

***Pandora's Toolbox:
The Hopes and Hazards of Climate Intervention***

By Wake Smith



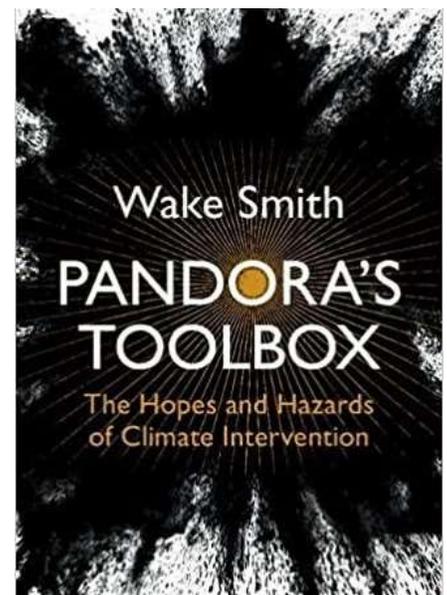
Net zero emissions is only the beginning

Unless we do so unexpectedly quickly, reaching net zero emissions will not be the end of the climate struggle, but only the end of the beginning. For centuries after net zero, temperatures will remain elevated; climate damages will continue to accrue, and sea levels will continue to rise. Even the urgent and utterly essential task of reaching net zero cannot be achieved rapidly by emissions reductions alone. To hasten net zero and minimize climate damages thereafter, we will also need massive carbon removal and storage. We may even need to reduce incoming solar radiation in order to lower unacceptably high temperatures. Such unproven and potentially risky climate interventions raise mind-blowing questions of governance and ethics.

Pandora's Toolbox offers readers an accessible and authoritative introduction to both the hopes and hazards of some of humanity's most controversial technologies, which may nevertheless provide the key to saving our world.

By opening up *Pandora's Toolbox*, you'll be prompted to consider:

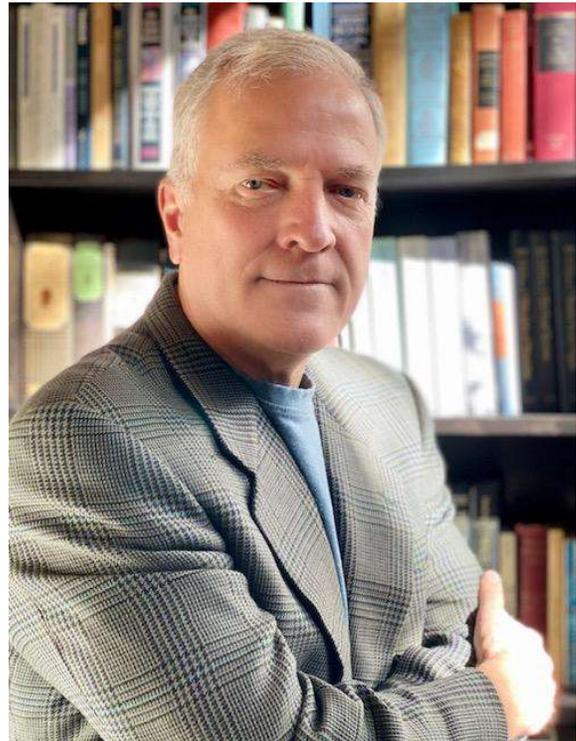
- Net zero emissions via emissions reductions remains the essential climate solution, but it is likely to prove difficult, expensive, and therefore slow
- Mid-century net zero would likely preserve the climate as we know it. Late century net-zero would imply drastic warming
- Whenever we reach net zero, temperatures will not decline, but merely plateau at their peak levels for centuries



- If we overheat the climate before reaching net zero, then high climate damages will also plague the planet for centuries
- Climate interventions are the likely tools that humanity would employ to shield itself from the impact of high climate damages after net zero
- They are not Plan B for Problem A, which is reaching net zero. We must do that via emissions reductions.
- Climate interventions are instead Plan A for Problem B, which is how to repair the climate and survive in an overheated world after net zero

WAKE SMITH'S ACADEMIC CAREER HIGHLIGHTS

- **BA from Yale and MBA from Harvard**
- **30+ year career in aviation and aviation finance**
- **President of the flight training division of Boeing**
- **COO of Atlas Air Worldwide Holdings (global cargo airline)**
- **CEO of Pemco World Air Services (aircraft maintenance / modification provider)**
- **Senior Advisor, New State Capital Partners (private equity firm)**
- **Since 2017, Lecturer in Yale College**
- **Since 2019, Senior Fellow, Mossavar-Rahmani Center for Business & Government, Harvard Kennedy School**



As a lecturer at Yale University, Wake Smith teaches a world-leading undergraduate course on climate intervention, which forms the basis for this book. Smith is also a Senior Fellow at Harvard, writing scholarly articles on costs, aeronautics, and governance of solar geoengineering. Prior to his academic career, Smith served in several executive roles in the aeronautical industry.

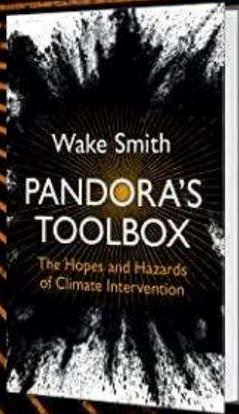
SELECT TALKING POINTS FROM THE BOOK

- The Paris Agreement is unlikely to prove capable of sparing the world from drastic climate change
- Despite the impressive growth of wind and solar, fossil fuels still comprise more than 80% of the world's primary energy supply, and renewables are barely gaining share
- Planting trees is mostly greenwashing and the modern equivalent of selling papal indulgences. "Natural solutions" will only matter on the margins
- Since we are currently on a roughly 3°C track, we should stop burying the public's head in the 1.5°C sand
- If we approach 3°C temperature change, emissions reductions and adaptation will be insufficient to preserve an acceptable climate. We would need other tools
- The most likely tools are carbon capture and storage, and solar radiation management
- Carbon capture would cure the underlying disease, but likely on a centennial timescale and at a crushing cost to future generations
- Solar radiation management would be cheap, but would only mask excessive heat rather than reverse climate change, and with possible side effects that are risky and unexplored
- Nonetheless, if drastic climate change causes societies in the global south to collapse late in this century, drastic and expensive solutions may be required after net zero
- Successful implementation of climate interventions – or of emissions reductions itself – will require empowered global governance on a scale unseen in human history



“At last, a realistic and unflinching view of the hard reality of climate choices that are coming.”

John Moore, Chief Scientist at the College of Global Change and Earth System Science, Beijing Normal University



“This great book gives us a ray of hope in a situation where everything looks rather bleak.”

Hugh Hunt, Fellow of Trinity College, University of Cambridge

“A well written, accurate and entertaining guide to climate change and climate intervention techniques that gives the readers all the arguments to make up their own mind on the topic.”

Olivier Boucher, Climatologist, Sorbonne Université / CNRS

“Pandora’s Toolbox emerges as ‘must reading’ for all who seek to understand the pathways to a successful global response to climate change.”

Dan Esty, Hillhouse Professor of Environmental Law and Policy, Yale University
and editor of *A Better Planet: 40 Big Ideas for a Sustainable Future*

Wake Smith is available for interviews, expert commentary, features, Q&As and select byline opportunities:

For more information, please visit wakesmith.earth

You can connect with Wake on [LinkedIn](#)

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