Foreword Michael Mann

The obstacles we face in mitigating climate change are political, not technological

BACK in the late 1990s, my co-authors and I published the now famous "hockey stick" curve – a graph documenting the unprecedented warming that had taken place over the previous century. It became an iconic symbol in the case for concern about human-caused planetary warming. It also attracted attention from the fossil fuel industry and the vast array of interested groups and climate deniers they fund and promote because of the threat it posed to unrestrained fossil fuel extraction. Ever since, I have been on the front lines of the battle to communicate the reality of climate change in the face of a concerted campaign attacking and discrediting the science and its implications.

Nearly three decades later, the catastrophic consequences of relative inaction are now evident on a daily basis in the form of unprecedented heat waves, wildfires, floods and superstorms. Meaningful action – at least in the US, the world's worst legacy carbon polluter – feels more distant than ever. The current US administration is engaged in a full frontal assault, not just on climate action but also on the overwhelming scientific consensus behind human-caused planetary warming and its consequences.

Meanwhile, we are approaching dangerous warming thresholds. The planet is now just a few years from burning through the cumulative carbon emissions budget for limiting warming to 1.5C above pre-industrial levels.

But we're not doomed yet. Limiting warming to 2°C, which would probably prevent many of the worst climate consequences, is still possible. The inexorable rise of renewables like wind and solar means we have the opportunity to decarbonise the global economy before it's too late. Clean energy has the potential to meet projected energy demands. The obstacles aren't physical or technological, but instead political, and political obstacles can be overcome.

For the time being at least, nations other than US, including the UK, Canada, Australia, China and European countries, will need to take a leadership role. And petrostate antagonists such as Russia, Saudi Arabia, and the US – at least in its current guise – will need to face increasingly severe sanctions. That might seem harsh. But nothing less than the future of the planet, and the fate of our children, grandchildren and future generations, is at stake. ∎


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PROFILE

Michael E. Mann is a climatologist and the director of the Penn Center for Science, Sustainability and the Media at the University of Pennsylvania. His latest book is *Science Under Siege: How to fight the five most powerful forces that threaten our world*.

CHAPTER 1
HOW WE ARE CHANGING THE CLIMATE

Earth's surface is heating up at an unprecedented rate, driven by greenhouse gas emissions from burning fossil fuels. The consequences are becoming ever more obvious, with record-breaking heatwaves and other extreme weather events. But for all the pledges made by governments and businesses, emissions continue to rise.

CHAPTER 2
THE BIG CLIMATE MYSTERIES

The complex science of climate change involves many uncertainties, not least the question of how much warmer the world has got – and will get. It is also difficult to predict the future impact of global warming, though some researchers are now warning that we are at risk of triggering catastrophic "tipping points".

CHAPTER 3
THE RENEWABLES REVOLUTION

From wind and solar to geological hydrogen, clean-energy technologies that reduce our reliance on fossil fuels have surged in recent years. Even so, experts are at odds over whether we can power the world on renewable energy alone – and whether the transition is happening fast enough.

CHAPTER 4
INNOVATION AND ACTION

We can't keep global warming below 2°C by halting emissions. We must also remove vast volumes of carbon dioxide from the atmosphere, and some now argue that we may have to artificially manipulate the climate. Others insist governments must do better with climate policies and enforcing climate justice.

CHAPTER 5
LIVING WITH CLIMATE CHANGE

Extreme weather may be the most dramatic manifestation of global warming, but it is far from the only way that climate change is affecting our day-to-day lives: food costs are rising, soaring temperatures are making some cities borderline unliveable and a growing number of us are experiencing climate-related stress or "eco-anxiety".

CHAPTER 6
OUR CLIMATE FUTURE

Despite the changes we are seeing, the future of the climate and the fate of humanity are still undecided, with much depending on how hot it gets and how we adapt. The good news is that if you look closely at the data, there are grounds for cautious optimism.