies receive an increasing number of inquiries on how they apply ESG criteria – from their financial investors, and especially institutional investors, asset managers and rating agencies. This means that investors' awareness is increasing in line with the evolution of regulation. However, there are some drawbacks, including the additional amount of work to answer investors' requests; the low level of understanding of ESG subjects that emerges from some requests; and the high number of similar but not harmonized questionnaires companies must fill in for ESG rating agencies. Despite this, all the companies researched publish some form of ESG report. Additionally, most of them have a sustainable development department, and the largest ones had committed to several international charters.

Second, active engagement from financial investors remains very limited. Indeed, less than half the companies included in the study mention the direct involvement of an investor in the evolution of corporate ESG practices. This is because companies perceive their relations with investors mostly as dialogues instead of initiatives by the owners of the company to change how it is run. However, these discussions often result in the expansion of ESG practices by the company if, for example, it finds it has underestimated the importance of a certain issue.

Overall, the ESG market needs investors to improve their understanding of ESG criteria, and the rating agencies to harmonize their valuation methods. The striking example of France confirms how governments can improve the structuring of the ESG market through legislation. French pension funds and insurance companies now produce very detailed documents about their ESG and Sustainable and Responsible Investments practices. The result is not only increased awareness of ESG issues, but also a guarantee of long-term sustainability for the corporate and the financial sectors.

This trend can only become more important in the coming years, as young people now arriving in the global financial workforce have a heightened sensitivity to these issues and will insist on being fully respected.

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