Book Review *– Sir Brian Heap*

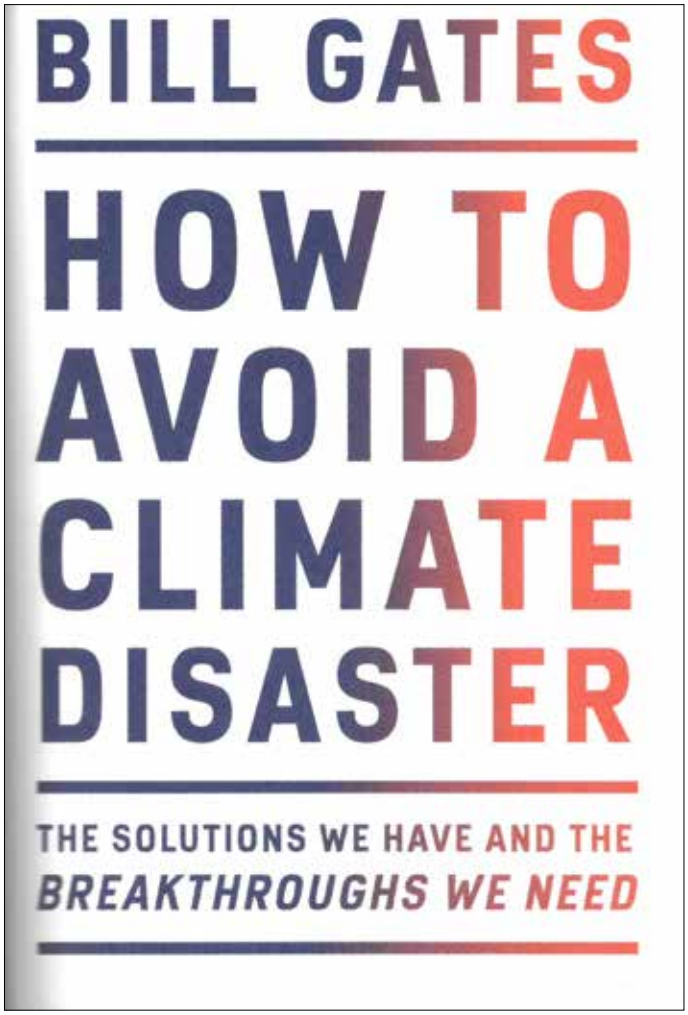
How to avoid a Climate Disaster:
The solutions we have and the breakthroughs we need

By Bill Gates

Alfred A. Knopf, 2021, 272 pp, hardback, £13.65, ISBN 978-0-385-54613-3

It feels as if Bill Gates had to write this book at speed after what he discovered about climate change from his decade-long investigation. It is a good read and admirable in its urgency.

Unsurprisingly, as a business leader and technologist he has an eye for what could work, how to get there and how to make a business. As a philanthropist he is driven by a 'can do' approach so that if the challenge is formidable, it is not insurmountable. He admires the writings of Czech-Canadian iconoclastic scientist Vaclav Smil but defers from commenting on the proposition in Smil's latest book, Growth, that the future habitability of the biosphere can be ensured only by moving away from prioritizing growth, if not abandoning it altogether.



Gates outlines why global warming is happening, why global carbon emissions are 65% higher than they were in 1990, and how this translates into very hot days, powerful storms, permafrost melts, sea level rise, prolonged droughts, wild fires, and increased mortality rates. He wants us to keep two numbers in mind - 51 billion tons (USA) of greenhouse gases added to the atmosphere every year, and zero, the emissions we need to aim for if we are to avoid catastrophe and save the planet. 'Net zero' is used to describe achieving an overall balance between emissions produced and emissions taken out of the atmosphere. As a target it is realistic and understandable because it allows for some residual emissions that are 'hard-to- treat', such as aviation, agriculture and manufacturing where reducing emissions is either too expensive, technologically too complex or simply not possible. Residual emissions from these sectors can be allowed in a net-zero scenario as long as they are offset by removing previous emissions using natural or engineered carbon sinks.

Getting to net-zero and a temperature rise of less than a 1.5°C by 2050 will be hard enough in the time remaining. But Gates claims that new ways to mitigate warming will provide huge economic and job opportunities for emerging zero-carbon industries particularly in rich countries, which are the biggest emitters but also well suited to eco-systems innovation. So, at the Paris accord of 2015 where it was agreed to prevent global temperatures rising to 2.0°C above pre-industrial level, Gates launched Breakthrough Energy, which engages in philanthropic programmes, advocacy efforts and private funds, investing in more than 40 companies with promising ideas.

The Breakthrough Energy team identify five human activities where we need to eliminate greenhouse gas emissions completely to meet the 2050 targets - making things (cement, steel, plastics), plugging-in (electricity), growing things (plants, animals), getting around (planes, truck, cargo ships) and keeping warm and cool (heating, cooling, refrigeration). The task sounds overwhelming but they introduced Gates' notion of the 'Green Premium' - the additional cost of choosing a clean technology to replace one that emits a greater amount of greenhouse gases. Gates presents a plethora of creative measures to drastically reduce the high cost of Green Premiums and his message overall is that accelerated innovation and scale-up will eventually win, as they have done in the past, with astonishing reductions in the

prices of renewable energy and smart grids. Some critics will question his calculations and others will accuse him of 'greenwashing' to the benefit of big emitters such as oil, gas and aviation industries, but the figures listed in the paragraph below reflect the challenge.

In the USA, replacement of current heating fuels, such as natural gas, with advanced biofuels or carbon-neutral electrofuels carries a hefty Green Premium (142% and 425%, respectively). If a heat pump is used to replace natural gas heaters and air-conditioning the news is better with the Green Premium on new constructions in cities around the USA being 16-27%. But for cement it ranges from 75-140%, for steel 16-29% and for ethylene (plastic) 9-15%. Artificial meats come with a high Premium, costing 86 % more than the real thing.

But will governments and policy makers act swiftly enough? Will enough people switch their behaviour and fly less to make a difference? What about the resilience of the poorest 800 million who still have no electricity or only an intermittent supply? Or, in other words, will we love our neighbours as much as we love ourselves in line with the second greatest commandment of Jesus?

For one of the world's richest men to write such a book presents a dilemma not unlike that of the rich young man who asked Jesus about the way of redemption. Gates, in contrast, contemplates his absurdly high carbon footprint and addresses his guilt and hypocrisy by using carbon-free fuels for his addiction to private planes, and by giving a $1bn investment of his own money to promising technologies – a scintilla of his $150 billion personal wealth.

Coming to terms with the cost we will have to pay and the adaptations needed to save the planet bring a salutary reminder of how we have plundered the planet over many generations. A theology that encouraged exploitative domination now demands a more nuanced approach into the many ways of caring for creation, including human stewardship and viewing ourselves as members of the community of creation[1], which, in the words of Pope Francis 'is the marvellous gift that God has given us'.[2]

Yet behavioural change is not always an option. Gates recognises that 'even though the world's poorest are doing nothing essentially to cause climate change they're going to suffer the most from it' with burgeoning cities that are unsustainable and potable water that is in increasingly short supply, his concern for malnourished children, poor farmers, and the lack of healthcare is palpable. His future Plan is not just about technocratic solutions. It includes: tax carbon to rapidly lower Green Premiums; provide new money to quintuple R&D; incentivise to reduce risks; capture and store carbon; and learn how to do atmospheric geo-engineering even if it is criticised as unethical, because one day we may have no choice.

Finally, Gates calls for citizens, consumers, employers and employees alike to adapt; to engage with decision-takers and policy-makers to create effective policies; and to share the facts with family, friends and colleagues to help spark individual action. COP26 at Glasgow will take courageous leadership, solidarity and the removal of geopolitical tensions to unite developed and less developed nations as they confront existential concerns. Solidarity stems from ancient philosophy[3], the prayer of Jesus about the oneness of followers[4], social teaching[5], and contemporary writings[6]. And it emerges from the Covid 19 pandemic[7] where solidarity came from working together. Solidarity is fundamental if we are to deal with what Gordon Brown, writing in The Guardian, calls the most difficult collective problem the world has ever had to face[8] and is underscored repeatedly by the Intergovernmental Panel on Climate Change.

However, the jury is still out in the Gates vs Smil debate[9].

1 D.Hayhoe, *Science and Christian Belief* 29, 93-120, 2017
2. https://www.ncronline.org/blogs/francis-chronicles/destroying-creation-destroying-gift-god-pope-says- audience
3. For example Aristotle: https://www.researchgate.net/publication/323146339_Aristotle's_Political_Friendship_politike_philia_as_Solidarity
4. John 17:21
5. 'To the managers and workers of the Terni steel mill and the faithful of the Diocese of Terni-Narni-Amelia, Italy' (20 March 2014) | Francis (vatican.va) https://www.vatican.va/content/francesco/en/speeches/2014/march/documents/papa- francesco_20140320_pellegrinaggio-diocesi-terni.html
6. J. Blau, *The Paris Agreement: Climate Change, Solidarity, and Human Rights*, 2017.
7. https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media- briefing-on-covid-19 (18-march-2020)
8. https://www.theguardian.com/books/2021/feb/17/how-to-avoid-a-climate-disaster-by-bill-gates-review-why- science-isnt-enough
9. https://nymag.com/intelligencer/2019/09/vaclav-smil-on-the-need-to abandon-growth.html

***Sir Brian Heap** is a biological scientist, Distinguished Fellow at the Centre for Development Studies, Cambridge, former President, European Academies Science Advisory Council, former Master of St Edmund's College, Cambridge, Fellow of the Royal Society where he was Foreign Secretary, Vice-President, and editor of the Philosophical Transactions of the Royal Society, Series B.*