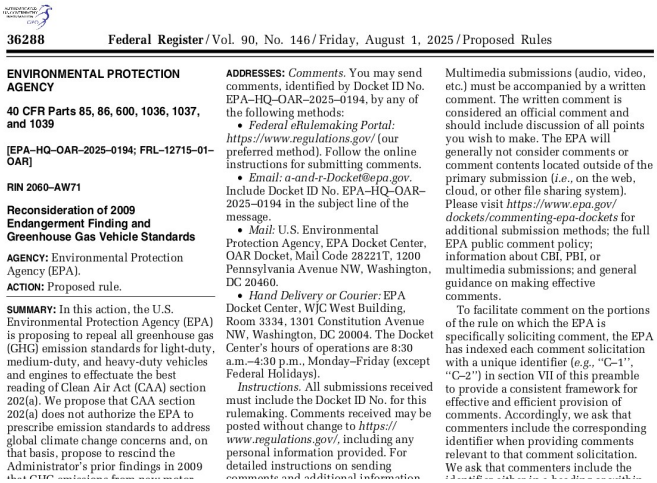
August 2025

CliSciPol

Climate Science and Policy for Nonscientists

One Picture is Worth a Thousand Words.



36288 **Federal Register** / Vol. 90, No. 146 / Friday, August 1, 2025 / Proposed Rules

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 85, 86, 600, 1036, 1037, and 1039

[EPA–HQ–OAR–2025–0194; FRL–12715–01–OAR]

RIN 2060–AW71

Reconsideration of 2009 Endangerment Finding and Greenhouse Gas Vehicle Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: In this action, the U.S. Environmental Protection Agency (EPA) is proposing to repeal all greenhouse gas (GHG) emission standards for light-duty, medium-duty, and heavy-duty vehicles and engines to effectuate the best reading of Clean Air Act (CAA) section 202(a). We propose that CAA section 202(a) does not authorize the EPA to prescribe emission standards to address global climate change concerns and, on that basis, propose to rescind the Administrator's prior findings in 2009 that GHG emissions from new motor

ADDRESSES: *Comments.* You may send comments, identified by Docket ID No. EPA–HQ–OAR–2025–0194, by any of the following methods:

- *Federal eRulemaking Portal: https://www.regulations.gov/* (our preferred method). Follow the online instructions for submitting comments.
- *Email: a-and-r-Docket@epa.gov.* Include Docket ID No. EPA–HQ–OAR–2025–0194 in the subject line of the message.
- *Mail:* U.S. Environmental Protection Agency, EPA Docket Center, OAR Docket, Mail Code 28221T, 1200 Pennsylvania Avenue NW, Washington, DC 20460.
- *Hand Delivery or Courier:* EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue NW, Washington, DC 20004. The Docket Center's hours of operations are 8:30 a.m.–4:30 p.m., Monday–Friday (except Federal Holidays).

Instructions. All submissions received must include the Docket ID No. for this rulemaking. Comments received may be posted without change to *https://www.regulations.gov/*, including any personal information provided. For detailed instructions on sending comments and additional information

Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered an official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.*, on the web, cloud, or other file sharing system). Please visit *https://www.epa.gov/dockets/commenting-epa-dockets* for additional submission methods; the full EPA public comment policy; information about CBI, PBI, or multimedia submissions; and general guidance on making effective comments.

To facilitate comment on the portions of the rule on which the EPA is specifically soliciting comment, the EPA has indexed each comment solicitation with a unique identifier (*e.g.*, "C–1", "C–2") in section VII of this preamble to provide a consistent framework for effective and efficient provision of comments. Accordingly, we ask that commenters include the corresponding identifier when providing comments relevant to that comment solicitation. We ask that commenters include the

The EPA's CO2 Endangerment Finding

On August 1, 2025, the EPA published in the Federal Register a proposal to reconsider and rescind the EPA's 2009 CO2 endangerment finding, which provides the basis for all EPA regulation of greenhouse gas emissions in the US. (The "Proposal").

Two of the proposed reasons for such action are: (1) that the EPA in 2009 unreasonably analyzed the scientific record, and (2) that developments since 2009 cast significant doubt on the reliability of the scientific findings. With respect to the current science the Proposal relies upon the Report to the US Department of Energy of the Climate Working Group, which analyzes the impacts of greenhouse gasses on the US climate. (The "Report').

A Critical Review of Impacts of Greenhouse Gas Emissions on the U.S. Climate

Report to U.S. Energy Secretary Christopher Wright

July 23, 2025

Climate Working Group:

John Christy, Ph.D
Judith Curry, Ph.D.
Steven Koonin, Ph.D.
Ross McKitrick, Ph.D.
Roy Spencer, Ph.D.

If the Proposal is adopted, it will effect a massive change in US energy policy with respect CO2 emissions.

This newsletter summarizes the Report's contents, which are significantly different from the general understanding of climate science, as presented in the media (Report p. viii), but which find a surprising amount of support in the most recent Assessment Report of the Intergovernmental Panel on Climate Change (the "IPCC"), [AR6 (2021)].

Neither the Proposal and nor the Report are in final form. Each is subject to a comment period, and it is to be expected that each will be amended based on the comments that are received.

Energy Department Secretary Chris Wright states that he chose the Report's five authors for their "rigor, honesty, and willingness to elevate the debate," and that he exerted no control over their conclusions. (Report p. viii). The authors are serious, respected climate scientists, who are known as independent thinkers. Each would agree with each of the settled propositions set out in the image to the right.

SETTLED PROPOSITIONS

The climate is changing, which is a concern.

Human activity causes some climate change.

The world is warming.

CO2 levels are rising.

Rising CO2 levels cause some warming.

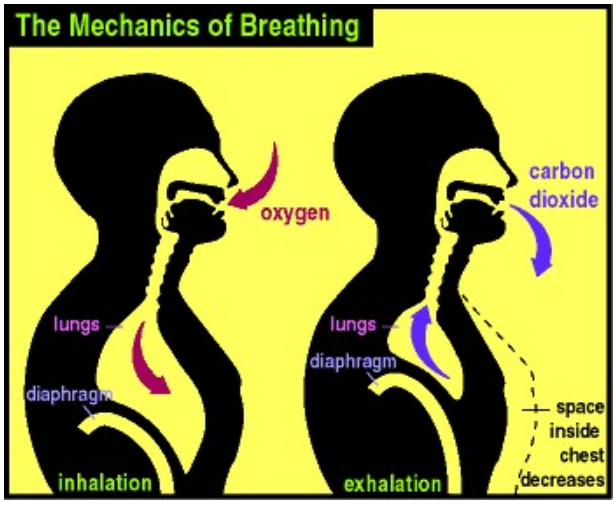
Sea levels are rising.

Ocean pH is declining.

Heatwaves are increasing in parts of the US, which is a concern.

Wildfires are increasing in parts of the US, which is a concern.

The authors state that they have focused as much as possible on scientific literature published since 2020. (Report p. x). What follows sets out the primary conclusions in the Report. These conclusions are supported by significant numbers of peer-reviewed papers, but many of these conclusions are disputed, as is frequently acknowledged in the Report. One of the benefits of the Report being open for comments is that a clearer picture will emerge regarding the issues on which scientists agree and the issues on which they disagree.



CO2 occurs in nature in massive quantities. It is essential to the basic cycles of life. The Report questions whether CO2 can reasonably be categorized as a "pollutant." For humans CO2 is a harmless, odorless, and tasteless gas. Every human every day inhales oxygen, processes it in his or her body to create CO2, and then exhales into the air about two pounds of CO2. The dictionary definition of "to pollute" is to contaminate water, air, or a place with harmful or poisonous substances. But CO2 is plant food and is essential to the growth of plants and crops. Plants eat CO2 and exhale oxygen. (And see CliSciPol Science Topic: CO2 Facts).

A number of studies since 2009 show that the world is greening, due in significant part to rising CO2 levels. "Over the past 60+ years there have been thousands of studies on the response of plants to rising CO2 levels. The overwhelming theme is that plants...benefit from extra CO2." (Report p. 5). In AR6 the IPCC only "minimally discussed" global greening and CO2 fertilization of agricultural crops. (Report p. 6) (And see CliSciPol Science Topic: Greening World).

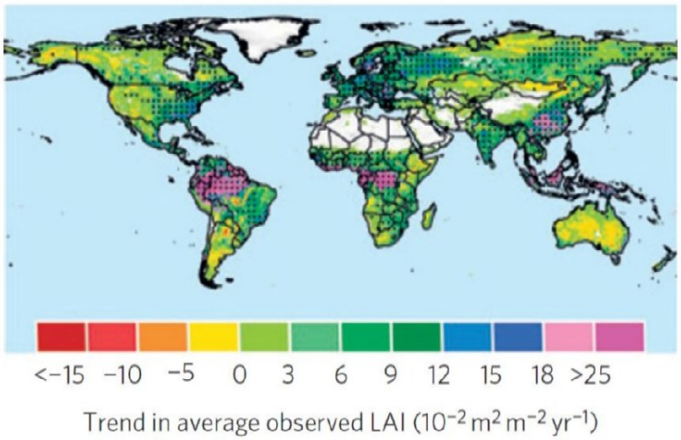


Figure 2.1: Trends in average Leaf Area Index (LAI). Source: Zhu *et al.* 2016 Figure 3.

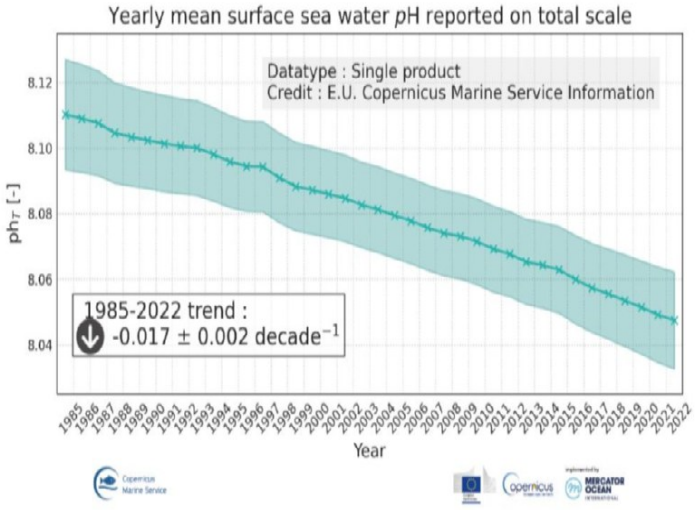
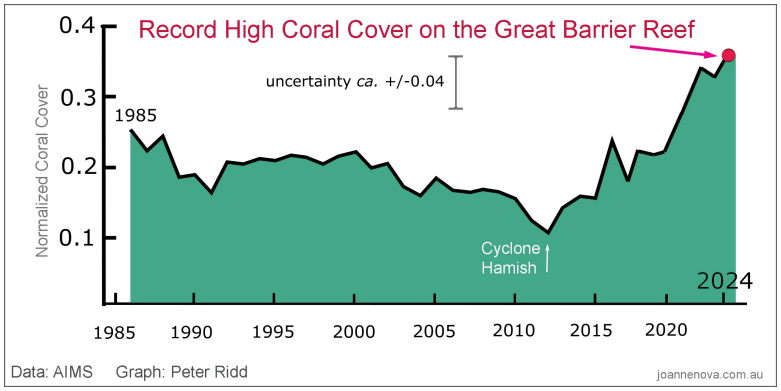
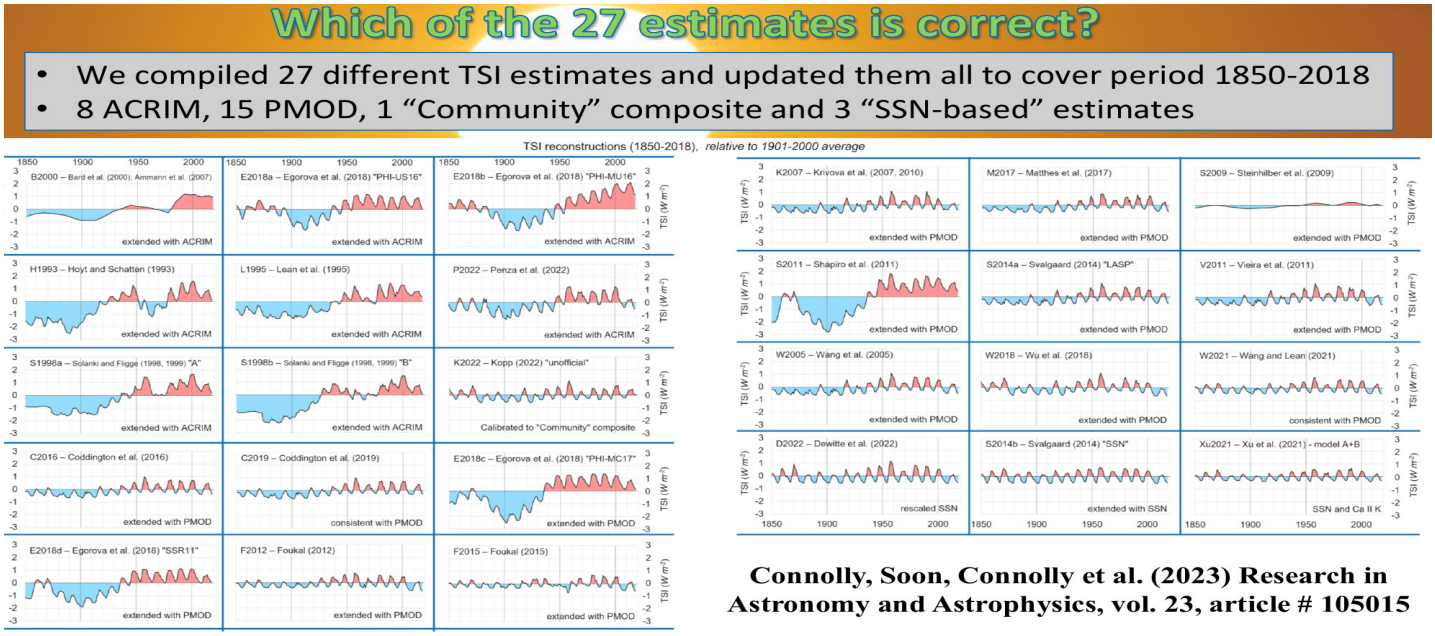


Figure 2.3: Ocean pH 1985 – 2022. Source: Copernicus Marine Service 2025

The other direct effect of rising atmospheric CO2 is the reduction of pH in the oceans as the oceans absorb CO2 from the atmosphere. But "Ocean acidification is a misnomer because the oceans are not expected to become acidic [pH below 7.0]; ocean neutralization would be more accurate." (Report p. 7). The measured decline in ocean pH is minimal, as shown, 8.11 to 8.04 over 37 years. Life in the oceans evolved when the oceans were slightly acidic with pH 6.5 to 7.0, and ocean biota appear to be "resilient" to natural long-term changes in ocean pH. (Report p. 7). The pH of rain water s 5.6.

Contrary to much media reporting, in recent years hard coral cover on the Great Barrier Reef has increased significantly after earlier declines due to intense tropical cyclone activity. (Report p. 7-8). The Report concludes at p. 8, that "Much of the public discussion of the effects of ocean acidification on marine biota has been one-sided and exaggerated." (And see CliSciPol Science Topic: Ocean Temperatures and pH)





Connolly, Soon, Connolly et al. (2023) Research in Astronomy and Astrophysics, vol. 23, article # 105015

The IPCC in AR6 attributes virtually all global warming since the mid 1970s to the increasing levels of greenhouse gasses in the atmosphere. This attribution assigns virtually no role to the sun. But, with respect to solar forcing, the Report accuses the IPCC of formulating its conclusions "prematurely through the suppression of dissenting scientific opinions." (Report p. 13). There is wide disagreement among scientists on solar variability, as shown in the image above. Depending on which of the 27 studies set out above one prioritizes, variations in TSI (total solar irradiance) could have caused either "none or most 20th century warming." (Report p. 13). (And see CliSciPol Science Topic: Sun)

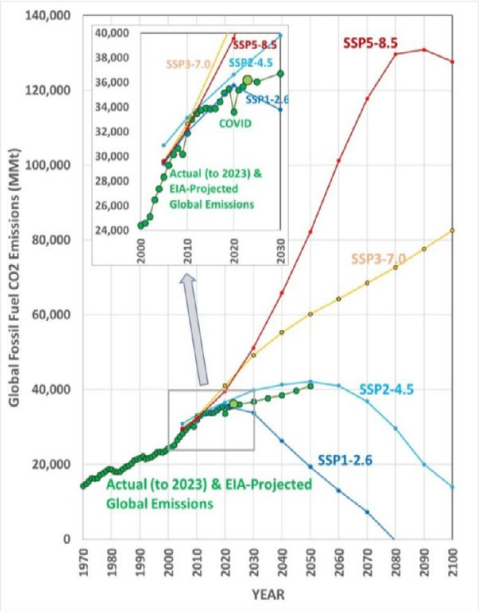


Figure 3.2.2. Observed and projected CO_2 emissions. Source: IPCC (SSP scenarios) and Energy Information Administration (EIA). Green: observed historical emissions and EIA projections. Other lines: SSP1-5. Data source: Friedlingstein *et al.* (2024).

All of the climate models that calculate future temperatures must start with a set of assumptions. The IPCC creates these sets of assumptions for the models to use. A key part of each set of assumptions is the assumption about CO2 emissions per year going forward. The image shows the CO2 emission assumptions for each of the four main assumption sets used by the models in the most recent IPCC assessment report, AR6. The green line and dots show the actual CO2 emissions and the most likely estimated emissions going forward. In creating the four sets of assumptions the IPCC wanted to create a range of assumptions. It did not try to assess likelihood. The higher the assumed CO2 emissions, the larger the temperature rise calculated by the models.

Most of the models that calculate dangerously high temperature rises (and that are cited in the media) use the SSP5-8.5 set of assumptions. But the SSP5-8.5 assumptions are so unlikely that the use of this scenario has been criticized as "grossly misleading." The Report concludes that this "misuse" has "resulted in a large number of misleading studies and media reporting," and has "created a bias towards alarm in the climate impacts literature." (Report p. 15)

A key issue in estimating the amount of future global warming is CO2's strength as a greenhouse gas. If atmospheric CO2 increases by 10 ppm from its present level of 430 ppm, how much warming will that produce? The scientific term for CO2 strength is Equilibrium Climate Sensitivity ("ECS"). There is no agreement on this number. As the Report points out with this image (Report p. 27), the models use numbers for ECS ranging from 1.83 to 5.67. The IPCC in AR6 (2021) concluded that the "likely" range for ECS was 2.5-4.0 C.

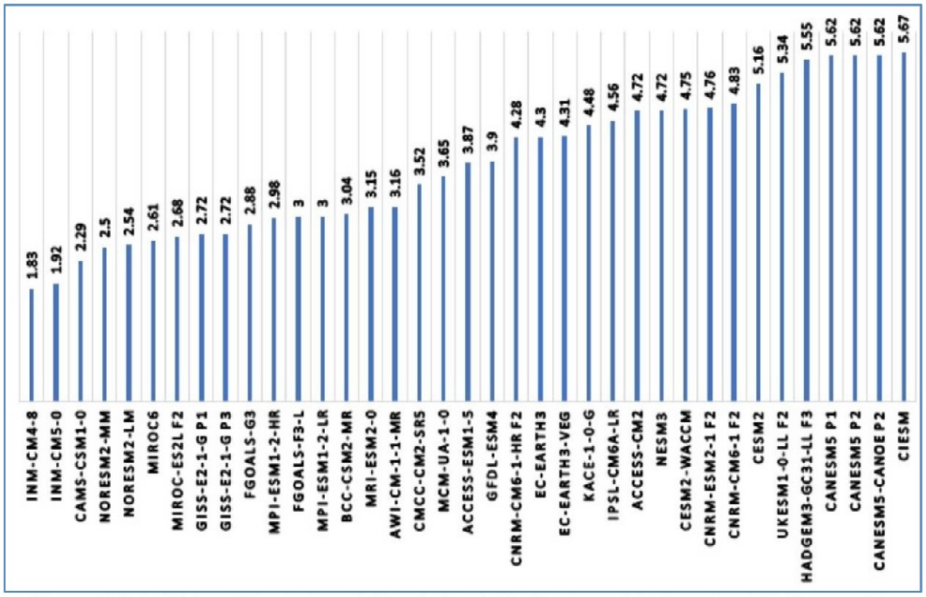


Figure 4.1 Equilibrium Climate Sensitivities in °C of 37 climate models from the CMIP6 ensemble. Identifiers for the various models appear along the horizontal axis. From (Scafetta, 2021)

But the Report concludes that recent evidence puts the lower end of the range at 1.8 C, significantly lower than 2.5 C (Report p. 25), and, if anything, ECS might actually in the future be determined to be lower than current estimates. (Report p. 28). The lower the ECS, the less warming and the less climate change that will follow. An ECS of 1.8 suggests that global warming through 2100 due to rising CO2 levels will be moderate.

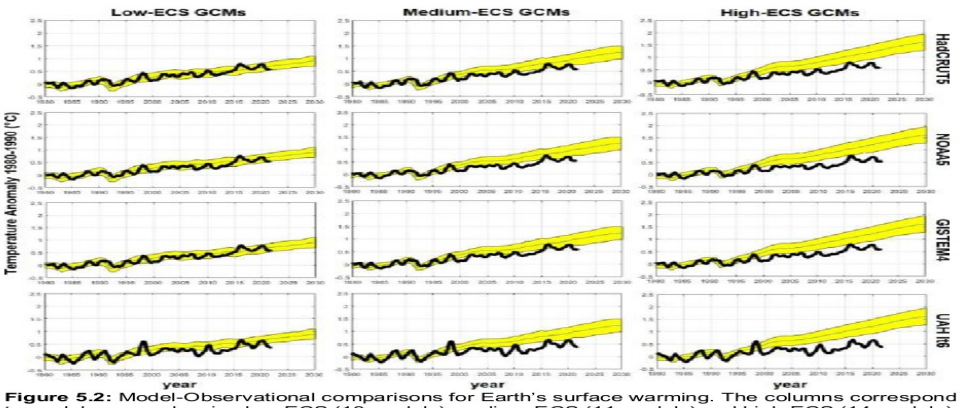


Figure 5.2: Model-Observational comparisons for Earth's surface warming. The columns correspond to model groups showing low-ECS (13 models) medium-ECS (11 models) and high-ECS (14 models), while the rows correspond to widely-used observed temperature records, the first three showing surface averages and the fourth showing the lower troposphere average. In each panel the yellow area denotes the mean and range (± one standard deviation) of climate model simulations for that group. The thick black line shows the observed annual average temperature in the indicated record. Source: Scafetta (2023) Fig.2.

Only the models using a low estimate of ECS reasonably track historical warming since 1980. (Report p. 33).

A significant failure of the models that is their prediction of falling Northern Hemisphere snow fall. In fact, Northern Hemisphere Winter Snow has been slightly increasing. (Report p. 39-41).

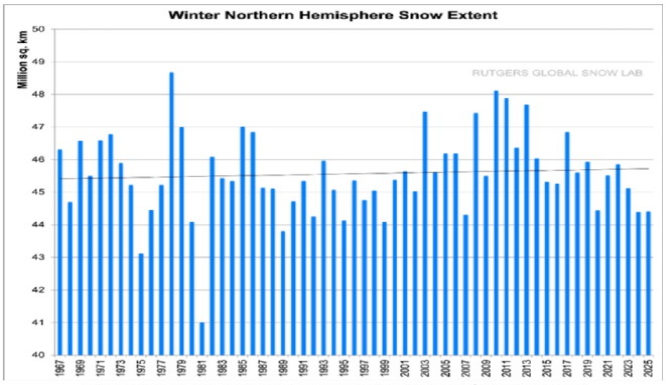


Figure 5.7: Northern Hemisphere Winter Snow extent.
Source: https://climate.rutgers.edu/snowcover/chart_seasonal.php?ui_set=nhland&ui_season=1
(accessed May 27, 2025)

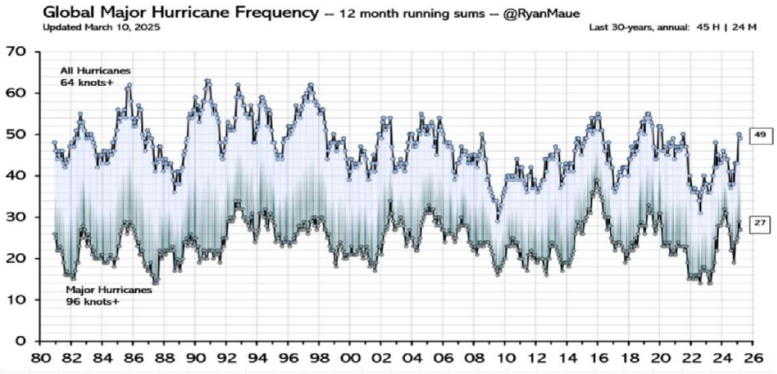
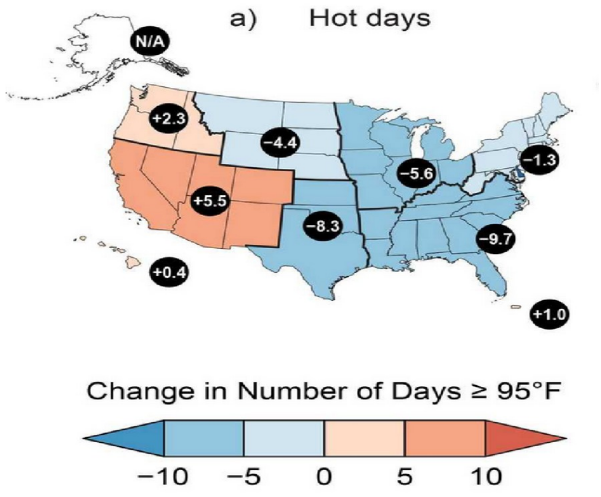


Figure 6.2.1: Global frequency of hurricanes and major hurricanes since 1980. Source: Updated from Maue 2011.

The Report at p. 48-51 agrees with the IPCC that there has been no demonstrated trend in the number of hurricanes, in the number of major hurricanes, or in US hurricane landfalls. (And see CliSciPol Science Topic: Hurricanes).

AR6 concluded that hot extremes including heatwaves have become more frequent and more intense across most land regions since the 1950s and cold extremes have become less frequent and less severe. (Report p. 52). But in the US the number of heatwave days per year per station peaked during 1935-1945 (the Dust Bowl years) and then declined through about 1980. The increase since then has not been general, but rather it has occurred in the Western regions of the US while heatwave days have declined in the Central and Eastern regions. (Report p. 58).



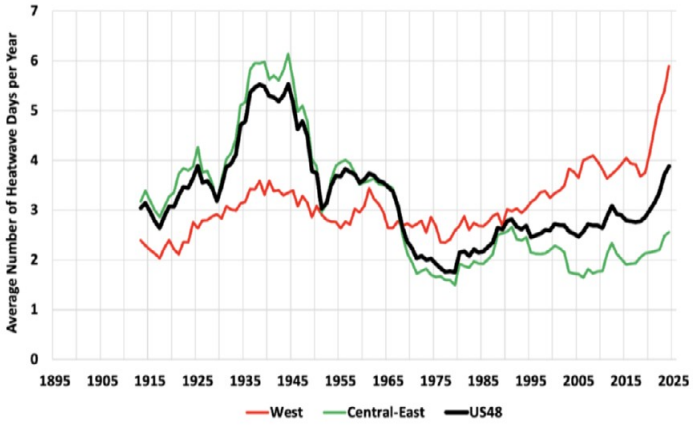


Figure 6.3.6 15-year trailing average of number of heatwave days per year per station in the CONUS (black line) and two regions: West (red), Central-east (green).

Rain and drought have high year-to-year variability, but the percentage of the continental US either "very wet" (green lines) or "very dry" (orange lines) has has shown virtually no chang since 1895. Some US regions have had short-duration increases in extreme precipitation (Report p. 66), but there has been no detectable US-wide trend in flooding. (Report p.68). The US long-term data shows an "insignificantly declining trend in extreme dryness." (Report p. 68).

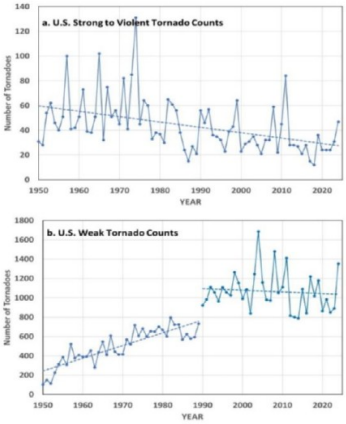
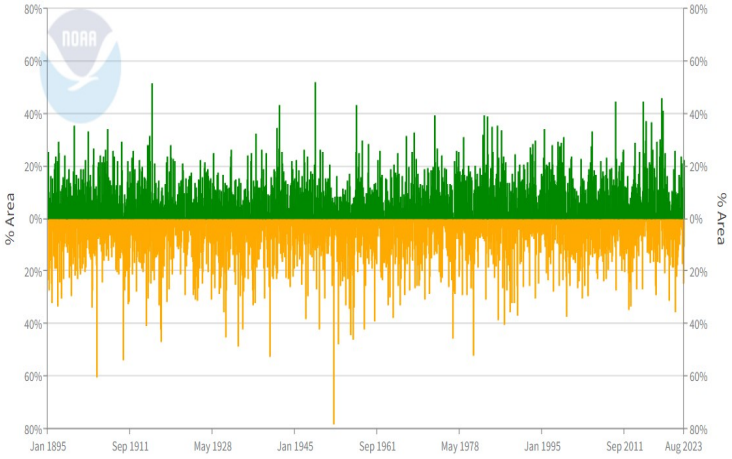


Figure 6.5.1. Annual U.S. tornado counts for (a) strong to violent tornadoes (EF3 to EF5), and (b) weak tornadoes (EF0 to EF2). Based upon NOAA Storms Prediction Center data, available at https://www.spc.noaa.gov/wcm/data/1950-2024_actual_tornadoes.csv

Wildfire coverage is constant or declining on every continent. (Report p. 69). In the US, as shown in the image: (1) wildfire area burned (orange line) peaked around 1930 and then declined dramatically through 1983 but has increased somewhat since then, and (2) the number of wildfires (blue vertical lines) has been down dramatically since 1982. (Report p. 69-71). Particular areas, such as Southern California, do have significant wildfire problems. It is disputed how much this is due to climate change and how much to bad forest management. (And see CliSciPol Science Post: Wildfires).

This image further demonstrates the regional differences involved. Obviously, Western parts of the US, but not other parts, are suffering from an increase in heatwaves. The Report concludes:

"The evidence ... suggests GHG emissions have had little-to-no effect on heatwaves against the background of urbanization and natural climate variability. Irrespective of the ultimate cause of regional trends, heatwaves have important effects on society that must be addressed." (Report, p. 59).



There has been a "noticeable downward trend" in the number of severe US tornadoes since 1950 and, since 1990, the number of weak tornadoes has remained "roughly constant." (Report p. 66). (And see CliSciPol Science Post: Tornadoes).

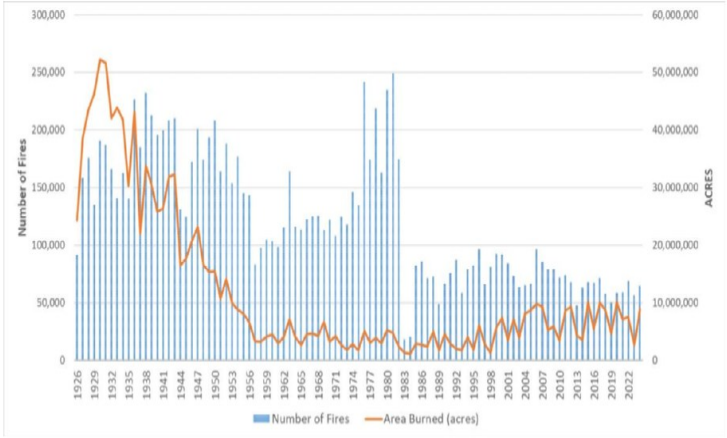
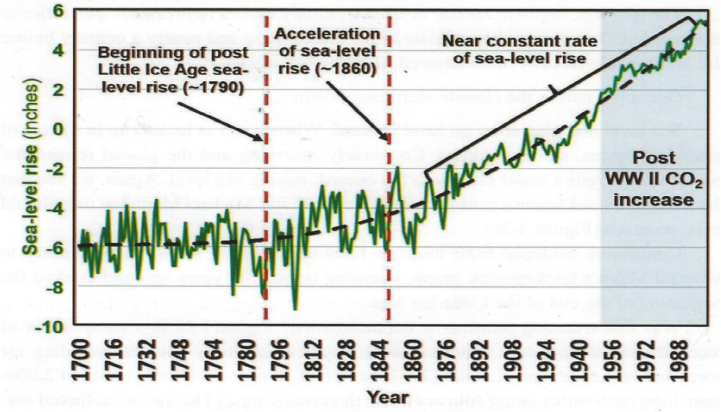


Figure 6.8.3: U.S. wildfires 1926 to 2023. Source: Post-2018: National InterAgency Fire Center data https://www.nifc.gov/fire-information/statistics/wildfires. Pre-2017 webarchive.org (n.d.).

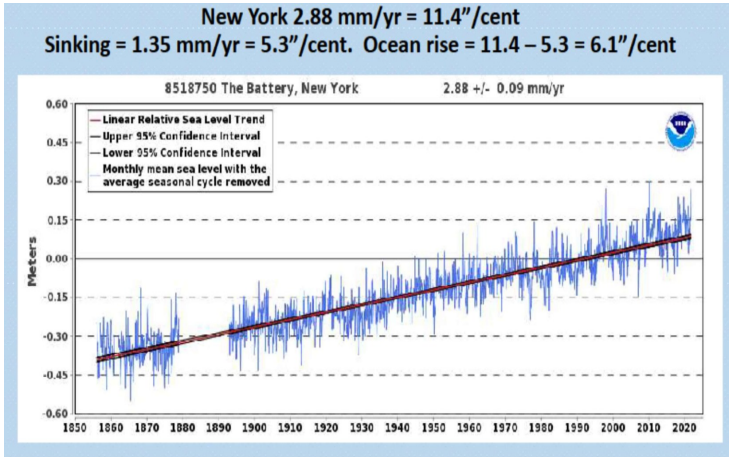
Figure I-26: Greater than 200 years of sea-level rise

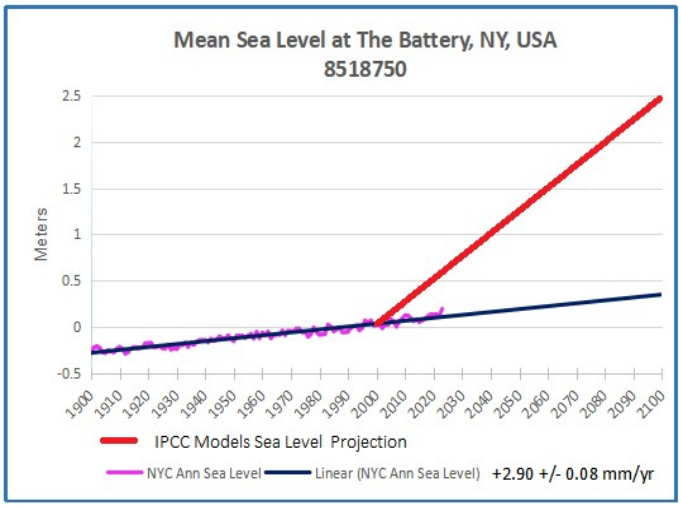


(Source data: Jevrejeva 2008, PSMSL 2008)

Sea level rise, as shown, began in the early 1800s and became roughly linear by the late 1800s. This was long before human emissions, or any human activity, could have caused any of the rise. Since 1900, global average sea level rise has been about 8 inches per century, which has not, in general, caused any particular problems. (Report p. 75).

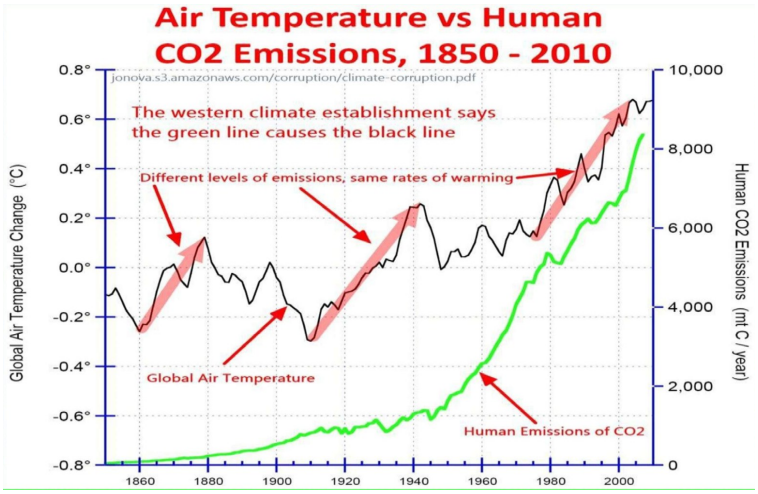
Sea level rise at particular US ports varies significantly because of different rates of subsidence (sinking). For example, the tide gauges at the Battery show sea level rising at a very linear rate of 11 inches per century, of which 5.3 inches is due to the land sinking and 6.1 inches due to an actual increase in the water level. (Report p. 79).





Tide gauges show no obvious acceleration. AR6 estimates of accelerated rates of rise are based on models that, according to the Report, vary widely in the numbers they calculate, and are associated with "implausible extreme emissions scenarios and inclusion of poorly understood processes associated with hypothetical ice sheet instabilities." (Report 75). (And see CliSciPol Science Topic: Sea Levels).

The Report challenges the AR6's conclusions as to the causation of rising temperatures since 1900. For example, CO2 can not explain the warming from 1905-1940 (Report p. 87), nor can it explain the slight cooling from 1940-1976. (Report p. 88). There is no scientific consensus on such causation issues, but most theories suggest some form of natural variability. (And see CliSciPol Science Topic: Climate History II).



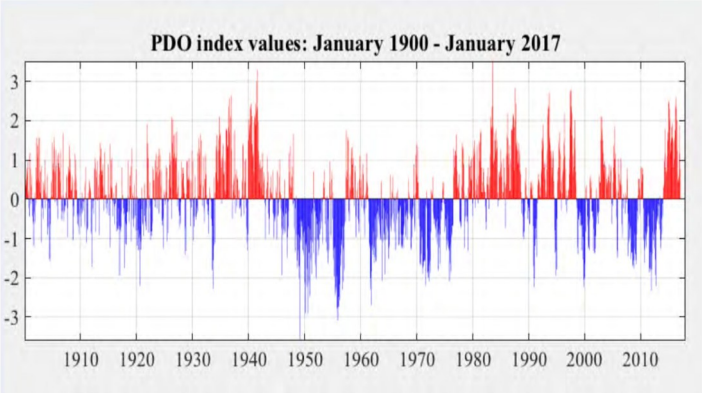


Figure 4.9 PDO Index values. Source: http://research.jisao.washington.edu/pdo/

Further AR6 ignores the recent decline in earth's albedo, which is "arguably the most striking change in the Earth's climate system during the 21st century, and which, since 2015, could exert a warming force approximately 73% as strong as the currently estimated CO2 warming force. (Report p. 90). The Report does not claim there is any agreement among scientists on these points. The basic conclusion of the lengthy section of the Report dealing with the causes of the warming since 1900 (Report ps. 82-97) is that the causation issue is unsettled and subject to debate.

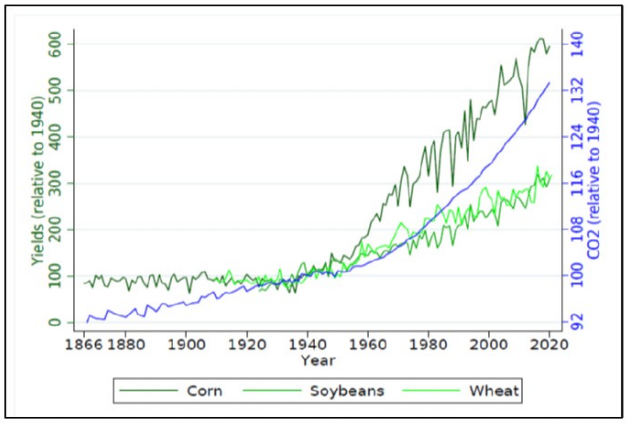


Figure 9.1: U.S. average CO_2 levels and yields of corn, soy and wheat all normalized so 1940=100. Source: Taylor and Schlenker (2021)

Predictions of harm to US food production are based on unverified models that predict extreme levels of temperature rise. The red lines are model predictions as to the Corn Belt temperature rise per decade. The blue line is the actual measured rate of temperature rise. The IPCC acknowledges limitations in the accuracy of regional climate model outputs. (Report p. 43)

As to the warming since 1976, AR6 ignores the "Great Pacific Climate Shift of 1976-7, when the Pacific Decadal Oscillation ("PDO") switched from its cold phase to its warm phase. This is an example of natural internal variability that could account for 40% or more of the warming since 1976. (Report p. 88).

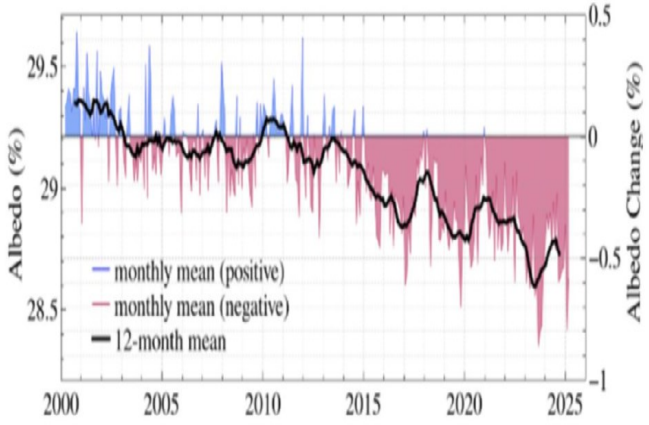


Figure 8.2. Earth's albedo (reflectivity, in percent), with seasonality removed. From Hansen and Karecha (2025)

While admittedly subject to dispute, the Report concludes at p. 104 that,

"CO2-induced warming will be a net benefit to US agriculture. The increase in ambient CO2 has also boosted productivity of all major US crop types. There is reason to conclude that on balance climate change has been and will continue to be neutral or beneficial for most US agriculture."

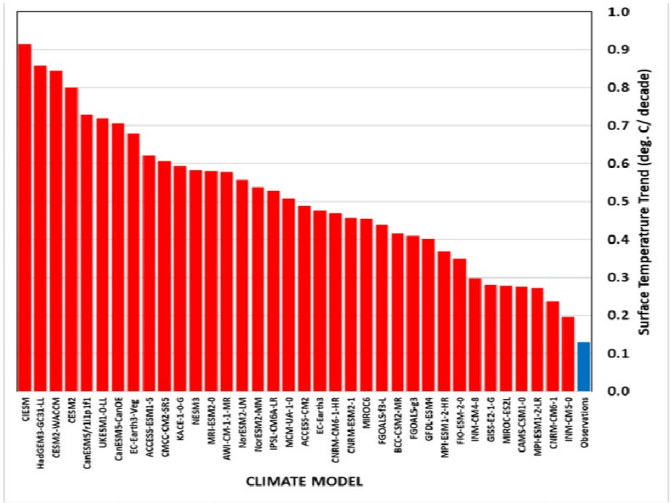


Figure 5.9: Modeled versus observed warming trends in the U.S. Corn Belt, 1973-2022.

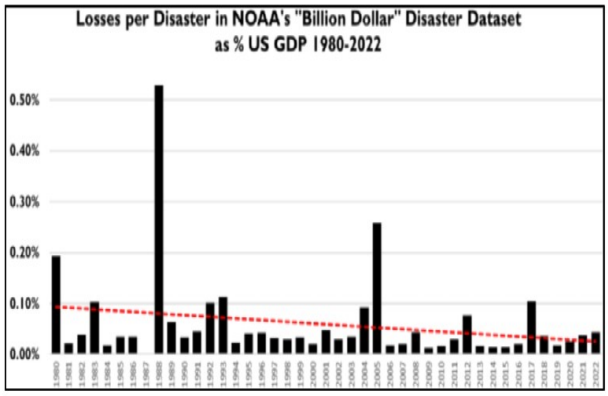


Figure 10.1: Losses per disaster as a % of Gross Domestic Product in NOAA's billion-dollar disaster dataset (the version downloaded in July 2023), 1980 to 2022. Source: (Pielke, Jr. 2024)

Monetary disaster losses from extreme weather and climate events are dominated by population increases and economic growth. When adjusted for the growing US GDP, disaster losses have been slowly trending downwards. (Report ps. 110-111). This has been caused partially by adaptation, e.g. better building codes, flood defenses, and disaster response mechanisms. (Report p. 110).

While heatwaves have been increasing, heatwave mortality risk has dropped "substantially" due to adaptation, e.g. increased use of air conditioning. (Report p. 110). As temperatures rise, coldwaves decrease, as have deaths from cold weather. In the US cold weather kills 14 times as many people as hot weather. (Report p. 112). This result is typical for many countries.

Figure 10.2 shows the distribution of results from Gasparini *et al.* (2015) by country. For the United States the fraction of deaths attributable to temperature was 5.9 percent, of which 5.5 percent was due to cold, thus cold weather killed 14 times as many people as hot weather.

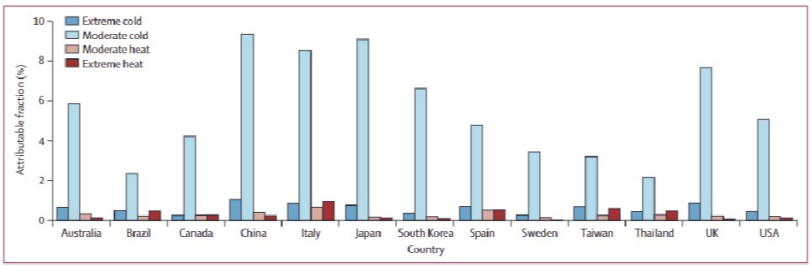


Figure 10.2. Mortality attributable to extreme and moderate cold and heat by country. Source: reproduced from Gasparini *et al.* (2015).

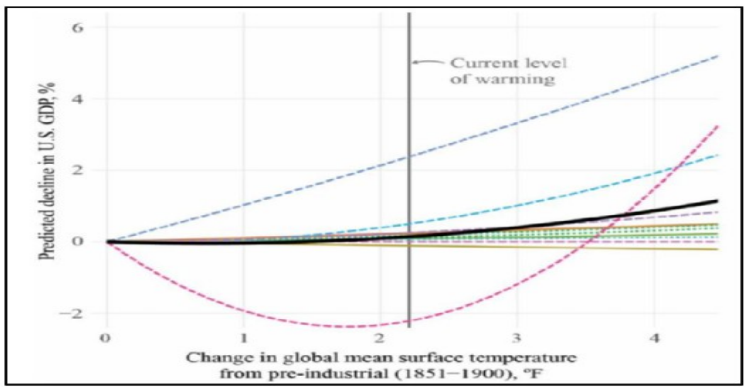


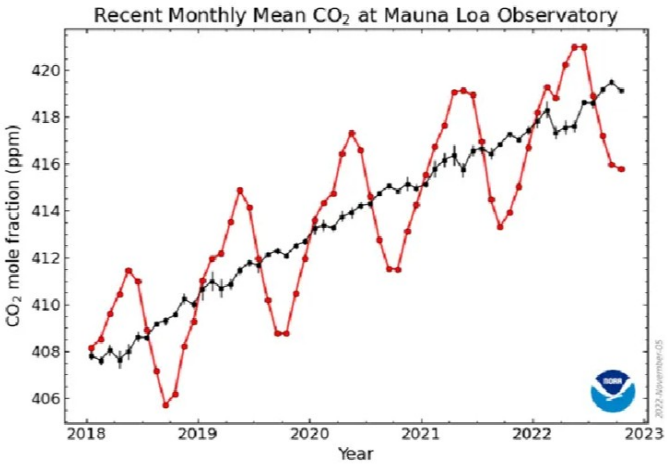
Figure 11.2: Decline in U.S. GDP per degree of warming. Source: CEA-OMB (2023)

The expectation that significant global warming would have a small impact on the U.S. economy was acknowledged quietly by the Biden Administration, even as the President was proclaiming a climate emergency. Figure 11.2, from a 2023 CEA-OMB report, shows the expected decrement in U.S. GDP as a function of temperature rise. The colored lines show the results of a dozen peer-reviewed published studies while the solid black line is their average. The figure could be summarized as "a few percent impact for a few degrees of warming". Given that the economy's annual growth rate is expected to be 1-2 percent, the impact of a warming globe on the U.S. GDP is indeed negligible.

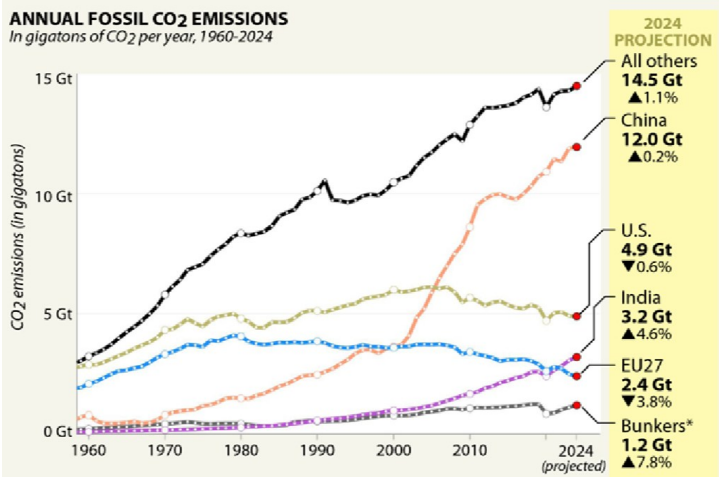
Economists have long considered climate a "relatively unimportant" factor in economic growth, a conclusion acknowledged by the IPCC in AR5. (Report p. 116). The graph shows the results of a dozen peer-reviewed studies with the black line showing their average. These studies show a "few percent impact for a few degrees of warming," and suggest that the impact of a warming world on the US GDP is "negligible." (Report p. 120). The Report states:

"Mainstream climate economics has recognized that CO2-induced warming might have some negative economic effects, but they are too small to justify aggressive abatement policy, and trying to stop or cap global warming even at levels well above the Paris target would be worse than doing nothing." (Report p. 116).

The US and the EU27 have been reducing their CO2 emissions significantly for over 20 years, but this reduction has been dwarfed by the hugely increasing emissions from China and from other countries around the world. Thus any reductions in US CO2 emissions are "expected to have undetectably small direct impacts on the global climate and any effects will emerge only with long delay." (Report p. 129).



Annual cycle of carbon dioxide concentrations in the atmosphere. Source: NOAA.



During COVID 2020-2021 world emissions fell by about 6%, but this had only a very small, delayed effect on the steady rise of atmospheric CO2. The seasonal variation (the red line) in CO2 levels results from there being roughly twice as much land in the Northern Hemisphere and hence roughly twice as much plant life. So, when it is summer in the Northern Hemisphere, plants eating CO2 cause significant dips in the world CO2 level. The black line is the running 12-month average, which filters out the seasonal effect.

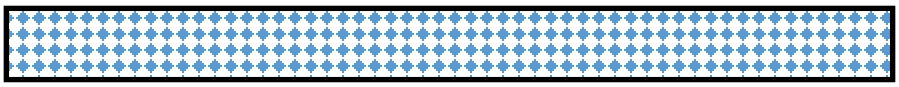
REPORT CONCLUSION

Climate policy should be approached the way one decides whether or not to buy an insurance policy: the risks of loss must be weighed against the cost of the coverage. In particular, consideration must be given to "the nation's need for reliable and affordable energy with minimal local pollution." (Report p. 130). "An approach that acknowledges both the potential risks and benefits of CO2, rather than relying on flawed models and extreme scenarios, is essential for informed and effective decision-making." (Report p. 130).

OBSERVATIONS

The Report shows that, while climate change is a concern, there is no climate crisis nor any existential threat. None of the six IPCC assessment reports actually claims that there is a climate crisis or an existential threat.

All of the points made in the Report are supported by significant numbers of recently published, peer-reviewed papers. Therefore, when scientists with differing opinions state their opinions during the comment period, this will, at most, show that particular issues are disputed. The overall effect will be to highlight the actual extent of disagreement among scientists on numerous points that are important to government environmental policy. One of the principal criticisms of the IPCC reports and the media coverage is that they are biased in favor of the claim that the science is "settled" when, in fact, there are many disagreements on important scientific issues.



Works Cited:

Climate Working Group (2025) A Critical Review of Impacts of Greenhouse Gas Emissions on the US Climate. Washington DC: Department of Energy, July 23, 2025.

Intergovernmental Panel on Climate Change's publication, Climate Change 2021 The Physical Science Basis, the first part of the Sixth Assessment Report (AR6).