

Book Review

March 12, 2021

How To Avoid A Climate Disaster: The Solutions We Have and the Breakthroughs We Need by Bill Gates. Published by Alfred A. Knopf, 2021.

Bill Gates has written a very good book on global warming and climate change. It is well-organized, clearly written, and fact-based. The book is illustrated with easy to understand tables, charts and graphs.

It's good to know that someone as capable as Bill Gates is now focusing on climate change and what to do about it. As we all know, he is a very successful entrepreneur, corporate executive, and philanthropist. He and his wife Melinda are not content to give their money away. They put in the time and effort to understand complex problems and how to solve them.

This book is a good roadmap of how Bill Gates thinks about big, complicated problems like climate change and how to solve them. He clearly defines the problem, gathers and analyzes the facts, makes logical conclusions, and proposes realistic recommendations.

He understands "the only way to avoid disastrous outcomes is to get to net zero." Net zero is when there are no greenhouse gas emissions that are not offset by removing greenhouse gases by natural or artificial means. He appreciates how difficult it will be to reach net zero. There are no simple solutions or silver bullets. "The world has never done anything quite this big." In spite of this he is an optimist.

He correctly focuses on two big numbers. The first is 51 billion. 51 billion tons is the quantity of greenhouse gases put in the atmosphere annually. The other big number is 2050. This is the date by which these greenhouse gas emissions have to be reduced to net zero. This is required if we are to stay under the Intergovernmental Panel on Climate Change (IPCC) goal of limiting global warming to less than a 1.5°C increase over preindustrial temperatures.

We agree that we must do all we can to get to net zero as soon as possible. However, we doubt that it's possible to move fast enough to keep global warming under 1.5°C or even 2.0°C. We hope we are wrong. Today, the global average

temperature increase is already 1.1°C and greenhouse gas emissions are still increasing.

Bill Gates believes that human ingenuity and technical progress will, if properly harnessed, be able to solve this problem. We have to get the incentives right and use the capabilities of governments and the private sector. He puts a lot of emphasis on the need for more R&D and more innovation, and includes a list of needed technical breakthroughs.

Throughout the book there is a necessary emphasis on the need to electrify the economy to the maximum extent possible and to produce all this electricity using renewables. This is the single most important step in stopping climate change.

Energy austerity by reducing our energy use is not a solution. Rising living standards and population increases require more energy. “There is nothing wrong with using more energy as long as it is carbon free. The key to addressing climate change is to make clean energy just as cheap and reliable as what we get from fossil fuels.”

He introduces a very useful concept, a “green premium,” the additional cost of a carbon-free solution over current practices that are dependent upon fossil fuels. He gives several useful examples of green premiums and what is needed to reduce or eliminate them in transportation, steelmaking, cement production and agriculture. He uses the green premium to identify areas that have the biggest potential for technical breakthroughs such as making steel without using coke, a coal product.

Bill Gates emphasizes the need for a coordinated global program. No one country wants to commit to the effort and expense to reach net zero if all other countries with significant emissions don’t make the same commitment. The Paris Agreement is the international organization needed to address climate change on a global basis.

He discusses the need for synthetic gaseous and liquid fuels in the future such as for aircraft and ocean shipping. These fuels could be made from CO₂ captured from the atmosphere and hydrogen produced by electrolysis using electricity from renewables.

Bill Gates is encouraged by his success with Microsoft. He and cofounder Paul Allen came up with what was originally considered a ridiculous thought that there would be a computer on every desk and in every home. A similar vision and optimism guides his thinking concerning climate change. It can be done.

He is very concerned about equity and fairness. He understands that the most vulnerable people in the world will suffer first and suffer the most from climate change.

There are a few areas where we would like to see more emphasis:

First, there could be more emphasis on a carbon tax or fee which is discussed in the book. The ability of fossil fuel users to discharge greenhouse gases and other pollutants into the atmosphere should not be free. This is a huge subsidy for fossil fuel use. Putting a realistic price on carbon would go a long way to reduce or eliminate the green premium for many renewable energy uses and would also be a big incentive to improve energy conservation and efficiency.

Second, we would like to see more discussion of the need to educate the public. As Bill Gates points out, public awareness is increasing rapidly. However we are a long way from convincing the public to support actions needed to stop climate change. For example, there would be a lot of opposition to any increase in gasoline prices and other fuel costs. Our politicians will not do what needs to be done unless the voting public is willing to support change.

Third, he correctly points out that the transition to renewables and other actions needed to eliminate greenhouse gas emissions present major new business opportunities. What he did not point out is that China is already ahead of the U.S. in many of these businesses and relevant technologies. Many of the green jobs that President Biden is anticipating will be in China if U.S. industry is not competitive and does not move fast enough.

Fourth, more emphasis should be put on the potential for conservation and efficiency improvements to reduce greenhouse gas emissions. Energy efficiency is already improving by about two percent per year on a global basis. An improvement to three percent per year would reduce our energy use about 25 percent by 2050 with a substantial reduction in greenhouse gas emissions.

Finally, we need to point out that failure is an option. If we don't do enough fast enough the earth's temperature could exceed 3.0°C by the end of this century with very severe consequences.

William Fletcher and Craig Smith, coauthors of **Reaching Net Zero: What it Takes to Solve the Global Climate Crisis** published by Elsevier in 2020.