THE GLOBAL CLIMATE CRISIS: 2025 MID-YEAR UPDATE

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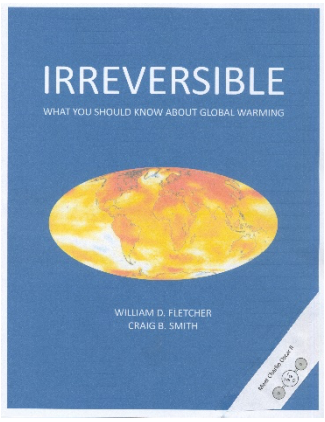
Update reports.

Our last update, "*Update Report: year-end 2024,"* was published in January 2025 and is available on our website. Following is a brief summary of important developments since our last report.

- For the last three years, each year has set a new global temperature record.
- Global warming is ***irreversible***; even if we stop greenhouse gas emissions, temperatures will not decrease for decades.
- The world **will not** achieve "net zero" by 2050.
- The current forecast is that the average global temperature rise will reach 2°C (3.6°F) to 4°C (7.2°F) by 2100.
- Rising temperatures will continue to at least 2100, with weather disasters becoming more frequent.

Proposed new book:



Politics.

U.S.

The U.S. government has provided on-again, off-again support for efforts to reduce global warming. Pres. Obama joined the Paris agreement in 2016; Pres. Trump withdrew in 2017; and Pres. Biden rejoined in 2021. In August 2022, Pres. Biden signed the "Inflation Reduction Act," (IRA) approving $360 billion in spending over 10 years to combat climate change. There are many criticisms of this bill: there was insufficient government auditing and monitoring; some projects were best left to industry; tax credits and loans were done without adequate verification, etc.

In January 2025, when Trump was elected for a second term, he again withdrew from the Paris Agreement and took an ax to the IRA, rolling back tax breaks for wind and solar programs, for electric vehicles, and for many other signature programs, but creating new incentives for coal and leasing federal lands for fossil fuel production. In other actions, the Trump administration shut down the federal website that publishes updates on climate change research.[1] Los Angeles Times columnist Sammy Roth called these actions "The slaughter of clean energy."[2]

China.

China is the world's largest source of human-caused greenhouse gas emissions. China's emissions exceeded the U.S. starting in 2006 and now account for about 30 percent of global greenhouse gas emissions compared to about 11 percent for the U.S. However, China is also now the world's leader in green energy. The world is increasingly dependent on China for the products and technology needed to reduce human-caused greenhouse gas emissions. China is the world's largest manufacturer and user of solar panels, wind turbines, batteries, electric vehicles, and nuclear power plants.

In September 2020, China's Pres. Xi Jinping announced that "China would aim to have CO_2 emissions peak before 2030 and achieve carbon neutrality before 2060." China plans have more than 1,200 GW installed capacity of wind and solar before 2030.[3] This objective may be reached ahead of schedule. In April 2025, China's wind and solar power generation capacity surged to 1,482 GW, exceeding fossil fuel-based electricity generation for the first time in its history. In 2024, China added

[1] James, EN and Haggerty, Noah, "US shutters federal website on climate change," Los Angeles Times, p. A-9, July 4, 2025.

[2] Ross, Sammy, "the slaughter of clean energy," Los Angeles Times, p. A-9, July 4, 2025

[3] Carbonbrief.org/qa-what-does-Chinas-new-paris-agreement-pledge-mean-for-climate-change/

63% of the world's solar and wind capacity, compared to 12% for Europe, 8% for the U.S. and about 16% for the rest of the world.

A major accomplishment is 2025 growth in renewable energy use, that caused China's emissions to actually decrease1.6% in the first quarter of 2025, compared to the first quarter of 2024. Emissions have decreased by 1% over the latest 12 months. If sustainable, this is a remarkable achievement.

Greenhouse gas emissions.

Each year in May, the carbon dioxide (CO_2) levels in the atmosphere reach their highest level, according to the National Oceanic and Atmospheric Administration (NOAA) monitoring station on Mauna Loa, Hawaii. In May 2025, concentration reached 430.5 ppm. The atmospheric concentration of CO_2 has continued its steady climb, consistent since 1958 when the first measurements were made. But now, it is rising faster.[4]

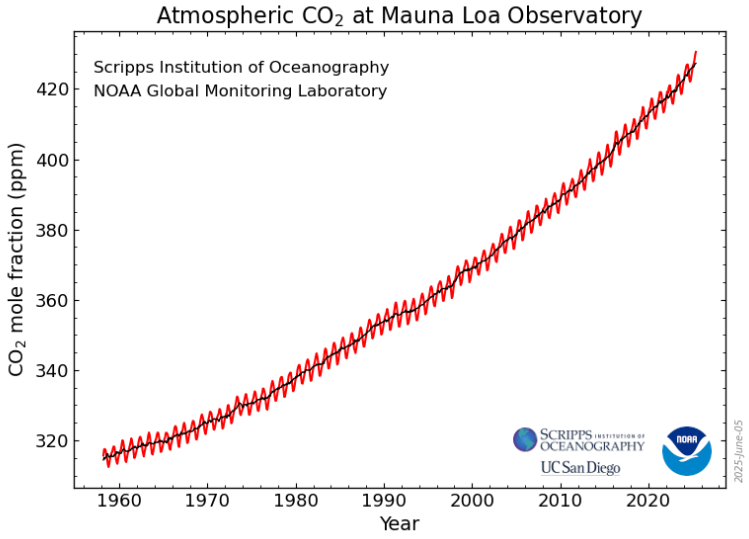


Figure 1: Carbon Dioxide Levels Measured at Mauna Loa to May 2025

Total global greenhouse gas emissions for 2024 are not yet available. However, the IEA has issued a report on total *energy sector* CO_2 emissions.[5] These emissions increased by 0.08%, reaching an all-time high of 37.8 Gmt. In another year or two, emissions of energy-related CO_2 will likely exceed 40+ billion metric tons. Coal use has been declining globally except for China and India. Emissions of methane have been increasing with the greater use of natural gas. While China's emissions are slowing, U.S. emissions are expected to increase as the Trump Administration pushes for greater fossil fuel use. We expect it to be only a matter of a year or two before global emissions reach 60 billion $mtCO_{2e}$/year.

Global average temperatures.

According to the latest reports, June 2025 was the third hottest ever, and 2025 is likely to rank as the third warmest year since records have been kept. According to NOAA, the year to-date period

[4] https://gml.noaa.gov/ccgg/trends/

[5] IEA, Global Energy Review, 2025: https://www.iea.org/reports/global-energy-review-2025/co2-emissions

(January-June) has been the second warmest on record for the globe, only 0.08°C cooler than 2024.[6]

The global mean temperature in 2024 was estimated to have been about 1.6°C (2.88°F) above the pre-industrial average temperature from 1850-1900.[7] The 1850-1900 average temperature is the baseline for measuring the Earth's average temperature. Although the exact temperature estimate may vary somewhat, other authoritative sources also confirm that 2024 was the hottest year on record to date.

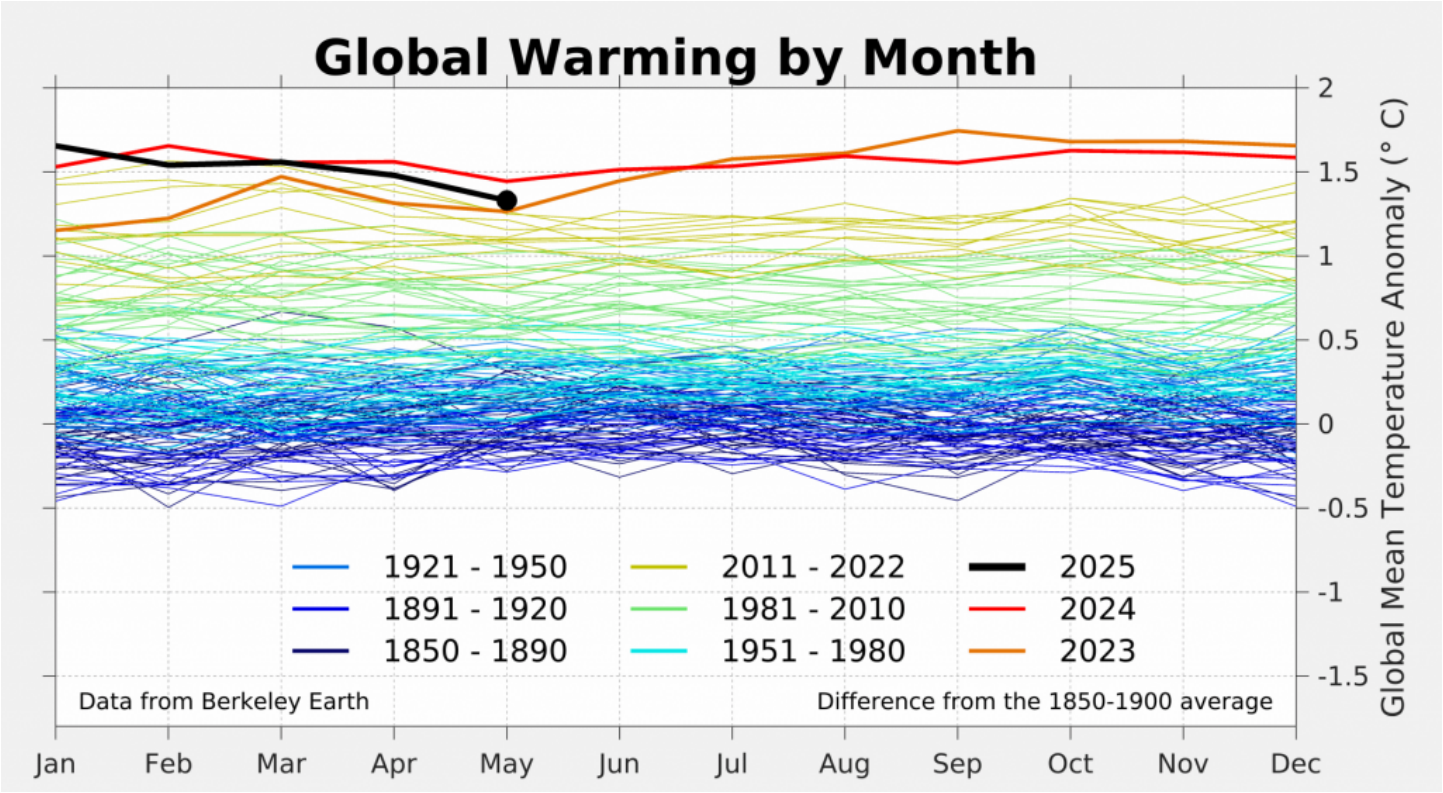


Figure 2: Monthly Global Surface Temperatures through May 2025[8]

Global warming is irreversible!

We should understand that global warming is irreversible. We can speed up global warming by discharging more greenhouse gases into the atmosphere, but we can't slow down or reverse global warming. Carbon dioxide discharged into the atmosphere stays there for hundreds of years until it slowly dissipates by natural forces. In effect, we are driving a vehicle that can go faster by pressing the accelerator, but we can't slow down or stop. There are no brakes and no reverse.

If we stop greenhouse gas emissions at some future date, the Earth's temperature will not go down. It will stabilize at some higher temperature consistent with greenhouse gases in the atmosphere at that time.

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[6] Masters, Jeff and Henson, Bob, "June 2025 was the planet's third warmest on record," Yale Climate Connections: https://yaleclimateconnections.org/2025/07/june-2025-was-the-planets-3rd-warmest-on-record

[7] Freedman, Andrew, "2024 was Earth's hottest year on record, exceeding Paris Target," Axios: https://www.axios.com/2025/01/10/2024-earth-hottest-year-paris-target

[8] https://berkeley-earth-wp-offload.storage.googleapis.com/wp: content/uploads/2025/06/06194413/SeasonalWrap.png

Growth of renewable energy.

Globally, about 93% of electricity capacity additions in 2024 were for renewables, a growth rate of about 15% per year. Of the 585 GW new capacity, about 77% was for solar and 32% was wind power. In addition, 164 GW-hours of utility scale battery storage was added in 2024, a two thirds increase over the prior year. China alone accounts for two-thirds of the renewable energy capacity additions in 2024, about 277 GW of solar and 80 GW of wind. This gives China a total capacity of 1,400 GW of renewable energy, about six years ahead of China's stated target for 2030. Green energy is now meeting about 80% of China's rapidly increasing electricity demand.

Nuclear energy is receiving renewed interest as a source of carbon free energy, to help meet the growing demand of massive new data centers for artificial intelligence. Some companies, for example Microsoft, are looking to restarting older plants. Three new companies, Terra Power (a 345 MW sodium-cooled powerplant backed by Bill Gates) will be breaking ground at a site in Wyoming this year and is said to be sending power by the end of 2030 to Warren Buffett's Pacific Corp. X-energy is developing an 80 MW reactor sold in the pack of four units to construct 320 MW in total. Funding is to a partnership with Amazon Corporation. Both Terra Power and X-Energy expect to receive billions in funding from the US Department of Energy. Kairos Power is designing a 75 MW reactor to be deployed in pairs to provide 150 MW, using a molten fluoride salt instead of water as a coolant. It is operating in partnership with Google, building a low-power demonstration reactor in Oak Ridge Tennessee.[9]

However, we must remember that building new nuclear plants is a costly and lengthy process, with licensing historically taking five years or more. As former nuclear engineers, we think that designing licensing and constructing a new concept nuclear power plant and delivering power in five years is wildly optimistic. Also, the three fundamental problems of nuclear power are still unresolved. Nuclear plants are the most expensive way to generate electricity, especially compared to solar and wind. Second, there is still no approved system for storing radioactive waste. And finally, siting of nuclear power plants is still a concern of the general public.

Climate disasters:
An ever-hotter planet looms.

A new report from the World Meteorological Organization (the climate and weather arm of the United Nations) is predicting that over the next five years the world is going to see increasing warmth with resulting droughts, heat waves, longer fire seasons, and more intense fires.[10] The report goes on to say that the consequences of warming will vary widely across the world: in the far north, rapid thawing of Arctic sea ice; in the tropics, drier seasons in the Amazon. With warmer atmospheres holding more moisture, greater chances of flood-inducing downpours and hurricanes. Coincident with this, we observe that the U.S. will be going into this period with reduced ability to forecast disasters and less ability to provide aid in the time of disasters with reductions in U.S. climate science weather reporting and FEMA due to Trump Administration budget cuts.

Sea level rise.

Globally sea level rise has averaged about 1.5 mm per year since 1900, and has now risen by 200 millimeters (mm) (8 inches) on average. The pace of sea level rise is increasing. From 1993 to 2002, the rate of rise averaged 2.1 mm/yr. From 2015 to 2024, the rate had more than doubled, to 4.7 mm/year. In that 30-yr period, the rise was 1.12 meters, (44 inches).[11]

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[9] Kimball, Spencer, "These nuclear companies are leading the race to build advanced reactors in the U.S.," March 29, 2025: https://www.cnbc.com/2025/03/29/these-nuclear-companies-lead-the-race-to-build-small-reactors-in-US.html

[10] Purtill, Corinne, "An ever-hotter planet looms," *Los Angeles Times*, pg. A-1, May 29, 2025

[11] Freedman, Andrew, "Climate change indicators hit record levels in 2024, UN study finds," Axios, March 18, 2025: https://www.axios.com/2025/03/19/climate-change-indicators-records-global-warming.

Another problem that is increasing in severity is ocean heating. For example, the Gulf of Mexico reached a new maximum on August 22, 2024, making it the hottest it has been in the modern record. This poses a triple threat: the first is that warm water will power hurricanes, making stronger hurricanes that grow faster; warm water expands raising the sea level; and hot water kills corals.[1]

Arctic/Antarctic ice melt.

In previous reports we've described how glaciers, Arctic, and Antarctica ice have been melting. The loss of glacier ice poses a threat to drinking water and water for agriculture. New research has identified a potential serious side effect due to loss of glaciers. A study carried out on six volcanoes in southern Chile using argon dating and crystal analysis methods found that around the peak of the last Ice Age, around 20,000 years, ago a thick ice cover subdued volcanic activity, allowing a huge reservoir of magma to accumulate 6 to 9 miles below the surface. Then, at the end of the Ice Age the covering ice sheets began to retreat rapidly. This sudden loss of ice weight allowed gases in the magma to expand, setting the stage for explosive eruptions from newly formed volcanoes. Scientists are now warning that a similar result could occur with global warming. The phenomenon is already being observed in Iceland, but other places in the world could be at risk.[12]

Wildfires.

In past years, we have seen extensive wildfires around the globe. 2025 portends to be no different. The year began with two terrible wildfires in Southern California. The first, the blaze that completely destroyed an entire city—Pacific Palisades—had an emotional impact on author Craig Smith and his wife, since Pacific Palisades had been their home (twice) and was the site of Marquez Knolls Elementary, where she was a teacher….

- *Pacific Palisades:*

The Pacific Palisades fire broke out on the morning of January 7 and was fanned by gusting winds flowing down the mountain side canyons towards the ocean. It burned through more than 12,000 acres in 24 hours, heading into Malibu and east toward Brentwood and burning all the way to the Pacific coast. Efforts to fight the fire were hampered by heavy winds and lack of water in some places. A reservoir for the area had been undergoing repairs and was empty. To a former resident, it is almost impossible to imagine an entire community destroyed—stores, banks, schools, restaurants, thousands of residences—all gone, all smoldering ashes.

- *Eaton*

Later that day on January 7 around 6 P.M. a fire was seen east of the town of Altadena and in an area called Eaton Canyon. That fire spread rapidly, fanned by hundred mile-per-hour wind gusts. Like the Palisades fire, the fire spread so rapidly that people had literally to flee for their lives. There was no time for orderly evacuation; it was simply get out of the area as fast as possible.

- *Aftermath*

The fires were 100% contained 3 ½ weeks after the blazes began. A preliminary accounting indicated 6,800 structures lost in Pacific Palisades, and 9,400 in Altadena with a total of 28 persons known dead and destroyed or damaged structures valued at more than $275 billion dollars.[13]

- *Grand Canyon Arizona*

In July two large fires were burning in the vicinity of the Grand Canyon. A fire known as the Dragon Bravo fire began on July 4 and was caused by lightning strike. The second fire, called the Wild Sage fire, began five days later on July 9 after a thunderstorm rolled through the area. More than 50 buildings in the park area have been lost to the Dragon Bravo fire including the historic Grand Canyon Lodge which had been operating in the National Park since the 1930s. The White Sage fire had initially burned

[12] Tangerman, Victor, "Horrifying Research Finds Melting Glaciers Could Activate Deadly Volcanoes," July 12, 2025: https://futurism.com/research-melting-glaciers-activate-volcanos

[13] Nelson, Laura J., :24 hours that changed Los Angeles," Los Angeles Times, pg. A-1 January 26, 2025

more than 40,000 acres of the Kaibab National Forest and was still 0% contained as of the date of this report.[14]

- *Greece, Turkey, Syria*

Summer wildfires are becoming more common in both Greece and Turkey, where local experts warned that climate change is intensifying conditions. A number of fires south of Athens required evacuations in coastal areas. At the same time other wildfires broke out in at least five locations across Turkey's Aegean coast, fueled by soaring temperatures, strong winds, and low humidity. Several deaths have occurred and many homes and buildings have been damaged. Fires also flared on both sides of the Turkeys-Syrian frontier on July 5. In Syria, wildfires spread across large swaths of mountainous areas driven by high temperatures and gusty winds. There was also a coastal wildfire on the island of Crete, where more than 5,000 tourists, hotel workers and residents were evacuated from seaside areas.[15]

Floods.

- *Kerrville Texas July 4th flood*

On July 2 the Texas weather service issued a warning that heavy rainfall with the potential to cause flash flooding was anticipated across the West Texas and Hill country area through the 4th of July weekend. Unfortunately, many people did not receive this warning or did not react promptly. At midnight on July 4 the Guadalupe River became a raging flood, rising 34 feet in six hours and literally wiping out many recreational facilities along the area of the river. At one historic location, Camp Mystic, a century-old all-girls Christian summer camp, floodwaters rose to a level above bunk beds in the bunkhouses, killing at least 27 campers and counselors, and a number are still missing as of this writing. The young age of many victims makes this an especially tragic event. The death toll has so far reached 120 but more than 170 people were still reported missing as of mid-July 2025.[16]

- *Ruidoso, New Mexico*

On July 8 residents were urged to seek higher ground as the waters of the Rio Ruidoso rose 19 feet in a matter of minutes during heavy rainfall. Flooding was aggravated by the fact that the area had been stripped of vegetation by recent wildfires. Dozens of rescues were carried out and rescue teams were searching for missing persons. There were three known dead.[17]

- *Central North Carolina*

On 4 July weekend, tropical storm *Chantal* dumped more than 12 inches of rain over parts of central North Carolina, with the result that the Eno River crested over 25 feet high, beating a record previously set during hurricane Fran in 1996. The flooding killed at least six people.[18]

Billion-dollar weather and climate disasters in 2025

So far, in 2025, there been major weather and climate disasters on these dates in the first six months of the year. It is safe to assume that among these cited below, there will be billion dollar weather and climate disasters.

- July flooding, Texas, New Mexico
- June flooding, Texas, West Virginia
- May 16, tornadoes, central U.S.
- April 7 May 1 storms and flooding, central and eastern U.S.

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[14] Debusmann, Bernd Jr and Yousif, Nadine, "Historic Lodge destroyed in Grand Canyon blaze," July 12, 2025, BBC News: https://www.bbc.com/news/articles/c33527p2nzeo

[15] Fraser, Suzan and Gatopoulis, Derek, "Crews continue to battle blazes in Greece, Turkey, Syria," Los Angeles Times, July 5, 2025, page A-3

[16] Lathan, Nadia, et al., "Mourning begins for flood victims across Texas," Los Angeles Times, July 11, 2025, pg. A-5

[17] Lee, Morgan, and Peipert, Thomas, "Three dead after rains, flash floods in New Mexico," Los Angeles Times, July 10, 2025, pg. A-5

[18] Ory, Tyler, "is the US seeing worst flooding this summer? Here's what's happening," CNN weather, updated July 10, 2025: https://www.cnn.com/2025/07/10/weather/flash-flooding-us-summer-climate

- March 31 April 6, storms and flooding central and southern U.S.
- March 29-30, ice storm Canada and U.S.
- March 26-28 rain/flooding, South Texas and Reynosa, Mexico
- March 13-17, storms and wildfires, U.S.

Unfortunately, the NOAA National Centers for Environmental Information, which would be normally tracking billion-dollar climate and weather disasters, is no longer being updated by direction of the Trump administration. (The worst year in U.S. history was 2023 with 28).

A new book

While some of our readers may question the sanity of two 86-year-olds writing a third book on climate change in a period of six years, we are doing just that. Here's the details:

"IRREVERSIBLE: What You Need To Know About Global Warming"

Our proposed new book is titled **IRREVERSIBLE**, to get across the important point that even if we eventually eliminate human-caused greenhouse gas emissions, the earth's temperature will not go down immediately. It will stabilize at a temperature consistent with the amount of greenhouse gases in the atmosphere at that time. However, due to latency, the delay between cause and effect, we can anticipate that unexpected climate changes could occur 20 or more years after emissions cease.

Our earlier books were a more technical treatment of global warming and the publisher put a higher price on the book than we wished. In hindsight, price and technical complexity of our two previous books did not attract the readers we wanted to reach, the concerned citizens who want to learn what they need to know about global warming and climate change. Our readers need to know what can and should be done about global warming, and how they can help. In addition, there are new events and up-to-date information that needed to be included. We also believe there's a big gap in what is available to the average person. We want our next book to be a handbook for the concerned citizen, giving them information they need to discuss global warming and climate change and hopefully support actions to help solve this problem, There is a lot of reporting about specific events that are incomplete and don't provide a more complete treatment of this important subject. Most of the information readers need is written for or by scientists and is largely inaccessible to many people. Also, many of the books written are focused on the negative consequences of climate change without explaining what can and should be done about it.

With this in mind, we decided to do a complete rewrite of our last book, to make it more accessible to the average person who is concerned about global warming and would like the information presented in a less technical, more readable, and inexpensive format. To accomplish this, we have eliminated most charts and graphs and are explaining technology and complex issues as plainly as we can. To improve affordability, we've set a price limit of $15-$20 per copy and selected a 5.5" x 8.5" size paperback format for the book, with a maximum length of 300 pages. We anticipate this will sell for $15-$20 per copy and a companion e-book will be available for $7 or $8. To prove readability, we are working with an experienced editor who has edited a number of books by popular novelists, bringing a new perspective to our writing. The publisher we are using publishes books at the price point we want and has good marketing and distribution capabilities.

To highlight key issues in an entertaining manner, we've introduced a new character—a molecule of *carbon dioxide named Charlie Oscar II.* Charlie supplants our work with some blunt advice of his own, and we think that you will find his contributions of interest!

We anticipate completing the book in time to be released in early 2026.

What must be done to stop additional global warming?
The planet has already exceeded the IPCC's warning level of a 1.5°C average global temperature increase. There is no way we can undo the billions of tons of greenhouse gases in the atmosphere at this date. Actions to date have not led to an actual reduction in global greenhouse gas emissions. Population growth and per capita energy use due to rising living standards have offset any reductions. The obvious answer is that the world has to accelerate steps to reduce greenhouse gas emissions across the planet.

We hope our proposed new book may help. If you are interested in receiving a copy, or perhaps buying 20 copies to give to friends, pass out at bridge parties, send a copy to your congressional representatives or local mayor, or otherwise help us spread the word, please let us know. We will provide copies at our cost and we will pay shipping.

Best regards,
Craig and Bill