Will technology resolve the climate change crisis ?

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Preventing an acceleration of climate changes and ensuring that the planet is on a sustainable *human trajectory* are the greatest challenges human beings are facing in this early part of the 21st century. Humans tend to assume that when a problem reaches critical proportions, a solution will be found. This is a dangerous assumption in the case of complex systems in general, and climate changes in particular.

One of the greatest risks going forward may lie in a combination of resignation, ignorance, arrogance, and unquestionable faith in technological capabilities. Resignation makes us believe that *nothing can be done*. Ignorance leads us to believe that *nothing needs to be done*. Arrogance is to believe that *we know more than we do*.

We live in a period when the future of the planet will be the result of human actions, decisions, and ways of life. This is the Anthropocene era, the age in which humans acquired the power to transform the physical world on a *massive scale* . This does not mean that our understanding of world scale phenomena and our wisdom are commensurate with our technological capabilities. Having the technological capacity to affect the climate of the planet and making wise use of technological capabilities are two very different things. Public fear in the face of extreme climate changes, combined with ignorance, a touch of arrogance, and technological might is a potent mix that could set the world on an unpredictable path with irreversible consequences.

This is not as farfetched as it may sound; this scenario is in the making today. Geo-engineering research is currently exploring how large-scale manipulation of the earth's systems may reverse the damages caused by humans' activities. Geo-engineering interventions will become increasingly appealing as climate changes begin to displace large numbers of people. Cambridge University has a Center for Climate Repair as part of its Carbon Neutral Futures Initiative. They are conducting an initiative on deploying 'space sails' to deflect heat. On

August 1st, 2019, Harvard University announced that a "Stratospheric Controlled Perturbation Experiment" will be conducted in the coming months. A few kilograms of particles will be dropped in the stratosphere to conduct simulation on how this may affect climate changes. Eventually, artificial intelligence (AI) could be used to decide where, when, and how many particles need to be dropped to cool down the planet. The capabilities for drones and AI computer-controlled cockpits already exist. The petroleum industry and the military have a keen interest in such research. In May 2019, Saudi Arabia and the United States of America, the two most prominent producers of oil and gas, opposed the idea of regulating geo-engineering at a UN assembly meeting. These experiments entail scientific, social, and political risks

In the past, the balance between technological might and the use that society makes of it has been the result of social norms and public values. We have the capacity to run farms to collect organs – but we do not do so because it is unethical. We have the capacity to genetically generate superhumans but, we have not. We have the capacity to start a nuclear war that would inflict irreparable global harm, but years of effort have been dedicated to avoiding such an outcome. The scientific community has displayed much self-restraint. Social norms, public values and self-restraint have been the safeguards of human technological progress. What normative frame will guide actions and decisions about engineering the climate of the planet? Low cost geo-engineering options and the diversity of circumstances may make it irresistible for some countries to attempt to influence climate changes in their favour. Interventions by some countries would inevitably lead to counter-reactions by others. The President of the United State recently mused about the possibility of using atomic bombs to deter hurricane formation. The potential for climate warfare in the coming years is a very real possibility.

Technological innovations are needed and may be part of the solution. But there may not be technological solutions to what are basically problems of society, such as climate change. A techno-managerial focus bears its own set of risks. It limits the discussion about change within existing parameters so that nothing really needs to change. It provides a false sense of reassurance that it is possible to continue generating CO2 emissions without restraint because there will be a technological

solutions. It avoids addressing the root causes of climate changes and circumvents fundamental questions about the way society is organized.

The ecological crisis we are experiencing is anchored in the way society is organized. The system is perfectly designed to generate the results we are witnessing.

This article is based on an unpublished working paper entitled ***Why is it so difficult to make progress on climate change***