

Preston, C.J. (ed.): Climate Justice and Geoengineering: Ethics and Policy in the Atmospheric Anthropocene. London–New York, Rowman & Littlefield International. 2016. 209 p.

A great many researches have been addressing the issue of global climate change for decades. The Intergovernmental Panel on Climate Change (IPCC) in its fifth Assessment Report significantly expanded its focus to climate engineering compared to previous reports. Adaptation to climate change is not optimal, as countries most in need of adaptation have the least amount of resources. In response, and as the planet is already locked in the future warming caused by past emissions, geoengineering is suggested as a possible tool of further mitigation. Geoengineering, also known as climate engineering, describes methods and technologies for ‘manipulating’ the climate in order to mitigate or prevent the effects of climate change.

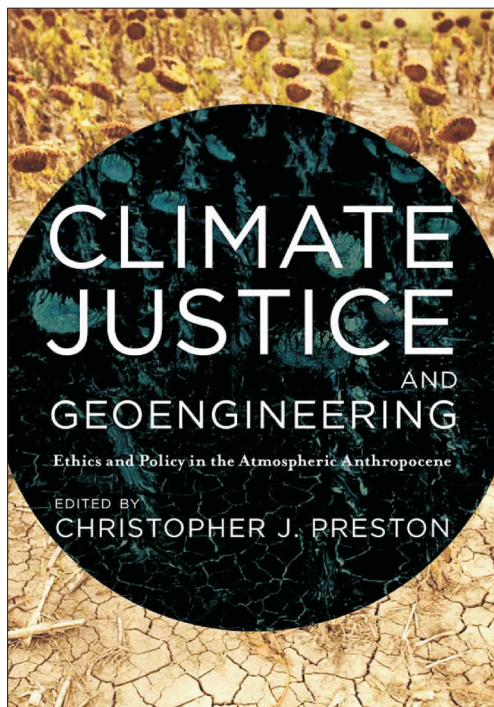
Christopher PRESTON, professor of philosophy at the University of Montana and a leading philosopher of the ethics of climate engineering, has brought together an impressive group of thinkers and researchers to reflect on the complex topic of “Climate Justice and Geoengineering: Ethics and Policy in the Atmospheric Anthropocene” in the current volume. There is an extensive literature nowadays on the ethics of geoengineering which offers several important observations. One of the main ethical issues this vol-

ume indirectly draws attention to is the thought of intentionally manipulating the whole planet challenges the whole domain of environmental thinking. The current edited volume is a remarkable initiative to provide a comprehensive and comparative overview of climatic technologies and ethical issues in their interrelations. It gives us the opportunity to evaluate technologies while taking into consideration key ethical challenges, and to gain a better understanding of alternative climate policies. Thanks to the fairness approach the list of contributors includes both advocates of climate intervention research and its sceptics.

This cross-disciplinary collection contains a second-generation of analyses which state that the portrayal of the problems identified in first generation studies of climate engineering can start to take on a different hue when put into a more realistic context. While significant ethical challenges are still clearly surrounding climate engineering, the arguments of several authors do not preclude the possibility that some form of climate engineering will make some contribution to climate justice in the future under certain highly constrained circumstances.

The volume includes 13 studies written by economists, geographers, philosophers, policy experts, climate experts and sustainable development theorists. Diversity is not only presented in terms of disciplinary background, but also as regarding the nationality of the authors. Contributors originate from Canada, Finland, Germany, Italy, Kenya, the Netherlands, Nigeria, Sweden, Switzerland, the United Kingdom and the United States. The articles take up theoretical and practical aspects as well. The book consists of three parts.

Part I (*Geoengineering Justice in Theory*) is oriented primarily towards philosophical and ethical theory. Geoengineering means deliberate large scale intervention into the Earth’s natural systems in order to counteract climate change. Generally, geoengineering techniques can be grouped in two categories: Carbon Dioxide Removal (CDR) and Solar Radiation Management (SRM). CDR techniques aim to remove carbon dioxide from the atmosphere, directly counteracting the increased greenhouse effect and ocean acidification. These techniques (e.g. afforestation, biochar, bio energy with carbon capture and sequestration, ambient air capture, ocean fertilisation, enhanced weathering, ocean alkalinity enhancement) should be implemented on a global scale to make a significant impact on carbon dioxide levels in the atmosphere. SRM techniques aim to reflect a small proportion of the Sun’s energy back to space, counteracting an increasing level of greenhouse gases in the atmosphere which absorb energy and raise temperature. Some SRM techniques are albedo enhancement, and the



use of either space reflectors or stratospheric aerosols through stratospheric sulphate injection (SSI).

Toby SVOBODA argues in Chapter 1 that, although SRM may impose distributive injustice in general, certain uses of SRM might nonetheless be distributively just. According to PRESTON, SRM could have the morally contestable outcome of increasing the vulnerability of some parties to climate related burdens, yet on the whole a policy involving SRM might be more just than its alternatives, given SRM's potential to manage climate risk and buy time for mitigation, development, adaptation and, possibly, CDR. As SVOBODA puts it: "Accordingly, SRM might be permissible in light of our duties of justice, despite its potential to bring unjust burdens to some parties. To be clear, I am not advocating SRM deployment, but it is time for ethicists to begin broadening their consideration of SRM, attending not just to its potential ethical problems but also to its potential ethical merits" (p. 13).

Employing geoengineering to struggle with climate change is often identified as 'Plan B'. Chapter 2 argues against the common Plan B framing of SSI. According to Augustin FRAGNIÈRE and Stephen M. GARDINER, Plan B framing presupposes distinctness, independence, exclusiveness, attractiveness and relative feasibility. In general, it claims that the framing encourages distortions of the ethical judgement by unnecessarily narrowing down the variety of options available to future climate policy and underestimating the relevance of past moral failures. According to the authors, rather than a comparative assessment of mitigation and geoengineering, we should encourage a more integrative assessment that situates SSI within the wider context of climate policy as a potential part of more general schemes of action. Another lesson learnt from this chapter is that ethics is premier to this task.

Chapter 3 addresses the problem that the debate surrounding climate change and climate justice mostly focuses on emission reduction. The aim of this chapter is to argue that the concept of recognition plays an important role in evaluation and improvement of participatory processes. The main conclusion of the authors is that using SRM without ensuring participatory justice for all actors concerned we risk endangering the trust and social capital.

In Chapter 4 Patrik BAARD and Per WIKMAN-SVAHN try to figure out whether we have a residual obligation to engineer the climate as a matter of justice. The theory of residual obligation was first discussed by Bernard WILLIAMS. The concept pointed out that if an agent has more than one obligation, fulfilling one of them does not cancel out the moral importance of the others. The authors critically examine the thesis that we have a residual obligation of solar geoengineering. Furthermore, geoengineering exposes individuals to new risks. Concluding alternative residual obligations should thus be more seriously considered in climate policy.

The last topic of Part I is intergenerational justice of climate change (Chapter 5). The problem is that earlier generations' emissions cause loss to the future generations by climate change which must be compensated. According to Frank JANKUNIS and Allen HABIB further investigations about geoengineering as a potential compensatory mechanism are necessary.

In Part II (*Geoengineering Justice in Practice*) four theoretical questions are addressed. The first one is that the solar geoengineering has obligations to the global poor (Chapter 6). There is a broad consensus that the effects of climate change will disproportionately affect the poor, for the simple reason that poorer people will have less resources compared to wealthier ones to manage climate risks and adapt to unavoidable changes. The other most significant criticism against solar geoengineering is that it could shrink responsibility by postponing the harmful effects of climate change.

The second question is why aggressive mitigation must be part of any pathway to climate justice (Chapter 7). Reflecting on it, countries' representatives are obliged to ensure that their citizens' total fair share (FS) of emission entitlement is not exceeded and to promote the establishment of adequate global institutions. Also, wealthy countries ought to undertake fast and far reaching mitigation. The possibility to research and deploy climate engineering (CE) technologies and to undertake adaptation does not diminish the original obligation with respect to mitigation. In conclusion, different strategies of how meaningful policies can evolve over time are suggested, for example carbon pricing as well as low carbon research and development.

Chapter 8 discusses the energy and climate context that shapes the possible roles of climate engineering, the way CE might be used as a part of a strategic portfolio to control climate impacts, cultural issues associated with starting research on this topic, and some thoughts about moving towards the international control of CE. The author's main conclusions are that geoengineering may be needed in the future, but one needs further research to prove its potential. As the problem of climate change grows, the need for international interaction and coordination will also increase. Here, early and smaller scale interventions can provide an alternative to build the institutions required.

The last topic in this part of the volume analyses the ethical challenges, risks and opportunities that result from the complex relations between food systems and climate engineering. Important and difficult questions arise from interactions between climate engineering, climate mitigation, and food production and consumption. It is necessary to find the ways to resolve or manage the risks related to non-agricultural SRM techniques. Considering how significantly climate change threatens food justice and food security, there are good reasons for being cautiously positive towards those climate engineering strategies that are safe in terms of food justice and food security.

Part III (*Geoengineering Justice in Frames, Scenarios, and Models*) employs four individual models and case studies. The first topic addressed here is “Framing out Justice: The Post-politics of Climate Engineering Discourses” (Chapter 10). It compares climate engineering to climate change in terms of how they are framed in media discourses. The chapter begins with a brief introduction to the existing climate change discourses. Three competing theories, ‘Prometheanism’, ‘eco-modernisation’ and ‘green radicalism’, are presented in this part of the book. According to the author three explicit master framings can be identified in the discourses: technological optimism, political realism and ‘avoiding catastrophe’ framings. The researches presented here focus on explicit aspects of the debate, also analysing separately the framings of the two main techniques, CDR and SRM. In general, media framings typically imply that geoengineering would be practical and controllable, and describe it as a decision to be made to avoid potentially catastrophic levels of climate change. Duncan McLAREN also emphasises the possibility of cancelling the domination of the climate debate by discourses sustaining existing injustices.

Chapter 11 presents a case study which focuses on solar geoengineering. It investigates “Technology-Based Climate Intervention and Compromising Social Justice in Africa”. According to the authors, Africa is likely to experience catastrophic climate impacts if the current trajectory of climate policies is maintained. In consequence, this study shows that under certain climatic conditions and a specific climate intervention regime, African policymakers often decide to prioritise one group of stakeholders over others, depending on this group’s social influence and its firm interest in the outcome of climate policy, which has significant implications for climate justice. Furthermore, the implementation of such systems requires sustainable, socially equitable and affordable infrastructure. Therefore, African leaders need to become self-determined ‘climate pro actors’ by developing consistent climate protection mechanisms.

The next chapter (Chapter 12) presents integrated assessment models (IAMs) which are analysing trade-offs and synergies as foreseen. As the authors, Johannes EMMERLING and Massimo TAVONI point out, “Achieving climate stabilization is the ultimate goal of climate change policies” (p. 175). According to the authors the main question is even if countries were to agree on a long term temperature goal, how could it be translated into climate change strategies. IAMs have already been used as a respond to this policy request. Geoengineering technologies, namely CDR and SRM, have been incorporated into IAMs, though in much different degrees. Both of them raise many concerns with important consequences for equity and justice, but these are fundamentally different from each other. In the case of CDR, the benefits of reduced economic costs must be compared with the temporal and geographical repartition of effort, and the risks can be mitigated

by setting appropriate measurement and introducing the right policies. On the other hand, SRM embodies a series of risks which are not easily mitigated.

The last chapter (Chapter 13) computes the KALDOR-HICKS optimal level of geoengineering and shows there is actually no PARETO optimal level in this case. The author, Richard TOL, considers two sets of transfers. The first set assumes that people are exposed to unbridled climate change and compensates those who would prefer less-than-globally-optimal geoengineering. The other set favours climate change and compensates those who would prefer more-than-globally-optimal geoengineering. Although the presented analysis is really simple, it provides a valuable overview of the main inequities that come with geoengineering. On the other hand, it has many limitations. For example, the analysis is static, but the problem is dynamic. Hence, this macroeconomic analysis is very useful to evaluate the process, but further development should be taken.

In conclusion, achieving climate stabilisation is the ultimate goal of climate change policies. Over the last decades, such approaches have considerably increased their legitimacy among scientists, policy makers and environmental groups. The most important question is even if the representatives of countries were to agree on a long term temperature goal, how could it be translated into climate change strategies? More specifically, how would the development of such strategies complement or weaken efforts aimed at mitigation and adaptation. The technologies discussed above may target different areas of the climate system with different concerns, diverse social impacts and environmental effects. In the end of the volume, we have an overall view about how to evaluate technologies while taking into consideration their ethical challenges, and how to gain a better understanding of alternative climate policies.

In light of these, the most outstanding message of the volume is that geoengineering intersects with other sectors and trends in all geographical regions and at all levels of governance (all scales). In order to determine whether any geoengineering approach is appropriate to address climate change, we must first turn to critical global discussions. According to Christopher J. PRESTON, matters of justice are perhaps the primary consideration that should drive any discussion of climate change.

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