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**Comments and Declarations on the
Department of Transportation
National Performance Management Measures
Notice of Proposed Rulemaking
87 *Fed. Reg.* 42401 (July 15, 2022)**

SCIENCE DEMONSTRATES
1-THE PROPOSED RULE AND “NET ZERO” POLICY
ARE NOT BASED ON REAL SCIENCE AND
2-WILL BE DISASTROUS FOR PEOPLE WORLDWIDE
BY REDUCING FOOD AND ELIMINATING
LOW-COST FOSSIL FUEL ENERGY, AND
3-THAT FOSSIL FUEL CO2 WILL NOT CAUSE
CATASTROPHIC GLOBAL WARMING

October 13, 2022 Updated

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I. SUMMARY AND DECLARATIONS

We (Happer and Lindzen) are career physicists who have specialized in radiation physics and dynamic heat transfer for decades. The CO₂ Coalition is a non-profit corporation comprised of more than 100 scientists, engineers and energy experts, publishing on various aspects of climate change and related fields.

Thank you for the opportunity to comment on the proposed U.S. Department of Transportation (DOT) Federal Highway Administration (FHWA) rule that “would require State[s] ... to establish declining targets that reduce CO₂ emissions generated by on-road mobile sources ... that align with the Administration’s target of net-zero emissions, economy-wide, by 2050” and purports to address “Extreme weather due to climate change.” 87 Fed. Reg. pp. 42401, 42402, 42401 (footnote omitted).

With all due respect, in our scientific opinion there is no real science that supports the proposed rule. Two types of purported “science” are cited to support it.

First, the government opinions of the Intergovernmental Panel on Climate Change (IPCC) and the U.S. Global Climate Research Program (USGCRP). They are not real science. Governments do not determine scientific knowledge; scientific method does. The dangers of governmental meddling in science were tragically demonstrated almost a century ago in the former Soviet Union where the Stalin appointed Trofim Lysenko rejected scientific method and used his agricultural theory. Lysenko’s government controlled science resulted in famine and millions of deaths through starvation and disease.

Second, the theory extreme weather is caused by fossil fuel CO₂. However, the theory is contradicted by the facts, and is invalid using scientific method. Extreme weather is not caused by fossil fuel CO₂ and, in fact, has been in decline.

Moreover, real science demonstrates the proposed rule and policy will be doubly disastrous for Americans, people worldwide, the country and the West, comparable to the disastrous results caused by Lysenko Russian government controlled science, for two reasons.

First, the proposed rule and policy is part of a regulatory onslaught that will eliminate the use of fossil fuels in the U.S., the single most important source of reliable and low-cost energy in the U.S. and the West (in contrast to China, where fossil fuels are being used increasingly).

Second, contrary to common reporting, CO₂ is essential to life. Without CO₂, there would be no photosynthesis, no food and no human or other life on earth.

Further, more CO₂ means more food because of what is called the accelerating CO₂ fertilization effect. There is a mathematical formula¹ that computes how much more food will result from increasing CO₂ in the atmosphere. When CO₂ increased from about 280 parts per million (ppm) in 1750 to about 410 ppm currently, the formula computes that the food available worldwide increased more than 20%.

This also means that if the Administration’s and the proposed rule’s policy of “Net Zero” fossil fuel CO₂ were in effect worldwide in 1750, the amount of food available now would be 20% less.

What if the CO₂ in the atmosphere doubled from about 400 ppm today to 800 ppm, the number used for the Equilibrium Climate Sensitivity (ECS)? Using the formula, the

¹ Experiments with CO₂ enrichment show that many crop yields increase by a factor \sqrt{x} with adequate water and other nutrients, where x is the ratio of the current CO₂ ppm level to the former level. Thus, rounding, $x = 410/280 = 1.46$ and $\sqrt{x} = 1.21$, an approximate 21% increase.

amount of food available to people worldwide would increase by more than 40%.²

More good news about increasing CO₂ in the atmosphere. It will increase the amount of food in drought-stricken areas. Increasing CO₂ increases the resistance of plants to droughts because more moisture is retained because of lessened plant transpiration.

Finally, physics proves that doubling the CO₂ concentration from 400 ppm to 800 ppm would not cause catastrophic global warming, but rather would directly cause a beneficial warming of a mere 1° C.³

Thus more CO₂ means more food for people around the world, and that more CO₂ from fossil fuels means both there will be more food and more low cost energy for people worldwide, with no risk of catastrophic global warming.

On the other hand, real science demonstrates the Administration's and the proposed rule's "Net Zero" policies will disastrously result in less food for people worldwide and the elimination of low-cost fossil fuel energy.

Accordingly, it is our scientific opinion that the Department of Transportation should not adopt the proposed rule. Rather, the Administration policy should be to continue to use fossil fuels to produce more CO₂, which will both increase the amount of food available to people worldwide and continue to provide Americans and people worldwide with the largest source of reliable and low-cost energy, fossil fuels.

If the rule is adopted, it should be ruled invalid by the courts.

Here's the science why.

II. REAL SCIENTIFIC KNOWLEDGE COMES FROM VALIDATING THEORETICAL PREDICTIONS WITH OBSERVATIONS, NOT CONSENSUS, PEER REVIEW, GOVERNMENT OPINION, FABRICATED DATA, OR MODELS THAT DO NOT WORK

Scientific knowledge is determined by scientific method. Prof. Richard Feynman, a Nobel Laureate in Physics, provided an incisive definition of scientific method:

"[W]e compare the result of [a theory's] computation to nature, ... compare it directly with observations, to see if it works. If it disagrees with experiment it is wrong. In that simple statement is the key to science." *The Character of Physical Law* (1965), p. 150.

Agreement with observations is the measure of scientific truth. Scientific progress proceeds by the interplay of theory and observation. Theory explains observations and makes predictions of what will be observed in the future. Observations anchor understanding and weed out the theories that don't work. This has been scientific method for more than three hundred years.

Never has anything in science been beyond dispute. It is astounding that one of the most complex questions in physics (namely, the behavior of a multi-phase, radiatively active, turbulent fluid) should be labeled by the government — and funding agencies it controls — to be so settled that skeptics are silenced. That models supporting the climate-crisis narrative fail to describe observations confirms that the puzzle remains unsolved. Making this peculiar situation particularly dangerous are world leaders who have abandoned the science and intellectual rigor

² $x = 800/400 = 2$ and $\sqrt{2} = 1.41$, approximately a 41% increase.

³ See Lindzen, "On Climate Sensitivity" CO₂ Coalition, Climate Issues in Depth, (2/2/2020) and section V.

bequeathed to us by the Enlightenment and its forebears.

Real science is not determined by:

Consensus. What is correct in science is not determined by consensus, but by experiment and observations. Historically, scientific consensuses have often turned out to be wrong. The greatest scientists in history are great precisely because they broke with consensus. The frequent assertion that there is a consensus behind the idea that there is an impending disaster from climate change is not how the validity of science is determined to quote the profoundly true observation of Michael Crichton:

“If it’s consensus, it isn’t science. If it is science, it isn’t consensus.”

Government Opinion. Nobel physicist Richard Feynman put it clearly:

“No government has the right to decide on the truth of scientific principles.” *The Meaning of It All* (1998), p. 57.

The importance of scientific principles that government does not determine science was tragically underscored when Stalin made Trofim Lysenko the czar of Russian biology. False biology prevailed for 40 years in the Soviet Union because Lysenko gained dictatorial control, providing one of the most thoroughly documented and horrifying examples of the politicization of science. Lysenko was strongly supported by “scientists” who benefitted from his patronage. Millions died as a result. William Happer, Chapter 1 “Harmful Politicization of Science,” Michael Gough Ed., *Politicizing Science* (2003), pp. 29-35.

Peer Review. Peer review can be helpful in many areas of science, but it does not determine scientific validity. Agreement of theoretical predictions with observation or experiment, “scientific method,” is the real touchstone of truth in science.

With decades of personal experience in the field of climate study, we have been dismayed that many distinguished scientific journals now have editorial boards that further the agenda of climate-change alarmism rather than objective science. Research papers with scientific findings contrary to the dogma of climate calamity are rejected by reviewers, many of whom fear that their research funding will be cut if any doubt is cast on the coming climate catastrophe. Journal editors have been fired for publishing papers that go against the party line of the climate-alarm establishment.

Alas, peer review of the climate literature is a joke. It is pal review, not peer review. The present situation violates the ancient principle that “no man shall be a judge in his own cause.” Accordingly, all peer reviewed climate publications need to be viewed with skepticism. Some are right, but many have serious problems with confirmation bias.

Fabricated Observations. Since theories are tested with observations, fabricating favorable data and omitting unfavorable facts to make a theory work is an egregious violation of scientific method.

Richard Feynman stated this fundamental principal of scientific method:

“If you’re doing an experiment, you should report everything that you think might make it invalid – not only what you think is right about it... Details that could throw doubt on your interpretation must be given, if you know them.” 1974 Caltech commencement address, *Surely You're Joking, Mr. Feynman!* (1985), p. 311-12

In our experience and as exemplified below, one of us (Lindzen) frankly explained: “(M)isrepresentation, exaggeration, cherry picking, or outright lying pretty much covers all the so-called evidence” marshalled in support of the theory of imminent catastrophic global warming caused by fossil fuels and of the urgent need to achieve “net zero” fossil fuel and other human

CO₂ emissions by 2050.⁴

Models That Do Not Work. Models are a type of theory. Scientific method requires they be tested by observations to see if they work. As Feynman explained, any model's theoretical predictions must be tested with "observations, to see if it works. If it disagrees with experiment, it is wrong."

All the key IPCC models fail this basic test of science. None of their predictions are validated by observations. None work. If they were used to navigate a plane flying from New York to London, the plane would be sent to Moscow or Rome, but never to London. However, IPCC model predictions of catastrophic global warming caused by fossil fuel CO₂ are used all the time. In real science, they would never be used, as elaborated below in section V.A.

U.S. Supreme Court on Science. The U.S. Supreme Court has adopted essentially the same view of science, starting in 1993 with its landmark *Daubert* decision:

"[I]n order to qualify as 'scientific knowledge,' an inference or assertion must be derived by scientific method," "any and all scientific testimony or evidence admitted [must be] ...real," "tested," and "supported by appropriate validation." *Daubert v. Merrell Pharmaceutical, Inc.*, 509 U.S. 579 (1993) (emphasis added).

Scientific evidence must be real, tested and validated -- or not be used.

As to peer review, the Supreme Court similarly explained that peer review can be helpful but "does not necessarily correlate with reliability" because "in some instances well-grounded but innovative theories will not have been published." *Daubert, supra*, p. 593.

In summary, "real science" is determined by scientific method that tests theory with observations and provides scientific knowledge - not by consensus, government opinion, peer review, fabricated data, or models that do not work.

These fundamental principles of real science and scientific method are applied to the "science" cited in support of the proposed rule. Next, we respectfully, demonstrate that no real science supports the proposed rule.

III. THE PROPOSED RULE IS BASED ON IPCC AND USGCRP GOVERNMENT OPINIONS, NOT SCIENCE, WHICH PROVIDES NO REAL SCIENCE SUPPORTING IT

A. The Proposed Rule is Based on Fatally Flawed IPCC and USGCRP "Science"

All the purported "science" cited to support the proposed rule is fatally flawed: it is merely government opinion from the Intergovernmental Panel on Climate Change (IPCC) and the U.S. Global Climate Research Program (USGCRP), as demonstrated in the sections B and C below. The purported "science" supporting the proposed rule is quoted at length below:

"The proposed GHG measure would help the United States confront the increasingly urgent climate crisis. The **Sixth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC)**, released on August 7, 2021, confirms that human activities are increasing GHG concentrations that have warmed the atmosphere, ocean, and land at a rate that is unprecedented in at least the last 2,000 years.² According to the report, global mean sea level has increased between 1901 and 2018, and changes in extreme events such as heatwaves, heavy precipitation, hurricanes, wildfires, and droughts have intensified since the last assessment report in 2014.³ *** At the same time, transportation contributes significantly to the causes of climate change,⁵ and each additional ton of CO₂

⁴ Lindzen, "Global Warming for the Two Cultures," Global Warming Policy Foundation

produced by the combustion of fossil fuels contributes to future warming and other climate impacts. *Id.* 87 *Fed. Reg.* p. 42402.

“Scientific literature ... provides greater certainty on the impact of human activities on the earth’s current and future climate, as well as the urgency of actions to reduce human GHG emissions. The **IPCC Sixth Assessment Report** states that it is now unequivocal that human activities have increased atmospheric GHG emissions concentrations and resulted in warming of the atmosphere, ocean, and land, with average surface temperature having increased by approximately 2 degrees Fahrenheit since the 1800s.⁸ The **IPCC Sixth Assessment Report** also points to growing evidence linking human production of GHG emissions to extreme events such as heatwaves, heavy precipitation, droughts, and hurricanes. The report warns that human produced GHG emissions already in the atmosphere have assured that global surface temperatures will continue to increase until at least the mid-century, even with significant reductions in CO₂ emissions. This warming will result in other changes that are irreversible for centuries to millennia, including the continued melting of mountain and polar glaciers, the loss of ice from the Greenland Ice Sheet, and the continued rise in global mean sea level. The **IPCC Sixth Assessment Report** further notes that every ton of CO₂ emissions contributes to climate change.

“Other research also shows that CO₂ and other GHG emissions have accumulated rapidly as the world has industrialized, with concentrations of atmospheric CO₂ increasing from roughly 278 parts per million in 1750⁹ to 414 parts per million in 2020. (Footnote omitted).

“Scientists have warned that significant and potentially dangerous shifts in climate and weather are possible with climate change of 2 degrees Celsius (3.6 degrees Fahrenheit) beyond preindustrial levels.¹⁶ Stabilizing at this level would likely require atmospheric CO₂ concentrations of approximately 450 ppm or lower;¹⁷ achieving this concentration would likely require a decrease in global net anthropogenic CO₂ emissions of about 25 percent below 2010 levels by 2030, leading to net-zero CO₂ emissions by 2070.¹⁸” The Paris Agreement goal is to limit global warming well below that level, and preferably to 1.5 degrees Celsius (2.7 degrees Fahrenheit)(footnote omitted), which the IPCC estimates would likely require decreasing global net anthropogenic CO₂ emissions 45 percent below 2010 levels by 2030, reaching net-zero around 2050.²⁰ The **IPCC Sixth Assessment Report** includes new estimates of the likelihood of crossing the 1.5 degree Celsius threshold, concluding that without immediate, rapid and large-scale reductions in GHG emissions, it will no longer be possible to limit warming to 1.5 degrees or even 2 degrees Celsius.²¹ *Id.* pp. 42405-06 (emphasis added).

The footnotes, abbreviated for convenience and using a more conventional style, show all the key “science” cited in the proposed rule is based on IPCC and USGCRP government opinions, not science:

- 2 IPCC, *Climate Change 2021: The Physical Science Basis*. Sixth Assessment Report. (“IPCC 2021”). Summary for Policymakers.
- 3 IPCC 2021.
- 5 USGCRP, *Fourth National Climate Assessment, Volume II: Impacts, Risks, and Adaptation in the United States* (2018) pp. 479–511
- 8 IPCC 2021, Summary for Policymakers.

- 9 USGCRP, *Fourth National Climate Assessment, Volume I, 2017: Climate Science Special Report* (2017).
- 16 IPCC, *Global Warming of 1.5° C* (2018). Summary for Policymakers.
- 18 IPCC, *Climate Change 2018*. Summary for Policymakers.
- 20 IPCC, *Global Warming of 1.5° C* (2018). Summary for Policymakers (2018)
- 21 IPCC 2021. Summary for Policymakers.

Thus, all the key “science” cited to support the proposed rule is merely government opinion by the IPCC and the U.S. Global Climate Research Program (USGCRP), which is not science, demonstrated next in sections B and C.

B. The IPCC Is Government Controlled and Thus Only Issues Government Opinions, Not Science, Which Provides No Real Science Supporting the Proposed Rule

Unknown to most, two IPCC rules require that IPCC governments control what it reports as “scientific” findings on CO₂, fossil fuels and catastrophic human-made global warming, not scientists. IPCC governments meet behind closed doors and control what is published in its Summaries for Policymakers (“SPMs”), which controls what is published in full reports.

The picture below tells all.⁵



IPCC Summary for Policymakers writing meeting

This not how scientific knowledge is determined. In science, as the Lysenko experience tragically underscores, and as Richard Feynman emphasized:

“No government has the right to decide on the truth of scientific principles.”

The two IPCC rules are:

IPCC SPM Rule No.1: All Summaries for Policymakers (SPMs) Are Approved Line by Line by Member Governments

⁵ Donna Framboise. “US Scientific Integrity Rules Repudiate the UN Climate Process (January 29, 2017) link [US Scientific Integrity Rules Repudiate the UN Climate Process | Big Picture News, Informed Analysis](#).

“IPCC Fact Sheet: How does the IPCC approve reports? ‘Approval’ is the process used for **IPCC Summaries for Policymakers (SPMs)**. **Approval signifies that the material has been subject to detailed, line-by-line discussion, leading to agreement among the participating IPCC member countries**, in consultation with the scientists responsible for drafting the report.”⁶

Since governments control the SPMs, the SPMs are merely government opinions. Therefore, they have no value as real science.

The Proposed Rule’s 7 IPCC Citations. As shown above, the proposed rule cites the IPCC seven times as “scientific” support for the rule, six of the citations were to SPMs. They have no value as real science.

What about the seventh IPCC citation? It also has no value as real science, as full IPCC reports must comply with the SPMs. Whatever scientists write in a draft is changed to conform to the SPMs, according to IPCC rules and practice as detailed next.

The full IPCC reports are thousands of pages long. A second IPCC rule requires that everything in an IPCC published report must be consistent with what the governments agree to in the SPMs about CO₂ and fossil fuels. This second rule subjects them to government control, and thus renders them of no value as science, including the seventh citation in the proposed rule.

Specifically, this second rule means any draft the independent scientists write are rewritten as necessary to be consistent with the SPM.

IPCC Reports Rule No. 2: Government SPMs Override Any Inconsistent Conclusions Scientists Write for IPCC Reports

IPCC Fact Sheet: “‘Acceptance’ is the process used for the full underlying report in a Working Group Assessment Report or a Special Report after its SPM has been approved.... **Changes ...are limited to those necessary to ensure consistency with the Summary for Policymakers.**” IPCC Fact Sheet, *supra*. (Emphasis added).

IPCC governments’ control of full reports using Rule No. 2 is poignantly demonstrated by the IPCC’s rewrite of scientific conclusions reached by independent scientists in their draft of Chapter 8 of the IPCC report *Climate Change 1995, The Science of Climate Change*.

The draft by the independent scientists concluded:

- “No study to date has positively attributed all or part (of the climate warming observed) to (manmade) causes.”
- “None of the studies cited above has shown clear evidence that we can attribute the observed [climate] changes to the specific cause of increases in greenhouse gases.”

Frederick Seitz, “A Major Deception on Climate Warming,” *Wall Street Journal* (June 12, 1996)(emphasis added).

However, the government written SPM proclaimed the exact opposite as to human

⁶ Intergovernmental Panel on Climate Change, Principles Governing IPCC Work, the Procedures for the Preparation, Review, Acceptance, Adoption, Approval and Publication of IPCC Reports , Appendix A Sections 4.4-4.6, https://archive.ipcc.ch/news_and_events/docs/factsheets/FS_ipcc_approve.pdf; <http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles-appendix-a-final.pdf> (Emphasis added).

influence:

“The balance of evidence suggests a discernible human influence on global climate.”
IPCC 1995 Science Report SPM, *supra*, p. 4.

What happened to the independent scientists’ draft? IPCC Rule No. 2 was applied, and their draft was rewritten to be consistent with the SPM in numerous ways:

- “[M]ore than 15 sections in Chapter 8 of the report--the key chapter setting out the scientific evidence for and against a human influence over climate--were changed or deleted... [N]early all worked to remove hints of the skepticism with which many scientists regard claims that human activities are having a major impact on climate in general and on global warming in particular.” Setz, *supra*.
- The scientists draft language was deleted from Chapter 8 in the 1995 Science Report.
- The government-written Summary for Policymakers proclaimed the exact opposite of what the scientists concluded as to human influence:

“The balance of evidence suggests a discernible human influence on global climate.” 1995 Science Report SPM, p. 4.

- The Summary for Policymakers’ opposite language was inserted in the published version of Chapter 8 in the 1995 Science Report, on page 439:

“The body of statistical evidence in chapter 8 ... Now points towards a discernible human influence on global climate.”

As to the full IPCC reports, hundreds of world-class scientists draft some very good science. What to do? Use a presumption that anything in IPCC reports should be presumed to be government opinion with no value as real science, unless independently verified by scientific method.

Stop for a moment. Just imagine what would have happened if the IPCC accurately reported the science. The scientists concluded, “No study to date has positively attributed all or part (of the climate warming observed) to (manmade) causes.” and that “None of the studies ... has shown clear evidence that we can attribute the observed [climate] changes to ... greenhouse gases.”

There would be no *Massachusetts v. EPA*, “Net Zero” fossil fuel CO₂ regulation, action to eliminate fossil fuels, Green New Deal, huge subsidies of renewable energy and electric cars. The IPCC, as a government-controlled organization, has never followed the science when facts contradict the theory of catastrophic global warming caused by fossil fuels and other human emissions.

In conclusion, none of the seven IPCC citations in the proposed rule contain real science; they are merely the opinions of IPCC governments. Thus, the IPCC citations supporting the proposed rule provide no real science — just as Lysenko failed to provide real biology for feeding millions of people.

C. The USGCRP 4th National Climate Assessment Fabricates Data and Relies on IPCC Findings, Thus Provides No Real Science Supporting the Proposed Rule

The U. S. Global Climate Research Program (USGCRP) *Fourth National Climate Assessment, Vol. I, Climate Science Special Report (CSSR)* (2017) and Vol. II, *Impacts, Risks, and Adaptation in the United States* (2018) are the most recent National Climate Assessment (“NCA”). They are two of the key scientific citations in the proposed rule.

However, Vol. I, CSSR is merely government opinion, not real science, for two reasons.

First, Prof. Koonin provided numerous examples, detailed below in section IV, where the USGCRP CSSR fabricated data, and omitted data that contradicted its theories, in his words, committing “egregious” violations of scientific method, which were “shockingly misleading” and “misrepresentation of climate science.” This, by itself, means the CSSR, and probably all the National Climate Assessments, are merely government opinions having no value as science.

Second, it relies extensively on IPCC models and opinions that are government-controlled “science.” The “USGCRP Web site states that: ‘When governments accept the IPCC reports and approve their Summary for Policymakers, they acknowledge the legitimacy of their scientific content.’”⁷ Id. (footnote omitted).

However, legitimacy of scientific content is not determined by government,

Richard Feynman emphasized, as noted: “No government has the right to decide on the truth of scientific principles.” Legitimacy of scientific content is determined by scientific method.

The CSSR chose to rely on IPCC government controlled “scientific” findings by about 240 times. As a result, their science is contaminated by the IPCC’s government-dictated opinions. Accordingly, the CSSR Fourth NCA is merely government opinion, as the Lysenko experience tragically underscores, has no value as real science.

As a result, the CSSR is fatally flawed science, as is Vol. II is *Impacts, Risks, and Adaptation in the United States* (2018) that depends on the science in the CSSR. Thus they provide no real science that supports the proposed rule.

In conclusion, all the purported “science” cited to support the proposed rule is fatally flawed science. None provide real science that supports the proposed rule. They are merely government opinion by the IPCC and the USGCRP, like Lysenko’s “science.”

IV. THE PROPOSED RULE’S THEORY EXTREME WEATHER IS CAUSED BY FOSSIL FUEL CO₂ IS CONTRADICTED BY FACTS, THUS THE THEORY PROVIDES NO REAL SCIENCE SUPPORTING THE PROPOSED RULE

The proposed rule states that it purports to address “Extreme weather due to climate change,” because, “The IPCC Sixth Assessment Report ... points to growing evidence linking human production of GHG emissions to extreme events such as heatwaves, heavy precipitation, droughts, and hurricanes.” 87 *Fed. Reg.* pp. 42401, 42405.

Prof. Stephen Koonin in *Unsettled* (2021) devotes five chapters to applying scientific method analyzing facts of extreme weather, including heat waves, hurricanes, tornadoes, sea-level rise, wildfires, floods, droughts and precipitation shifts. He concludes:

“The bottom line is that the science says that most extreme weather events show no long-term trends that can be attributed to human influence on the climate.”

“Observations extending back over a century indicate that most types of extreme weather events don’t show any significant change – and some such events have actually become less common or severe – even as human influences on the climate grow.” Id. pp. 99, 97

⁷ Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 *Fed. Reg.* 66496 (Dec. 15, 2009) (“Endangerment Findings”), p. 66511.

(emphasis added).

Relevant excerpts from his detailed 86 page analysis and contrary facts follow.

Heat. In “Hyping The Heat,” Chapter 5, he analyses the 2017 Fourth National Climate Assessment Volume I, called the Climate Science Special Report (CSSR).⁸

He notes “the CSSR’s Executive Summary says (prominently and with *Very High Confidence*):

“There have been marked changes in temperature extremes across the contiguous United States.” Id. p. 101 (emphasis added).

In support, it presents the chart below with the alarming heading “Record Warm Daily Temperatures Are Occurring More Often,” CSSR Figure ES.5 on p. 19 (Fig. 5.1 in his book on p. 101).

Note that the chart does not provide temperature data, but an unusual ratio, “the ratio of record highs to lows:”

Record Warm Daily Temperatures Are Occurring More Often

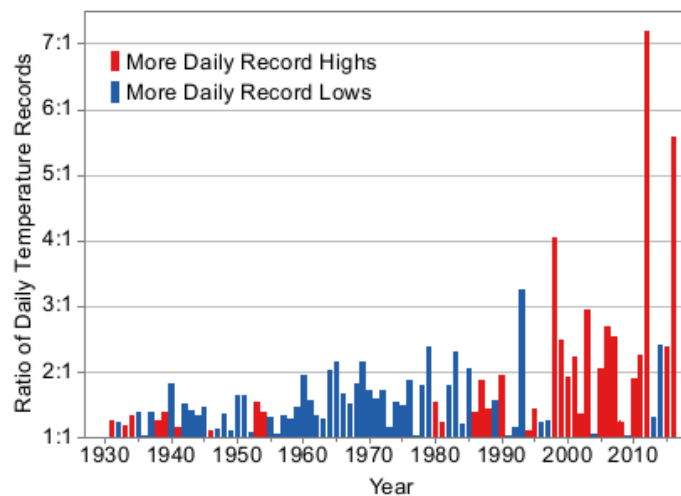


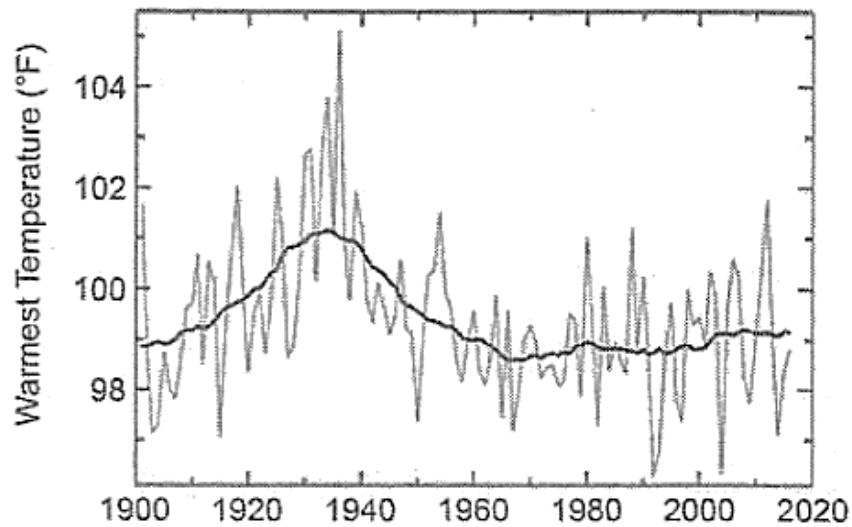
Figure ES.5: Observed changes in the occurrence of record-setting daily temperatures in the contiguous United States. Red bars indicate a year with more daily record highs than daily record lows, while blue bars indicate a year with more record lows than highs. The height of the bar indicates the ratio of record highs to lows (red) or of record lows to highs (blue). For example, a ratio of 2:1 for a blue bar means that there were twice as many record daily lows as daily record highs that year. (Figure source: NOAA/NCEI). From Figure 6.5 in Chapter 6.

He continued: “I suspect that most readers were shocked by that figure, as I was when I first saw it. Who wouldn’t be? An attention grabbing title (“Record Warm Daily Temperatures Are Occurring More Often”) backed up by data with a hockey-stick shape veering sharply upward in recent years.... It sure looks like temperatures are going through the roof.” Koonin, *supra*, p. 102.

So he looked deeper. He found a total “inconsistency” buried deep in the report that

⁸ NCAs are required by the Global Change Research Act of 1990, and are prepared by numerous Federal agencies and departments and the U.S. Global Climate Research Program (“USGRP”). The 4th National Climate Assessment is the most recent. Vol. II is *Impacts, Risks, and Adaptation in the United States* (2018). The 5th NCA is being prepared now.

shows temperatures from 1900 to 2020. It showed warm temperatures were not occurring more often and that the “warmest temperature has hardly changed over the last 60 years and is about the same today as it was in 1900. It shows that daily high temperatures are no more frequent than they were a century ago. The spiky lines show yearly values, the dark line shows the average. Id.:



CSSR Fig. 6.3, p. 190, his Fig. 5.2, p. 102.

He confirmed this fact by contacting Prof. John Christy, who did an analysis of U.S. daily temperature extremes from 1895 until 2018. His results were like the second CSSR chart above. “The record highs clearly show the warm 1930s [during the Dust Bowl], but there is no significant trend over the 120 years of observations, or even since 1980, when human influences on the climate grew strongly.” *Id.* pp. 106-07.

As a result, Prof. Koonin did not mince words. “The U.S. government’s most recent assessment report, the 2017 Climate Science Special Report (CSSR) is not just misleading on ... [high temperatures] – it’s wrong,” indeed “shockingly misleading” and “a prominent misrepresentation of climate science.” *Id.* pp. 101, 107, 109.

Prof. Koonin concludes two things.

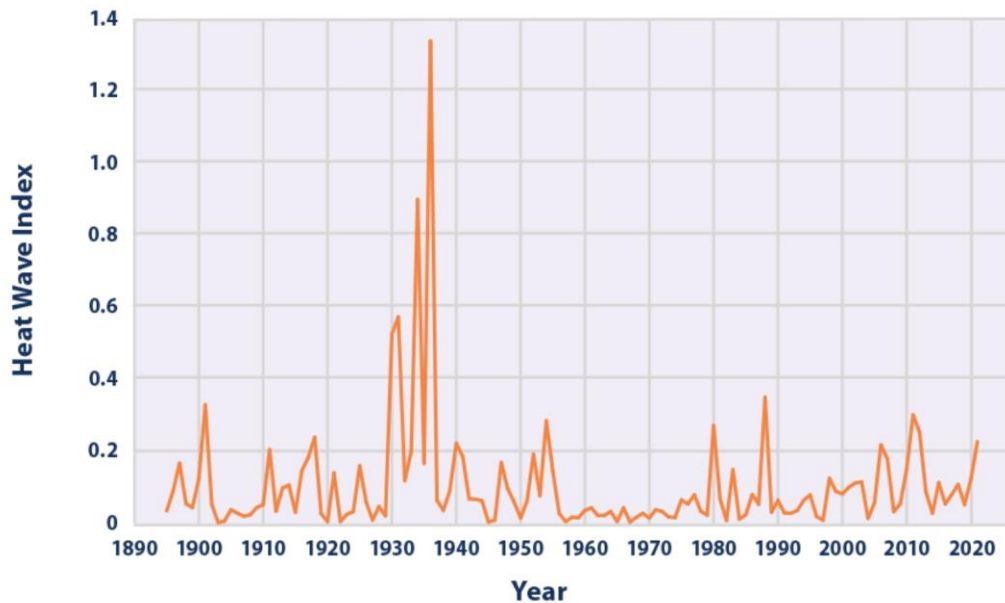
First, CSSR fabricated data on high temperatures using ratio numbers, not temperatures, to assert the theory that “Record Warm Daily Temperatures Are Occurring More Often,” which violate scientific method and is “wrong.”

Second, on extreme temperatures: “*The annual number of high temperature records set shows no significant trend over the past century, nor over the past 40 years.*” *Id.* p. 110.

Additional data confirms heat waves are not reaching unusual numbers in recent decades. According to the U. S. EPA’s heat wave index⁹, recent decades’ index is approximately 10% of that experienced during the hottest period in the continental United States in the 1920s and 1930s.

⁹ EPA U.S. Annual Heat Wave Index, 1895–2021

Figure 3. U.S. Annual Heat Wave Index, 1895–2021

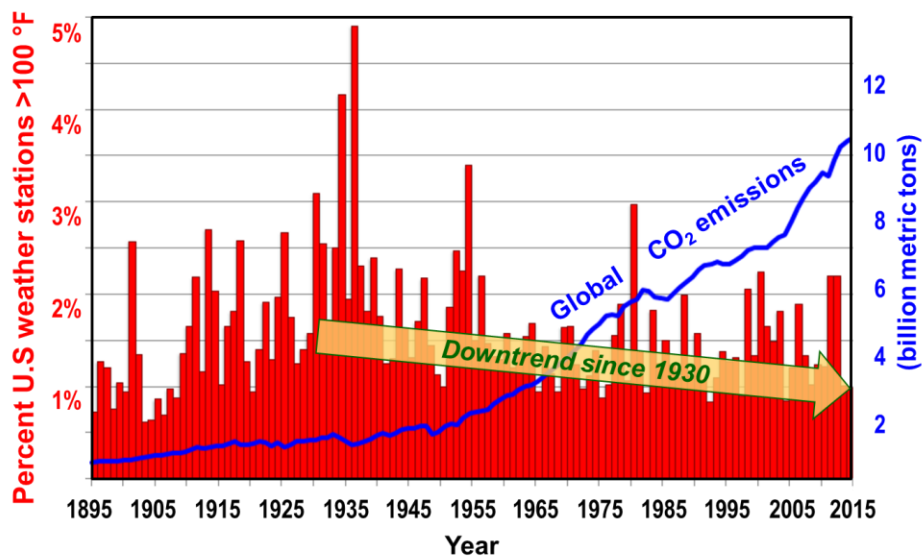


EPA U.S. Annual Heat Wave Index, 1895–2021

Dr. J. R. Christy in testimony before the U.S. House Committee on Science, Space & Technology¹⁰ provided data from 1895 to 2015 showing a significant decline in the percentage of mainland U. S. weather stations that reported a temperature of more than 100° F.

Note also that the number of these very hot days occur today with about the same frequency as they did 100 years ago.

Finally, note that CO₂ emissions were very low when temperatures were at their the highest around 1935 during the Dust Bowl. Further, CO₂ emissions started to increase substantially starting in the 1940s, yet the number of very hot days did not increase and were largely unchanged and even declined somewhat.

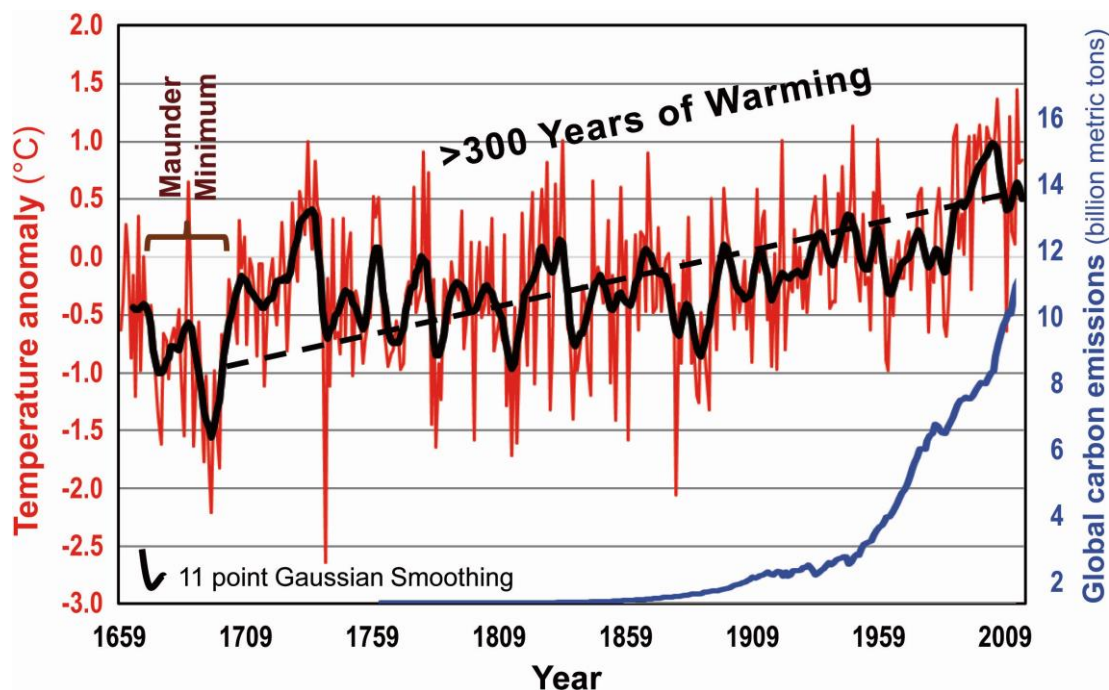


Per cent of U. S. weather stations >100° F

¹⁰ J. R. Christy's testimony U.S. House Committee on Science, Space & Technology 2 Feb 2016

Further, the chart below shows that the modern warming trend began more than 300 years ago around 1659, long before man's emissions of CO₂ could have had any impact on temperature. It is based on the longest thermometer-based temperature data from the Central England Temperature record (HadCET).¹¹

The chart also shows global CO₂ emissions from 1659 to 2009, which were virtually nonexistent until the mid-1850s. Thus the first 250 years of modern warming was unaffected by man's CO₂ emissions and were necessarily naturally driven.



Parker DE, Legg TP, Folland CK (1992) A new daily Central England Temperature Series, 1772-1991. Int. J. Clim., Vol 12, pp 317-342

Accordingly, Prof. Koonin applying scientific method and the data proves that record warm daily temperatures are not occurring more often. As in the past, high temperatures will continue to cause damage, but the resulting increased financial losses will have nothing to do with increases of CO₂ from fossil fuel or natural sources.

Hurricanes. “Tempest Terrors,” Chapter 6 of Prof. Koonin’s book deals with the theory that “Storms are becoming more common and more intense and rising greenhouse gas emissions are going to make it all a lot worse,”¹² a theory many argue is strongly confirmed by Hurricane Ian recently.

Rather, this another example of the cherry-picking of facts commonly used to support “Net Zero” fossil fuel CO₂ policies in basic violation of scientific method. An obvious scientific question is how often have there been extreme hurricanes in history? The facts show that Mother Nature has been producing extreme hurricanes, like Ian, many times over hundreds of thousands of years. For example, the worst decade for extreme hurricanes for the United States was the 1780s.

Specifically, Prof. Koonin proves “the data and research literature are starkly at odds with this message,” and that “hurricanes and tornadoes have showed no changes attributable to human

¹¹ Parker DE, Legg TP, Folland CK (1992) A new daily Central England Temperature Series, 1772-1991. Int. J. Clim., Vol 12, pp 317-342

¹² Id. p. 111.

influences.” Id. pp. 111-12, elaborated next.

He cites the 2014 3d National Climate Assessment issued by the U.S. government asserting in “Key Message 8:”

The intensity, frequency and duration of North Atlantic hurricanes, as well as the frequency of the strongest (Category 4 and 5) hurricanes, have all increased since the early 1980s.... Hurricane-associated storm intensity and rainfall rates are projected to increase as the climate continues to warm. Koonin, p. 115 (emphasis added).

He explains, “The report backs up that statement with the graph reproduced in figure 6.3 showing a seemingly alarming increase in the North Atlantic PDI (that is, the strongest hurricanes),” and “the general upward trend is emphasized, so that in the non-expert eye, it looks like we’re in trouble – and headed for more.” Id. p. 115.

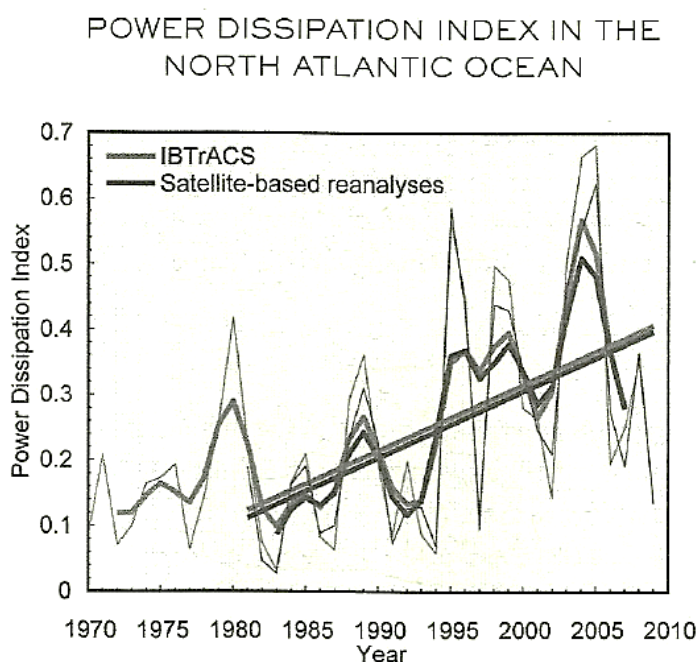


FIGURE 6.3 Power Dissipation Index in the North Atlantic Ocean. Two different analyses of the data are shown, along with straight lines indicating the trend in each. (NCA2014, Figure 2.23.)

Applying scientific method, Prof. Koonin examined the facts more deeply to see if they supported the theory that hurricanes were getting much stronger. Once again, he found that a USCCRP National Climate Assessment fabricated the facts and was wrong.

First he looked at the main research paper cited by the assessment. “To my surprise, I found it stated quite explicitly that there are *no* significant trends beyond natural variability in hurricane frequency, intensity, rainfall or storm surge flooding.” Id. p. 115.

Next, he went back and searched the NCA more thoroughly. On page 769, buried in the text of appendix 3, he found this statement:

There has been no significant trend in the global number of tropical cyclones nor has any trend been identified in the number of U.S. land-falling hurricanes. Id. p.117 (footnotes omitted).

Further, he found that the absence of significant trends in hurricanes was hardly unknown to the experts at the time the 2014 NCA was being prepared.

“The IPCC’s Fifth Assessment Report (AR 5), available in late 2013, states clearly that there is low confidence in any long-term increase in hurricane activity. And a 2012 reconstruction of the PDI back to 1880 reinforces the conclusion that recent decades are nothing out of the ordinary, noting that ‘there have been periods before 1949 that were relatively active compared to the post-1995 era of heightened activity.’ In other words, there have been times before human influences became significant that were at least as active as today.” Id. p. 117.

Next, Prof. Koonin examined the next National Climate Assessment, the 2017 CSSR, to see if it corrected the 2014 Assessment. It did not. It repeated the same false science: “Key Finding 1 of its Chapter 9 reads:

“Human activities have contributed substantially... to the observed upward trend in North Atlantic hurricane activity since the 1970s.” Id. p. 118 (footnote omitted).

As a result, he again did not mince words: the CSSR “discussion of hurricanes in the 2017 As a result, he again did not mince words: the CSSR “discussion of hurricanes in the 2017 CSSR is a profound violation of Feynman’s... [scientific method] caution, that a scientist must ‘try to give all of the information to help others to judge the value of your contribution; not just the information that leads to judgment in one particular direction or another.’” Koonin, *supra*, p. 119.

This is another egregious violation of scientific method by the USGCRP National Climate Assessment, and further proof that USGCRP National Climate Assessments are merely government opinions, not science, discussed more fully in section III. C.

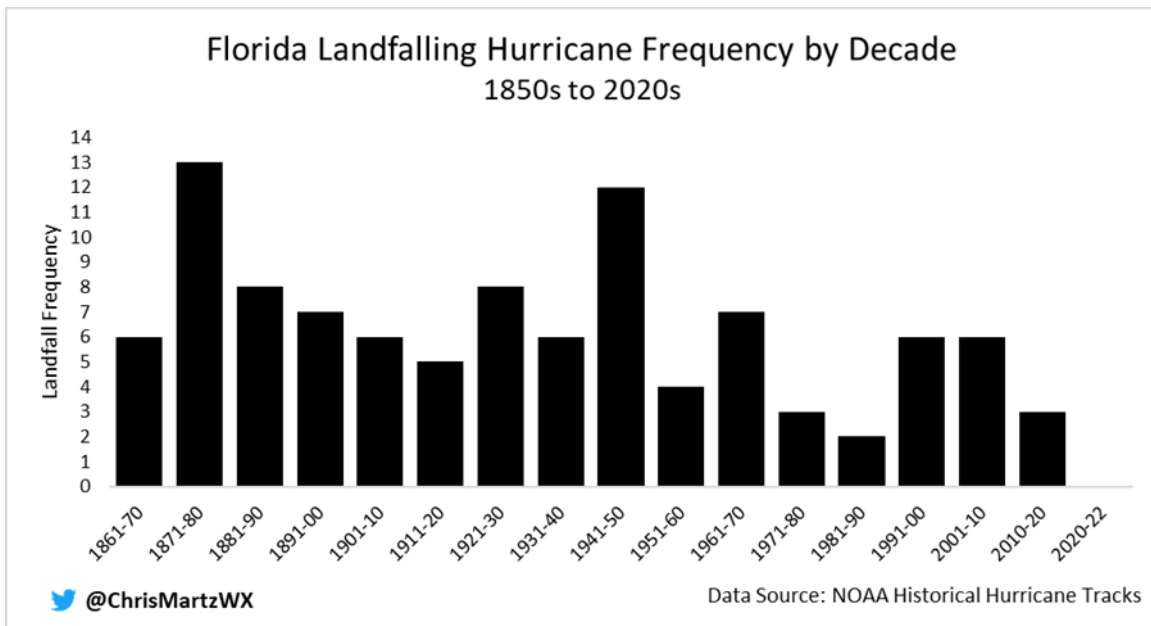
Since the claim that hurricanes and storms are becoming more severe because of rising fossil fuel CO₂ and other greenhouse gases is so frequently and fervently asserted, it’s important to set forth more evidence that the claim is false.

Most notably, Hurricane Ian made landfall in the United States in September of 2022, first in southwest Florida and then in South Carolina, leaving a path of destruction in its wake.

This storm created a tidal wave of stories claiming that this was the new normal and climate change was causing more and stronger hurricanes.

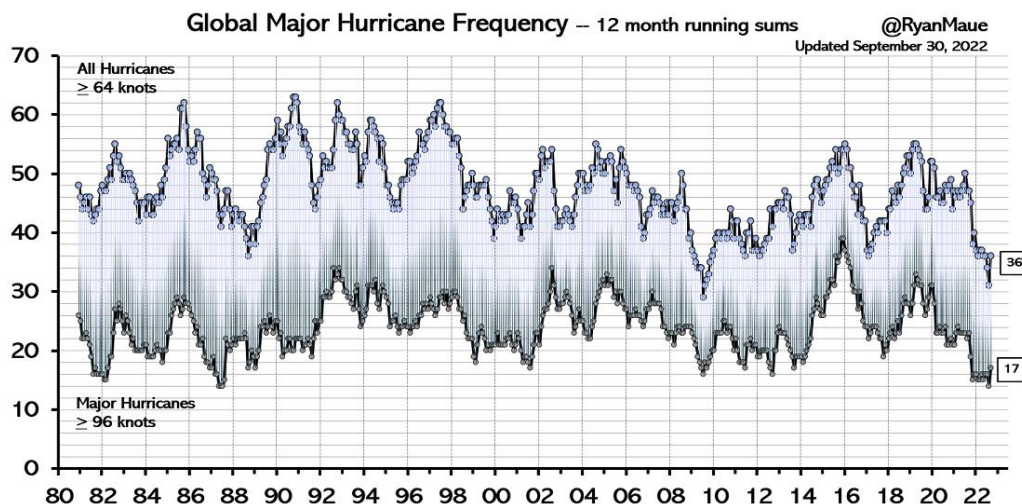
The facts show a quite different story. Rather than an increasing number of hurricanes landfalling in the Sunshine State, NOAA data thankfully shows we have seen fewer.¹³

¹³ Chris Martz (data source: NOAA Historical Hurricane Tracks)



Florida landfalling hurricanes

Further, Dr. Ryan Maue¹⁴ developed the following evidence that shows there is no discernible increase in the number of hurricanes from 1980 to 2022. In fact, this data shows a small decline in the hurricanes of all categories.



Maue (2022) Global Hurricane Frequency (all & major) -- 12-month running sums.

In summary, scientific method shows that there is no risk of increased damage by hurricanes because of increasing atmospheric CO₂ from fossil fuels. Hurricanes will continue to cause damage, and the damages will increase with time as more valuable property is located in poorly drained and other hazardous areas. But the resulting increased financial losses will have nothing to do with increases of fossil fuel CO₂. Moreover, scientific method rejects the theory that recent warming is causing an increase in hurricanes.

Tornadoes. The National Oceanic and Atmospheric Administration (“NOAA”) produced an alarming graph that shows the annual number of tornadoes in the U.S. have more than doubled in frequency over the last 20 years compared to the twenty years from 1950 to 1970

¹⁴ Maue (2022) Global Tropical Cyclone Activity <https://climatlas.com/tropical/>

Id. p. 121.

Careful scrutiny of the data, however, proves this is false.

Prof. Koonin explained that radar could only detect strong tornadoes, not weak ones, until the last 20 years or so. Thus the alarming 1950 to 1970 NOAA graph only included strong tornadoes because it could not count weak tornadoes. The later graph counted both, weak and strong. Thus to get an accurate comparison, it's necessary to exclude the weak tornadoes..

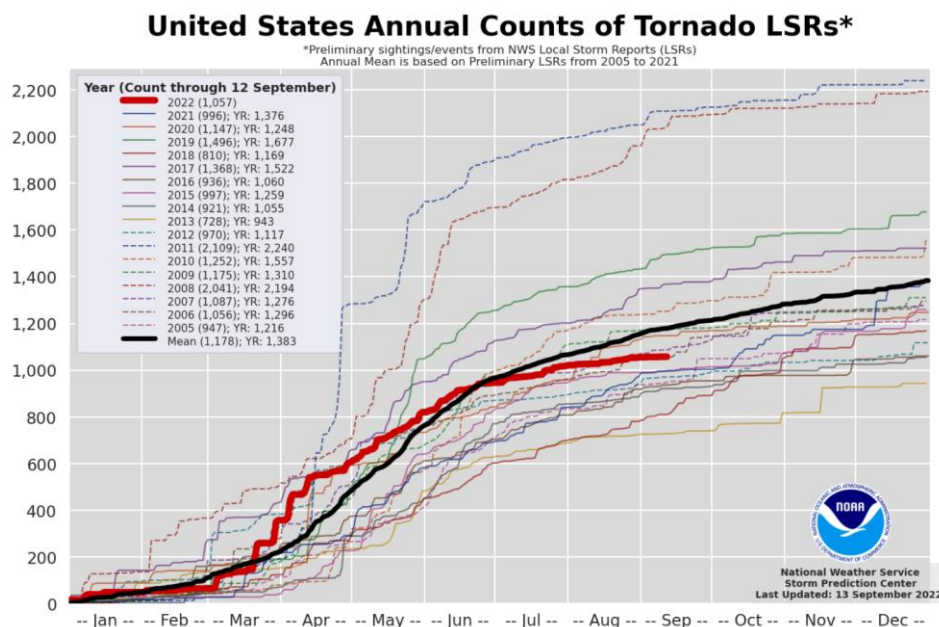
He presents two graphs of tornado numbers that exclude the weak tornadoes by using what is called the EF scale of tornado strength. One graph counts tornadoes of an EF of 1 or more, which excludes weak tornadoes. It shows the number of tornadoes has not increased over the past 60 years.

The second graph has even better news. It counts the strongest tornadoes, which have in EF of 3 and above. It shows the number of strong tornadoes *decreased* by about 40% during the last sixty years. Id. p. 123.

Prof. Koonin reports this good news is further confirmed by the IPCC's 2018 Special Report on Extreme Events, which states in the Executive Summary of its Chapter 3:

"There is low confidence in projections of... tornadoes because competing physical processes may affect future trends and because climate models do not simulate such phenomena." Koonin, *supra*, p. 126.

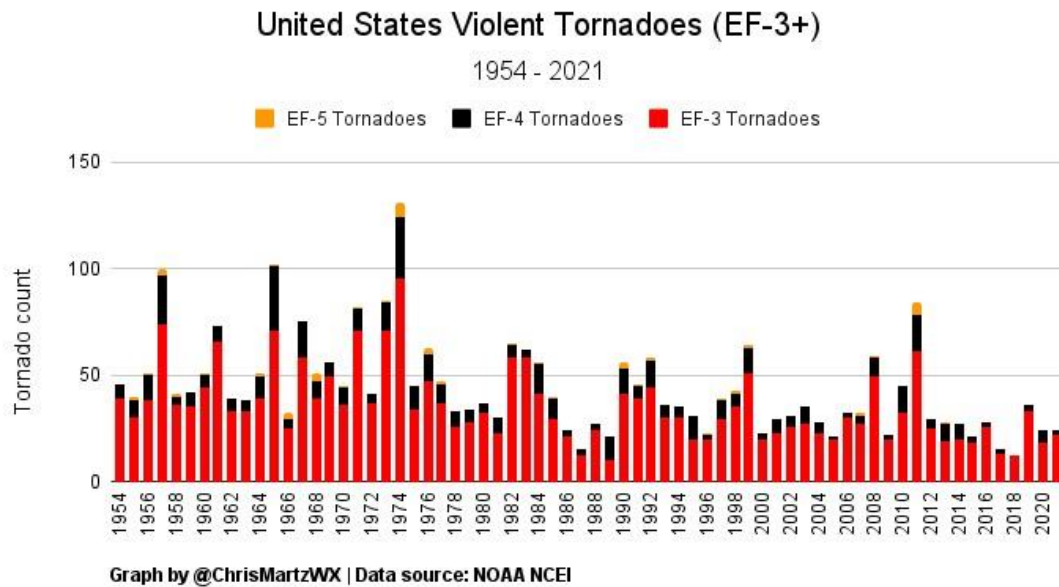
Looking further at the data, the National Oceanic and Atmospheric Administration¹⁵ ("NOAA") data on the annual count of tornadoes in the United State show that the number twisters in the U. S. is well below the average since 2005.



NOAA National Weather Service Data – Storm prediction Center (2022)

Since the advent of Doppler radar in the early 1980s a complete assessment of all tornadoes is available. For longer-term assessments, NOAA recommends only using the strongest of the storms, EF-3, EF-4, and EF-5. This is because, prior to the satellite era, many of the smaller storms would have not been catalogued. A review of these strong storms reveals a decline in tornadic activity, rather than an increase as claimed.

¹⁵ NOAA National Weather Service Data – Storm prediction Center (2022)



NOAA National Weather Service Data – Storm prediction Center (2022)

Prof. Koonin concludes “as human influences have grown since the middle of the twentieth century, the number of significant tornadoes hasn’t changed much at all,” and even better, “the strongest storms have become less frequent;” “US tornadoes have become more benign as the globe has warmed over the past seventy-five years, and we have no credible method for projecting future changes.” *Id.* pp. 123, 126.

In summary, scientific method shows that there is no risk of increased damage by tornados because of increasing atmospheric CO₂ from fossil fuels. Tornados will continue to cause damage, but the resulting increased financial losses will have nothing to do with increases of CO₂.

Sea Level. “Sea Level Scares” is the subject of Chapter 8.

As background, Prof. Koonin provides data on sea level, reporting that looking over hundreds of thousands of years the sea level has risen as much as 400 feet, and fallen 400 feet.

Since the Last Glacial Maximum 22,000 years ago, the sea level has risen 400 feet.

Since 1880, the sea level has risen 10 inches, with the annual rate of increase varying substantially and averaging .07 inches per year.

Between 1925-1940, the average rate of increase was .12 inches per year.

Between 1993-2013, two decades, the average rate of increase was also .12 inches per year. *Id.* p. 151.

Examining the facts, he pointed out that both the IPCC and the CSSR unscientifically emphasized the sea level increase between 1993–2013, but totally ignored the same increase between 1925-1940.

The “IPCC’s 2019 Special Report on the Ocean and Cryosphere in a Changing Climate Report (SROCC) expresses high confidence that the satellite data from 1993 to 2015 shows an acceleration (that is, the rate of [sea level] rise is increasing),” and the IPCC *Climate Change 2013: The Physical Science Basis*, AR5, “had this to say:”

“It has been clear for some time that there was a significant increase in the rate of sea level rise in the four oldest records from northern Europe starting in the early to mid-19th

century.” Koonin *supra*, p. 156.

As to the Fourth National Climate Assessment (CSSR), Prof. Koonin published “an Op-Ed calling out one of the more egregious misrepresentations in the CSSR” in the *Wall Street Journal* (Nov. 2, 2017), “A Deceptive New Report On Climate” on sea level rise. He singled out both the CSSR and IPCC for cherry-picking the recent two decade sea level rise, but omitting data of a similar sea-level rise earlier in the century that contradicts their theory:

“Although decade-by-decade changes in the rate of sea level rise over the past century are central to untangling the effect of human influence from natural influences, the recent assessment reports (the CSSR and the IPCC’s 2019 SROCC [Special Report on the Oceans and Cryosphere in a Changing Climate]) hardly mention them. ***

“All of the assessment reports have plenty of text emphasizing that the rate of sea level rise in the past two decades is higher [.12 inches/year] than the average of the twentieth century [.07 inches/year]. ... The rate of rise over the most recent twenty-five-years should be compared to that other twenty-five year period [also .12 inches/year] to understand just how significant the recent rate is. ***

“The CSSR follows the lead of some prominent climate scientists in hiding the huge fluctuations in the rate of sea level rise over the past century... The report misleads by omission in not mentioning either the strong decadal variability of sea level rise during the twentieth century or the fact that the then most recent values of the rate were statistically indistinguishable from those during the first half of the twentieth century.” Id. pp. 157-58.

Finally, Prof. Koonin concludes two things.

First, omitting data that contradicts the CSSR and IPCC theory that human influences are raising sea levels dangerously is a fundamental violation of scientific method:

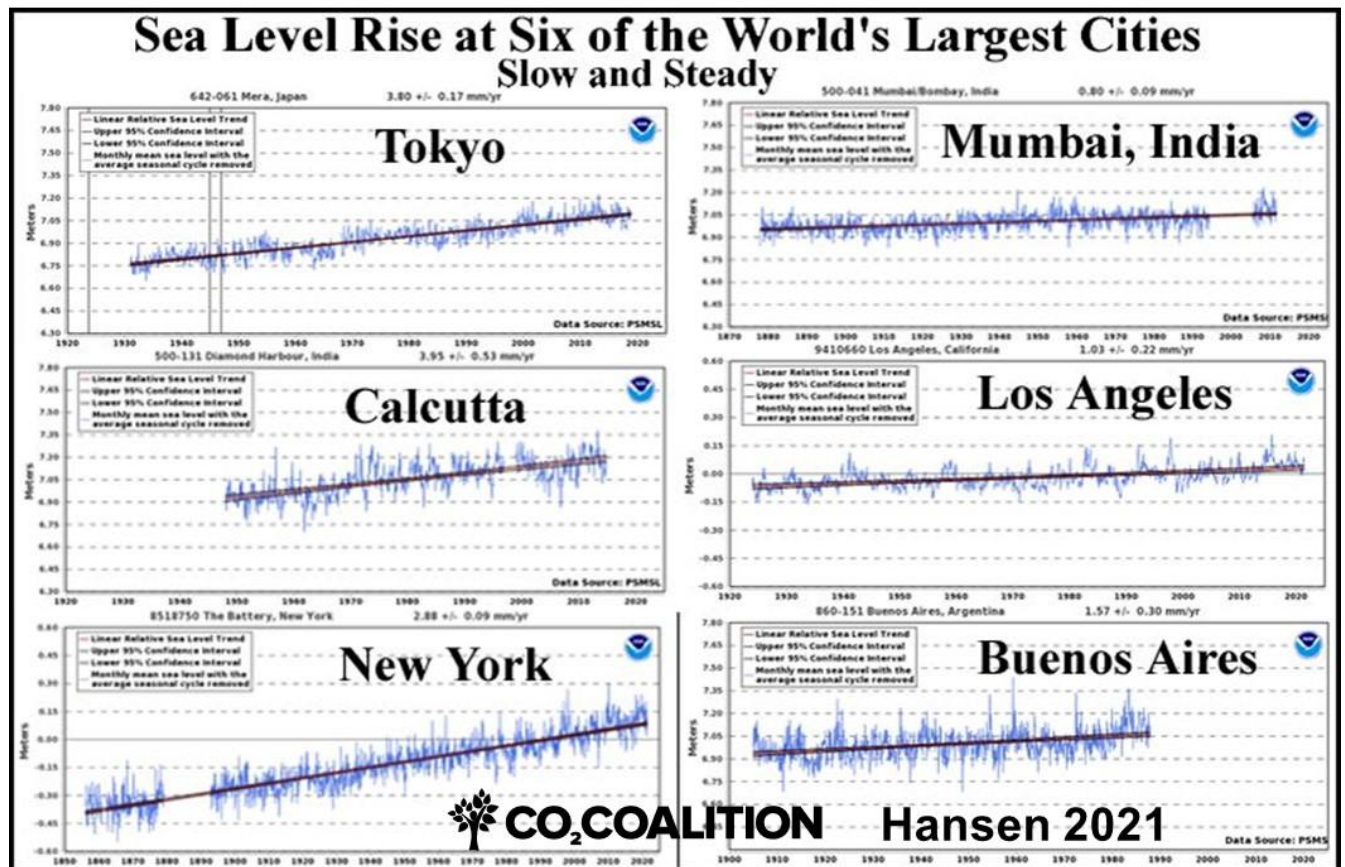
“CSSR and other assessment discussions of sea level rise omit important details that weaken the case for the rate of rise in recent decades being outside the scope of historical variability, and hence for attribution to human influences.” Id. p. 165.

Second, his bottom line is “we don’t know how much of the rise in global sea levels is due to human caused warming and how much is a product of long-term natural cycles...there’s also scant evidence that [the human] ... contribution has been or will be significant, much less disastrous.” Id.

Since the claim that sea levels are rising dangerously because of rising fossil fuel CO₂ and other greenhouse gases is so frequently and fervently asserted, it’s also important to set forth in more evidence that the claim is false.

The best method of evaluating sea-level rise prior to the first satellites is from tide gauges. These measurements go back to the early 1900s and some to the late 19th century. Below are tide gauges from some of the largest cities bordering our oceans.

Nearly all gauges show one remarkable characteristic: no acceleration is noted in the rate of rise during the period after World War II when we began adding significant amounts of CO₂ to the atmosphere.



Sea-level rise at six large coastal cities

In summary, scientific method shows that there is no risk of increased damage from rising sea levels because of increasing atmospheric CO₂ from fossil fuels. Sea levels may rise and cause damage, but the resulting increased financial losses will have nothing to do with increases of CO₂.

Next, the following extreme weather events are analyzed more briefly. See his book for more details.

Flooding, Droughts, Wildfires and Other Precipitation Perils. Prof. Koonin's "Precipitation Perils – From Floods to Fires" Chapter 7 deals with various weather events related to precipitation.

Flooding. He reports the U.S. data shows "modest changes in U.S. rainfall during the past century haven't changed the average incidence of floods."

Globally, he cites data from the IPCC that there is "*low confidence* regarding the sign of trend in the magnitude and/or frequency of floods on a global scale."

Thus he concludes, "we don't know whether floods globally are increasing, decreasing, or doing nothing at all." Id. p. 137.

In summary, scientific method shows that there is no risk of increased damage by flooding because of increasing atmospheric CO₂ from fossil fuels. Flooding will cause damage, but the resulting increased financial losses will have nothing to do with increases of CO₂.

Droughts. Prof. Koonin cites data in the U.S. from 1895 to 2015 on the severity of droughts and finds "it's difficult to see much long-term change." Id. p. 138.

Globally, he cites the IPCC data showing "pretty much the same thing for the globe as a

whole, expressing... ‘*Low confidence* in a global-scale trend in drought or dryness since the middle of the twentieth century,’ and also noting “the current impact of human influences seems weak in comparison with natural variability.” Id. p. 140.

He also points out droughts have been more severe and longer lasting in the past, citing data from both the IPCC and a 2009 National Climate Assessment. According to the IPCC in 2014: “There is high confidence for droughts during the last millennium of greater magnitude and longer duration than those observed since the beginning of the twentieth century in many regions.” And the NCA in 2009, “data reveal that some droughts in the past have been more severe and longer lasting than any experienced in the last 100 years.” Koonin, *supra*, p. 140.

In summary, scientific method shows that there is no risk of increased damage by droughts because of increasing atmospheric CO₂ from fossil fuels. Droughts will cause damage, but the resulting increased financial losses will have nothing to do with increases of CO₂.

Wildfires. Prof. Koonin explained there is a powerful new source of data on wildfire: “Sophisticated satellite sensors first began monitoring wildfires globally in 1993.” He cites NASA data that shows the global area burned by fires each year from 2003 to 2015.

The result of this new source of data is totally contrary to what is in the news. “Unexpectedly, this analysis of the images shows that the area burned annually declined by about 25% from 1998 to 2015.” Further, “Despite the very destructive wildfires in 2020, that year was among the least active globally since 2003.” Id. p. 142.

As a result he suggests, this should change “the conversation about wildfires [from] only one of unavoidable doom due to ‘climate change,’” to a conversation about how “to take steps that would more directly curtail these catastrophes” as “we have significant power to address ... human factors.” Id. p. 144.

In summary, scientific method shows that there is no risk of increased damage by wildfires because of increasing atmospheric CO₂ from fossil fuels. Wildfires will cause damage, but the resulting increased financial losses will have nothing to do with increases of CO₂.

In conclusion as to all these precipitation perils, Prof. Koonin, applying scientific method and analyzing the facts, states:

“In the end, the data tells us there’s not very much changing very quickly with precipitation, either globally or in the US. Id. p. 147.

Scientific method again shows that there is no risk of increased damage by precipitation perils because of increasing atmospheric CO₂ from fossil fuels. Precipitation perils of these varying types will cause damage, but the resulting increased financial losses will have nothing to do with increases of CO₂.

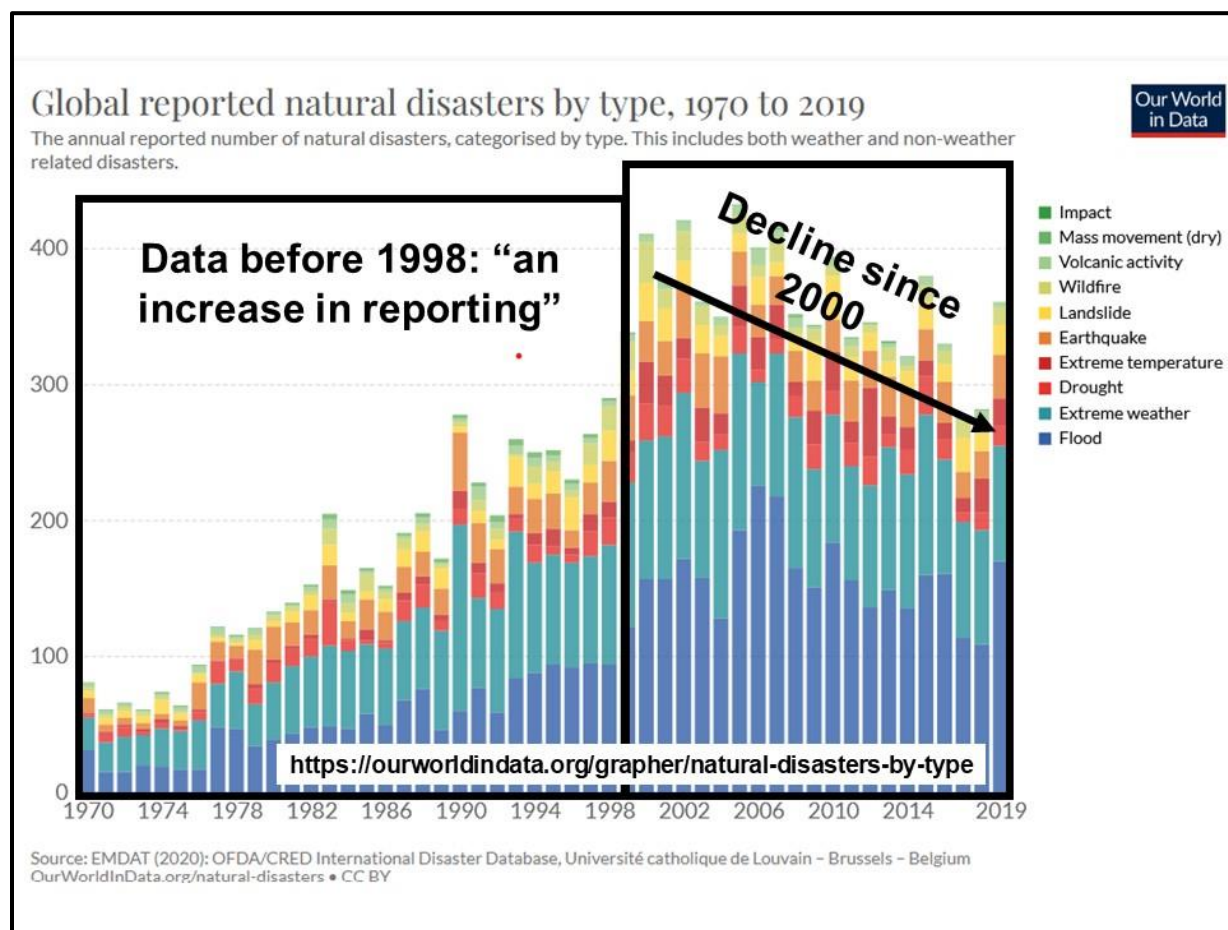
Climate-Related Deaths, Agricultural and Economic Disasters. “Apocalypses that Ain’t” is Chapter 9 of Prof. Koonin’s book, where he scientifically analyzes the facts regarding three other theories about extreme weather:

“One is ‘climate-related deaths,’ a menace based on speculation, strained assumptions and incorrect use of data. The second is a future agricultural ‘disaster’ that is belied by the evidence and requires acrobatic distortions to even detect. And the third is purportedly enormous economic costs – which turns out, even based on the data presented, to be minimal, if not too small to measure. Id. p. 167.

Thus none of the three theories are supported by the facts, and scientific method shows that there is no risk of increased damage by any of these three theories because of increasing atmospheric CO₂ from fossil fuels.

Extreme Weather Events Conclusion. The Centre for Research on the

Epidemiology of Disasters (CRED) is the most reputable agency in the world that reports on natural disasters. Their most recent evaluation of natural disasters was generated from their EM-DAT database and shows that there has been a 10% decline in disasters since they completed building out their data collection system in 2000.



Our World in Data 2020

In conclusion, the enormously important good news, contrary to conventional government and media wisdom, Prof. Koonin concludes by rigorously applying scientific method to numerous extreme weather events, confirmed by the additional data, that “science says that most extreme weather events show no long-term trends that can be attributed human influence on the climate.” Id. pp. 99.

Accordingly, the theory that extreme weather is caused by fossil fuel CO₂ is contradicted by the facts and thus provides no support for the proposed rule or the Biden Administration “Net Zero” fossil fuel CO₂ policy.

V. FOSSIL FUEL CO₂ WILL NOT CAUSE CATASTROPHIC GLOBAL WARMING

A. The IPCC Models Do Not Reliably Predict Temperatures, Thus Provide No Real Science That Fossil Fuel CO₂ Causes Catastrophic Global Warming and Scientific Method Requires They Not Be Used

Prof. Koonin’s book *Unsettled* devotes an entire chapter to “Many Muddled Models,” pp. 77-96. He explained that computer modeling is central to climate science and thus to the theory predicting fossil fuel CO₂ will cause catastrophic global warming:

“Computer modeling is central to climate science.... [their] results underpin the reports

of the other UN working groups that assess the impact of a changing climate on ecosystems and society.” *Id.* p. 78.

He asked, “how good are our climate models? And how much confidence should we have in what they say about future climates?” *Id.*

He concluded, using scientific method, “Projections of future climate and weather events rely on models demonstrably unfit for the purpose.” *Id.* p. 24 (emphasis added). He elaborated:

“The uncertainties in modeling of both climate change and the consequences of future greenhouse gas emissions make it impossible today to provide real, quantitative statements about relative risks and consequences and benefits of rising greenhouse gases to the Earth system as a whole, let alone to specific regions of the planet.” *Id.* p. 96.

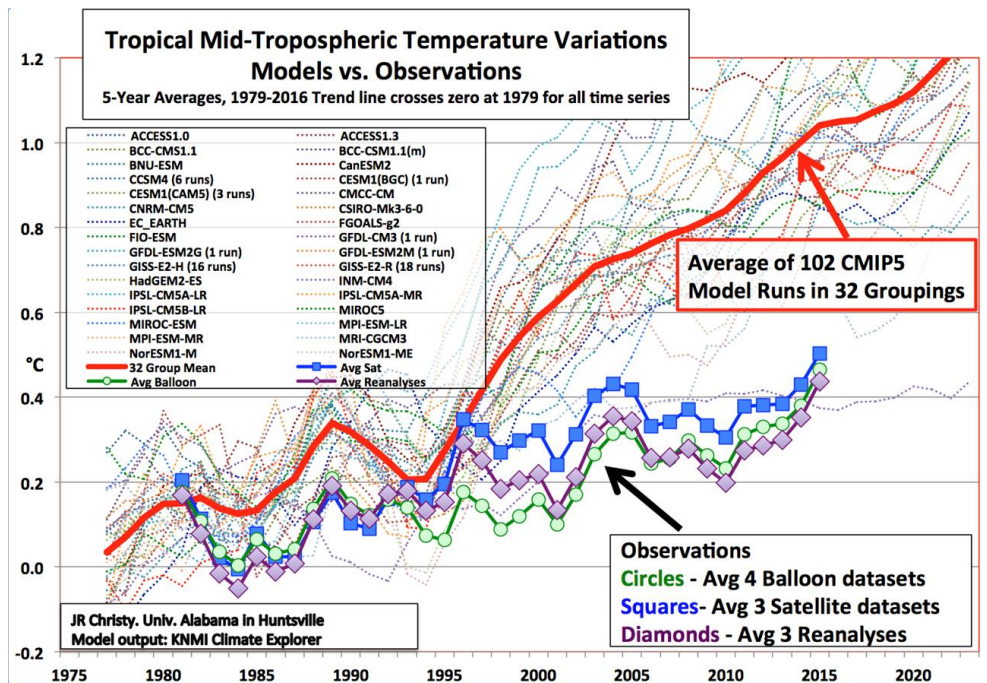
He focused on the IPCC’s dominant model, the Coupled Model Intercomparison Project (CMIP) model, which has gone through several versions over time. The most recent is CMIP6, which is used in the IPCC’s *Climate Change 2021: The Physical Science Basis* (AR 6). He demonstrated using scientific method that the CMIP6 theoretical model did not validly predict observations and thus should be rejected and never used:

- “An analysis of 267 simulations run by 29 different CMIP6 models created by 19 modeling groups around the world shows that they do a very poor job [1] describing warming since 1950 and ... [2] underestimate the rate of warming in the early twentieth century [1910-1940].” *Id.* p. 90 (emphasis added).
- “Comparisons among the [29] models [show] ... model results differed dramatically both from each other and from observations ... [and] disagree wildly with each other.” *Id.* p. 90 (emphasis added).
- “One particularly jarring failure is that the simulated global average surface temperature ... varies among models ... three times greater than the observed value of the twentieth century warming they’re purporting to describe and explain.” *Id.* p. 87 (emphasis added).
- As to the early twentieth century warming when CO₂ levels only increased from 300 to 310 ppm, “strong warming [was] observed from 1910 to 1940. On average, the models give a warming rate over that period of about half what was actually observed. That the models can’t reproduce the past is the big red flag -- it erodes confidence in their projections of future climate.” *Id.* pp. 88, 95 (emphasis added).

Accordingly, the CMIP6 model fails the fundamental test under scientific method. It does not work and scientifically should not be used in any policy that would “Net Zero” fossil fuels and its CO₂ emissions.

The previous CMIP5 model was analyzed in depth by John Christy, PhD, Professor of Atmospheric Science at the University of Alabama. He demonstrated that its 102 predictions also failed miserably when tested by observations, as shown in the following chart:¹⁶

¹⁶ John Christy, House Comm. Science, Space and Technology (March 29, 2017), link [ChristyJR Written 170329 \(house.gov\)](https://www.house.gov/ChristyJR/Written/170329%20(house.gov)), pp. 3, 5



- The gray dotted lines are the CMIP5 model’s 102 predictions of temperatures (“simulations”) for the period 1979-2016.
- The red line is the average, called the “consensus,” of the models.
- The blue, purple and green lines show the actual temperatures that were observed against which the models’ predictions were tested.

The graph clearly shows that 101 of the 102 predictions by the CMIP5 models (dotted lines) and their average (red line) failed to match the real-world observations significantly. Focusing on the consensus red line, he concluded:

“When the ‘scientific method’ is applied to the output from climate models of the IPCC AR5, ... I demonstrate that the consensus of the models [red line] fails the test to match the real-world observations by a significant margin. As such, the average of the models is untruthful in representing the recent decades of climate variation and change, and thus would be inappropriate for use in predicting future changes in the climate or related policy decisions.” Id. p. 13 (emphasis added).

Thus, the CMIP5 models that produced the 101 predictions fail the Feynman test under scientific method. They do not “work,” and therefore in real science would not be used.¹⁷

Koonin’s and Christy’s analysis and conclusion are extremely important. They demonstrate that the IPCC models that are widely used to support the Biden Administration’s “Net Zero” and the proposed rules’ fossil fuel CO₂ policies are based on theoretical models that under scientific method should be rejected and not used. Contrary to common reporting, they provide no real science supporting the theory fossil fuel CO₂ will cause catastrophic global warming.

¹⁷ The one model that best predicted the temperatures is a Russian model. The IPCC did not use it but used instead the models that should have been rejected in real science.

B. The Administration’s “Net Zero” Fossil Fuel CO₂ Goal Would Have a Trivial Impact on Temperatures Even Applied Worldwide, Thus Further Scientific Proof Fossil Fuel CO₂ Will Not Cause Catastrophic Global Warming

The surprising reality is that full implementation of the “Net Zero” fossil fuel CO₂ emission goals of the Biden Administration, the Green New Deal, the Paris Agreement and others would have a trivial impact on the climate according to the EPA’s own model. All would reduce global temperatures by less than 1° C by 2100.

Benjamin Zycher and Patrick Michaels provide more detail, based on a climate model developed with funding from the Environmental Protection Agency.¹⁸ “The predicted effects of the various proposals put forth may surprise many readers. Even if we were to incorporate assumptions that exaggerate the impact of reduced greenhouse-gas emissions, full implementation of the “net-zero” emissions goals of:

- “the Biden administration would reduce global temperatures by 0.17 degrees Celsius by 2100.
- “the Green New Deal ... would have about the same effect.
- “the Paris agreement, if implemented immediately and enforced strictly, would have a similar impact of about 0.17 degrees Celsius.
- “a 50% emissions cut by China would yield an impact of 0.18 degrees Celsius.
- “a net reduction to zero greenhouse-gas emissions by all 37 member states of the Organization for Economic Cooperation and Development would increase that figure to about 0.35 degrees Celsius.
- “an immediate global emissions cut of 75% would yield an impact of 0.54 degrees Celsius.

This means the Administration’s “Net Zero” fossil fuel CO₂ policy and this proposed rule goal of reducing the 6 Gigatons of annual U.S. CO₂ emissions and worldwide 40 Gigaton CO₂ emissions would cause only tiny changes of the heat radiation to space, and therefore only tiny changes of Earth’s surface temperature.

Accordingly there is no scientific basis for the proposed rule. Moreover, these trivial changes in the climate resulting from the Administration’s “Net Zero” fossil fuel CO₂ policies, if adopted in the U.S. and other countries, would cause a huge reduction in the amount of food available to people worldwide and the elimination of the major source of low-cost energy, fossil fuels, for Americans and worldwide, elaborated in section VI.

C. 600 Million Years of Data Show Today’s 420 ppm CO₂ Level is Near a Record Low, Not Dangerously High, Thus Contradicting the Theory Fossil Fuel CO₂ Will Cause Catastrophic Global Warming

As noted earlier, “Misrepresentation, exaggeration, cherry picking, or outright lying pretty much covers all the so-called evidence” marshalled in support of the theory of imminent catastrophic global warming caused by fossil fuels and of the urgent need to achieve “net zero”

¹⁸ Zycher, *The Case for Climate-Change Realism*, at 107-09; Zycher and Michaels Prepared Statement on S. 2754, “American Innovation and Manufacturing Act of 2019,” Sen. Comm. Environment and Public Works (April 2020).

fossil fuel and other human CO₂ emissions by 2050.¹⁹

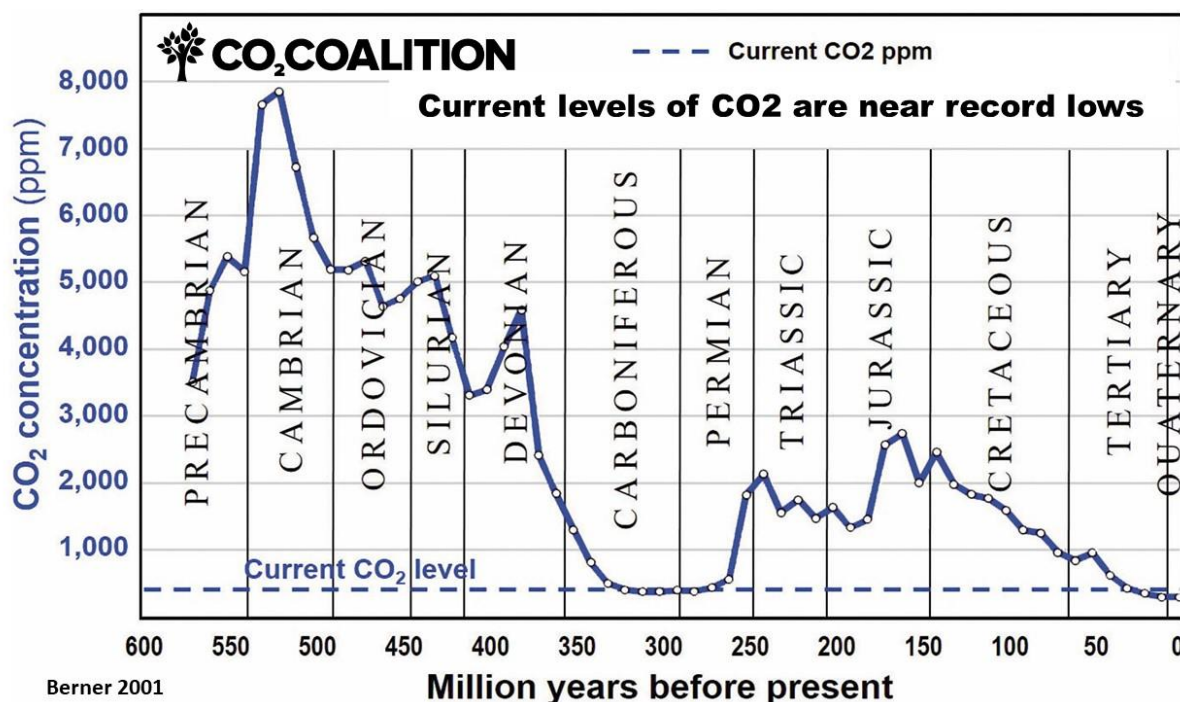
One classic example of cherry picking and omitting observations that contradict a theory is the repeated reporting that recent CO₂ levels, now 420 ppm, and its rise from 280 ppm at the beginning of the Industrial Age, is dangerously high, by only citing favorable data from a very short period of time and omitting unfavorable data from a longer period of time.

The proposed rule cites the “Sixth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC)” for “confirm[ing] that human activities are increasing GHG concentrations that have warmed the atmosphere, ocean, and land at a rate that is unprecedented in at least the last 2,000 years.” 87 *Fed. Reg.* p. 42402 (emphasis added).

Similarly, the EPA’s Endangerment Findings warned ominously, “[C]urrent atmospheric greenhouse gas concentrations are now at elevated and essentially unprecedented levels” and that carbon dioxide and methane at higher levels than they have been for “at least the last 650,000 years.”²⁰ (Emphasis added).

The Supreme Court in its landmark *Massachusetts v. EPA* stated that the CO₂ level that reached 382 ppm in 2006 was higher than “at any point over the last 20 million years.” 549 U. S. 504, 507 n. 10 (2007) (emphasis added).

But in geological time, 2,000 years, 650,000 years and 20 million years are just a moment in time. The hundreds of millions of years of data on CO₂ levels is not cited:²¹



¹⁹ Lindzen, "Global Warming for the Two Cultures," Global Warming Policy Foundation (2018), p. 10. Accord Lindzen, "The Absurdity of the Conventional Global Warming Narrative" (April 20, 2022) & "Straight Talk About Climate Change," Acad. Quest (2017), p. 419.

²⁰ EPA, "Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act," 74 *Fed. Reg.* 66496 (Dec. 15, 2009) ("Endangerment Findings"), p. 66511 (emphasis added).

²¹ Gregory Wrightstown, *Inconvenient Facts* (2017), p. 16; CO₂ Coalition, [CO2_07.jpg \(1280x720\) \(co2coalition.org\)](#)

The omitted data shows that that today's 420 ppm CO₂ level is near a record low, not dangerously high, and that:

- CO₂ levels ranged from a high of over 7,000 ppm -- almost 20 times higher than today's 420 ppm, to a low of 200 ppm, close to today's low 420 ppm
- Today's 420 ppm is not far above the minimal level when plants die of CO₂ starvation, around 150 ppm, when all human and other life would die for lack of food
- CO₂ levels were over 1,000 ppm for hundreds of millions of years
- The highly emphasized 135 ppm increase in CO₂ since the beginning of the Industrial Age is trivial compared to CO₂ changes over the geological history of life on Earth.

Applying scientific method, omitting unfavorable data that contradict a theory to make it work is an egregious violation of scientific method, unfortunately commonly used by those arguing there is a climate emergency.

Here the omitted 600 million years of data falsify the theory that CO₂ levels are dangerously high at 420 ppm, and will lead to catastrophic global warming unless fossil fuel CO₂ is reduced to "net zero." The omitted data proves the theory is "wrong" under Feynman's definition of scientific method.

What about temperatures?

D. 600 Million Years of CO₂ and Temperature Data Contradict the Theory that High Levels of CO₂ Will Cause Catastrophic Global Warming

The chart below shows 600 million years of CO₂ levels and temperature data.²²

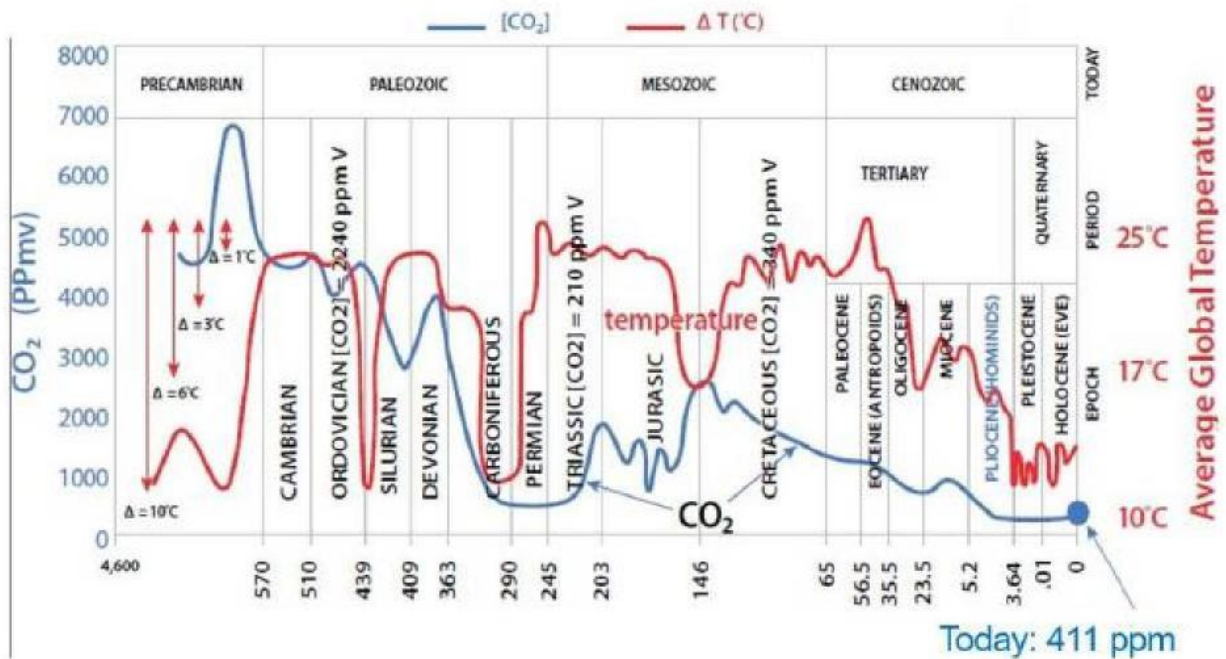
The blue line shows CO₂ levels.

The red line shows temperature.

²² Nahle, "Geologic Global Climate Changes," *Biology Cabinet J.* (March 2007), Gregory Wrightstone revision.

CO & Temperature long term view- 600 million years of climate change

Geological Timescale: Concentration of CO₂ and Temperature fluctuations



1- Analysis of the Temperature Oscillations in Geological Eras by Dr. C. R. Scotese © 2002. 2. Ruddiman, W.F. 2001. *Earth's Climate: past and future* W.H. Freeman & Sons. New York, NY. 3 - Mark Pegani et al. *Marked Decline in Atmospheric Carbon Dioxide Concentrations During the Paleocene*. *Science*; Vol. 309, No. 5734; pp. 600-603. 22 July 2005. *Corrected on 07 July 2008 (CO2: Ordovician Period)*.

Reconstructed atmospheric carbon dioxide concentrations (Berner, 2001) & global mean surface temperature (Scotese, 1999) over the last 550 million years

Note the chart shows little correlation between CO₂ and climate temperatures for much of Earth's history. Both extremely high and low temperatures occurred during periods of both high and low CO₂ levels, implying that the effects of CO₂ are, in fact, either marginal or non-existent.

Although the data are based on various proxies, with the attendant uncertainties, they are good enough to demolish the argument that atmospheric CO₂ concentrations control Earth's climate. Applying scientific method, these data show the theory of catastrophic global warming from high CO₂ levels is wrong. The theory does not agree with the observations. Scientifically it must be rejected.

This is yet another reason no real science supports the Biden Administration's and the proposed rule's "Net Zero" theory that fossil fuel CO₂ will cause catastrophic global warming.

E. Climate Science Publishing Is Dominated by One-Sided, Paid-For Studies with No Disclosure, and Thus Provides No Real Science of Fossil Fuel CO₂ Causing Catastrophic Global Warming Without Independent Verification and Disclosure of Funding

There has been enormous one-sided funding for research that reinforced the message of imminent doom from the use of fossil fuels and increasing CO₂ but very little funding of contrary research. Dr. Harold Lewis, a distinguished physics professor, bluntly described this reality:

"The global warming scam, with the (literally) trillions of dollars driving it ... has corrupted so many scientists ... It is the greatest and most successful pseudoscientific

fraud I have seen in my long life as a physicist.” (October 6, 2010 resignation letter to the American Physical Society).

Trillions of dollars had been spent on one-sided research 12 years ago, and much more since. The GAO reported that between 1993 and 2017, the Federal government has spent \$154 billion on clean energy, international assistance and climate science. GAO, *Climate Science: Analysis of Reported Federal Funding* (April 2018).

From our personal experience over decades, it is very difficult to obtain funding either from U.S. government sources or from private foundations for research that does not presuppose impending environmental doom.

When I (Prof. Happer) was the Director of Energy Research of the Department of Energy in the early 1990s, I was amazed that the great bulk of federal funds for environmental studies from the DOE, NASA, EPA and other federal agencies flowed into research programs that reinforced the message of imminent doom, humanity and planet Earth devastated by global warming, pestilence, famine, and flood. None of this was true then or now, but the shrill warnings have become more and more apocalyptic.

To date, one-sided papers have rarely disclosed funding sources, which include substantial funding from China and Russia. See, e.g., Rupert Darwall, *Green Tyranny* (details Russian and other foreign funding of the “climate industrial climate complex”), Patricia Adams, *The Red and The Green: China’s Useful Idiots*, Global Warming Policy Foundation (2020) & Henry Sanderson, *Volt Rush: Winners and Losers in the Race to Go Green* (2022).

Government and private foundation funded research should be particularly scrutinized as potentially biasing the results toward alarmism. The websites of most government agencies and private foundations clearly imply that the agency or foundation is working hard to counter “the climate crisis,” with the clear implication that proposed research that does not promise to support this narrative would be unlikely to receive funding.

Accordingly, no climate publications should be used to support the proposed rule without funding disclosure and independent verification that they satisfy standards for real science.

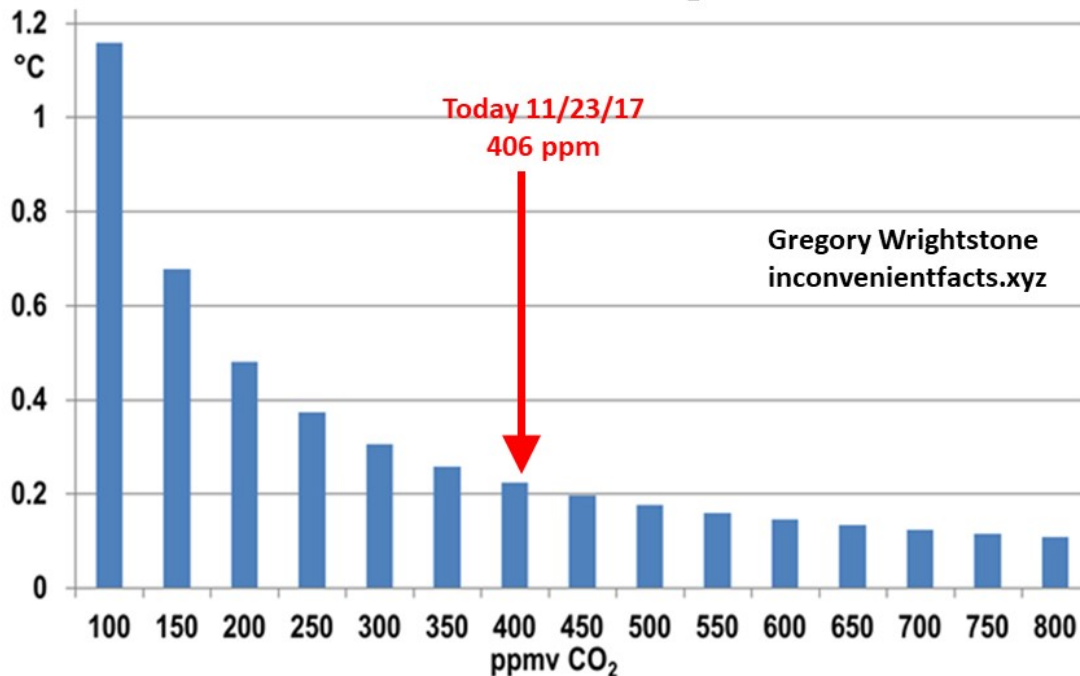
F. Atmospheric CO₂ is Now “Heavily Saturated,” Which in Physics Means Even Doubling CO₂ Will Have Little Warming Effect

Both of us have special expertise in radiation transfer, the prime mover of the greenhouse effect in Earth’s atmosphere. It is important to understand the radiation physics of what the effect is of adding CO₂ at current atmospheric concentrations.

CO₂ becomes a less effective greenhouse gas at higher concentrations because of what is often called “saturation.” Each additional 100 ppm increase of CO₂ in the atmosphere causes a smaller and smaller change in “radiative forcing,” or in temperature, since there are very good reasons to assume that temperature changes are proportional to changes in radiative forcing. The saturation is shown in the chart below.²³

²³ Gregory Wrightstone, *Inconvenient Facts*, p. 7.

Figure I-3: Less global warming for each additional 50 parts-per-million-by-volume of CO₂ concentration



(Graph calculated using IPCC's formula $\Delta T_0 = \frac{5.35}{3.2} \ln \frac{C}{C_0}$; AR3, Ch. 6.1. Courtesy Monckton 2017)

This means that from now on our emissions from burning fossil fuels could have little impact on global warming. There is no climate emergency. No threat at all. We could emit as much CO₂ as we like, with little warming effect.

Doubling CO₂ concentrations, from 400 ppm to 800 ppm, a 100% increase, would cause tiny changes of the heat radiation to space, and therefore tiny changes of Earth's surface temperature, on the order of 1° C (about 2° F) of surface warming for every doubling of CO₂ concentrations.

Saturation also explains why temperatures were not catastrophically high over the hundreds of millions of years when CO₂ levels were 10-20 times higher than they are today, shown in the chart above.

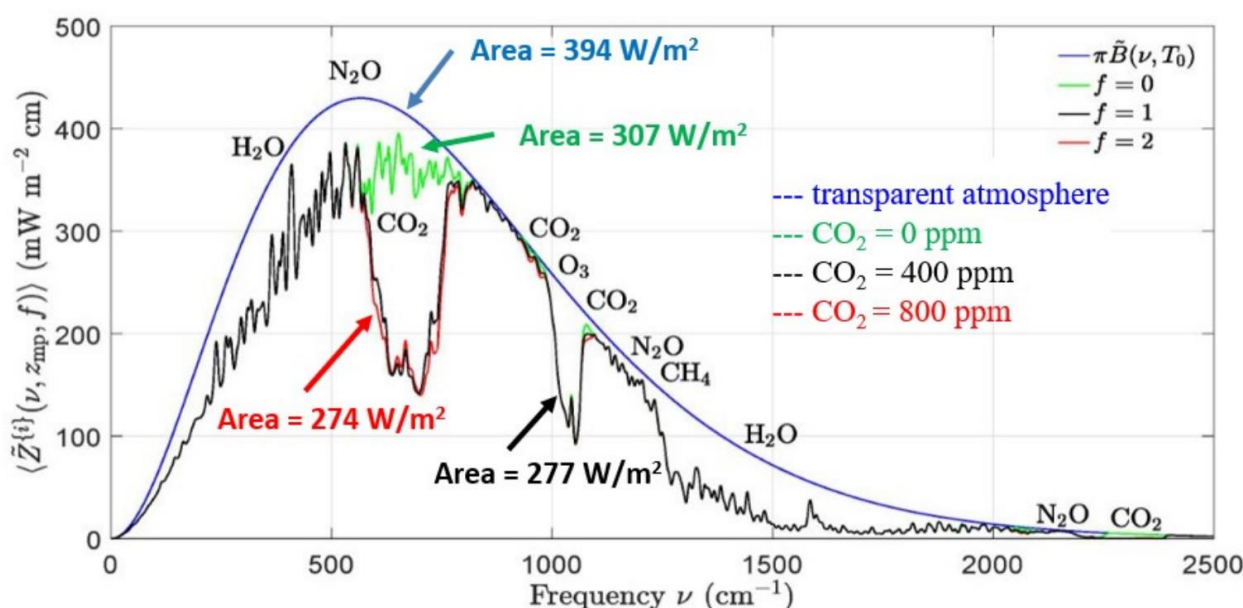
Further, saturation also provides another reason why reducing the use of fossil fuels to "net zero" by 2050 would have a trivial impact on climate, also contradicting the theory it is urgently necessary to eliminate fossil fuel CO₂ to avoid catastrophic global warming.

As a matter of physics, adding more CO₂ to the atmosphere slightly decreases the amount of long-wave infrared radiation that goes to space, called the "flux." The details are shown in the graph below.²⁴

The blue curve shows the heat energy the Earth would radiate to space if our atmosphere had no greenhouse gases or clouds. The magnitude is measured in Watts per square meter (W/m²). Without greenhouse gases, the total heat loss of 394 W/m² would soon cool the Earth's surface to 16° F, well below freezing. Most life would end at these low temperatures. Thus we

²⁴ Happer & Wyngarden, "Dependence of Earth's Thermal Radiation on Five Most Abundant Greenhouse Gases" (June 8, 2020), [2006.03098.pdf \(arxiv.org\)](#)

should be grateful for greenhouse warming of the Earth.



The jagged black curve below the blue curve shows how much less the Earth radiates infrared radiation to space with the current concentration of greenhouse gases water vapor (H_2O), nitrous oxide (N_2O), carbon dioxide (CO_2), ozone (O_3), and methane (CH_4). Because of these greenhouse gases, the Earth radiates 277 W/m^2 rather than 394 W/m^2 to space, 70% ($277/394$) of what it would radiate with no greenhouse gases.

What would happen if CO_2 concentrations were to be doubled from 400 ppm to 800 ppm? See the red curve. The decrease of radiation to space and increased heating is about 3 W/m^2 , which decreases the radiation to space from 277 W/m^2 to 274 W/m^2 , a decrease of 1.1% ($3/277$).

Without detailing the mathematics here, the physics shows that doubling CO_2 would result in a temperature increase of a trivial amount, less than 1° C (2° F). Thus, basic physics shows that doubling CO_2 would result in a temperature increase of a trivial amount, less than 1° C (2° F). Accordingly, this is another reason why there is no real supporting the proposed rule.

More scientific reasons demonstrating real science does not support the proposed rule, that fossil fuel CO_2 will not cause catastrophic global warming, that more fossil fuel CO_2 will provide more food for people worldwide and more low-cost energy, and that, to the contrary, the Administration's "Net Zero" fossil fuel CO_2 policy will be disastrous for people worldwide are detailed in Lindzen, Happer & CO2 Coalition Comment on the CFTC Climate-Related Financial Risk - CO2 Coalition 8-8-22, incorporated by reference.

VI. THE ADMINISTRATION'S "NET ZERO" FOSSIL FUEL CO_2 POLICY WILL DISASTROUSLY REDUCE FOOD AND ELIMINATE THE MAJOR SOURCE OF LOW-COST ENERGY, FOSSIL FUELS, IN THE U. S., THE WEST AND PEOPLE WORLDWIDE

There is overwhelming scientific evidence that fossil fuels and CO_2 provide enormous social benefits in terms of food and low-cost energy, and therefore there will be disastrous consequences for the poor, people worldwide, future generations and the United States if fossil fuels CO_2 emission are reduced to "net zero," elaborated next.

A. Photosynthesis from Atmospheric CO_2 Sustains Most Life on Earth

Nearly all the food we eat comes ultimately from photosynthesis on the land or in the oceans. Much of the oxygen we breathe was produced by photosynthesis over the geological history of the Earth. In the process of photosynthesis, energy from sunlight forces molecules of water, H_2O , and molecules of carbon dioxide and CO_2 to combine to make sugars and other organic molecules. A molecule of oxygen, O_2 , is released to the atmosphere for every molecule of CO_2 converted to sugar. An interesting scientific aside is that the O_2 comes from the water molecules, H_2O , used in photosynthesis, not from CO_2 .

Without CO_2 , there would be no photosynthesis, plants would die and the animals that eat them would starve to death, and most higher life forms would become extinct. The peculiar biological communities at deep sea vents and various chemotropic bacteria in sediments below Earth's surface would be all that remains of the once flourishing web of life that was sustained by atmospheric CO_2 , water and sunlight.

Most green plants evolved at CO_2 levels of several thousand parts per million (ppm), many times higher than now. Plants grow better and produce better flowers and fruit at higher levels. Commercial greenhouse operators recognize this and artificially increase CO_2 concentrations inside their greenhouses to over 1,000 ppm.

All green plants grow faster with more atmospheric CO_2 , including the CO_2 released by the combustion of fossil fuels, which is almost identical to the CO_2 respired by human beings and other living creatures.

B. CO_2 is Essential to Our Food, and Thus to Life on Earth.

As noted, we owe our existence to green plants that, through photosynthesis, convert CO_2 and water, H_2O , to carbohydrates with the aid of sunlight, and release oxygen. Land plants get the carbon they need from the CO_2 in the air. Other essential nutrients — water, nitrogen, phosphorus, potassium, etc. — come from the soil. Just as plants grow better in fertilized, well-watered soils, they grow better in air with several times higher CO_2 concentrations than present values. As far as green plants are concerned, CO_2 is part of their daily bread—like water, sunlight, nitrogen, phosphorus, potassium and other essential elements.

What happens with a doubling of CO_2 ? The benefits to plants of more CO_2 are documented in hundreds of scientific studies. More means CO_2 means more food. Many studies confirm that when CO_2 is doubled, agricultural yields are increased significantly, especially in arid regions where more CO_2 increases the resistance of plants to droughts. Greenhouse operators routinely pay to double or triple the concentrations of CO_2 over their plants. The improved yield and quality of fruits and flowers more than pay for the cost of adding CO_2 , with only small and beneficial warming.

Specifically, as noted at the outset, there is a mathematical formula that computes how much more food will result from more CO_2 . If the CO_2 level doubled by fossil fuels from 400 ppm to 800 ppm, under the formula the amount of food available to people worldwide would increase by more than 40%, and people around the world would continue to have low-cost energy from fossil fuels!

A dramatic example of the response of green plants to increases of atmospheric CO_2 is shown below: Dr. Sherwood Idso grew Eldarica (Afghan) pine trees with increasing amounts of CO_2 in experiments` about 10 years ago, starting with an ambient concentration of CO_2 of 385 ppm. He showed what happens over the 10 years when CO_2 is increased by 150, 300 and 450 ppm, for total CO_2 concentrations of 385, 535, 685 and 835 ppm:²⁵

²⁵ CO2 Coalition, [CO2_3.jpg \(1280×720\) \(co2coalition.org\)](https://www.co2coalition.org/CO2_3.jpg)

Here is what happens with more CO₂

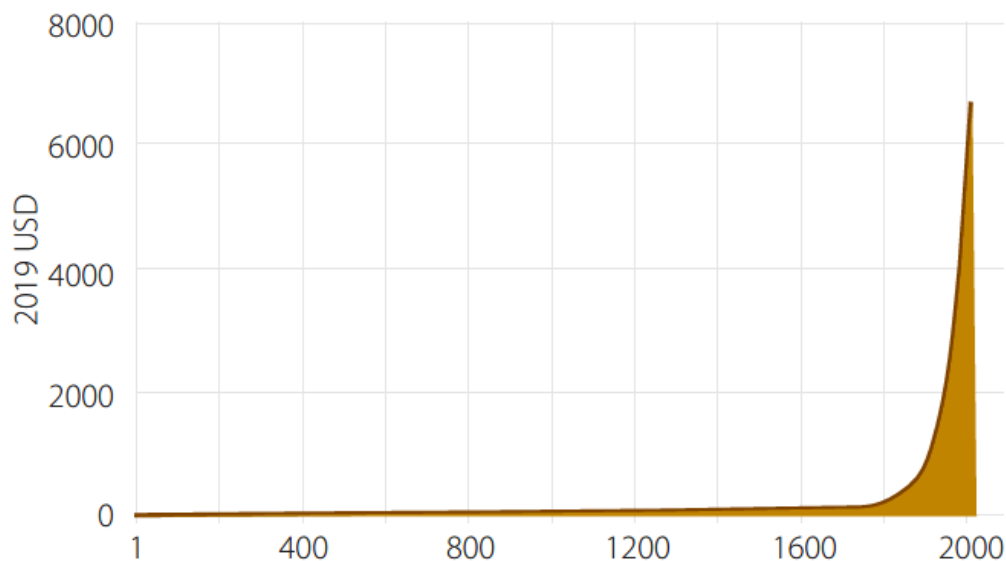


As noted at the outset, CO₂ increased from about 280 ppm about 100 years ago to about 400 ppm in 2020. As a result, the food available to people worldwide increased by more than 20% as computed previously.

C. Enormous Social Benefits of Fossil Fuels

Contrary to the incessant attack on fossil fuels, low-cost, abundant fossil fuels have given ordinary people the sort of freedom, prosperity and health that were reserved for kings in ages past.

The following chart of the GDP per person for the last 2,000 years powerfully illustrates what has happened:²⁶



²⁶ Rupert Darwall, *Climate Noose: Business, Net Zero and the IPCC's Anticapitalism*

Economies have grown substantially, so that many people have prospered, and poverty has been reduced.

Electricity has become more low-cost and available to many more people worldwide.

There has been a small but beneficial warming of the planet, about 2° Fahrenheit. This warming has been caused by a combination of natural causes and CO₂ increasing from its low level in 1850 and other greenhouse gases. CO₂ is a greenhouse gas and adding CO₂ to the atmosphere by burning coal, oil, and natural gas as a matter of radiation physics can only modestly increase the surface temperature of the earth. Specifically, as noted, physics proves that doubling the CO₂ concentration from our current 400 ppm to 800 ppm (rounded) will directly cause only about 1° C in warming.

D. Greenhouse Gases Prevent Us from Freezing to Death

Greenhouse gases hinder the escape of thermal radiation to space. We should be grateful for them. Greenhouse gases keep the Earth's surface temperature warm enough and moderate enough to sustain life on our verdant planet. Without them, we'd freeze to death.

To quote John Tyndall, the Anglo-Irish physicist who discovered greenhouse gases in the 1850's:

"Aqueous vapor is a blanket, more necessary to the vegetable life of England than clothing is to man. Remove for a single summer-night the aqueous vapor from the air which overspreads this country, and you would assuredly destroy every plant capable of being destroyed by a freezing temperature. The warmth of our fields and gardens would pour itself unrequited into space, and the sun would rise upon an island held fast in the iron grip of frost." John Tyndall, *Heat, a Mode of Motion* (5th Ed. 1875).

Tyndall identified "aqueous vapor" (water vapor) as the most important greenhouse gas. Water vapor, and clouds which condense from it, are the dominant greenhouse agents of Earth's atmosphere.

Carbon dioxide, CO₂, is also a greenhouse gas, and does cause a small amount of warming of our planet. But it is far less effective than water vapor and clouds.

Without the greenhouse warming of CO₂ and its more potent partners, water vapor and clouds, the earth would be too cold to sustain its current abundance of life. We would freeze. See also Goklany, *Carbon Dioxide: The Good News* (2015) & Happer, "The Truth About Greenhouse Gases," CO₂ Coalition (June 2011).

CONCLUSION

With all due respect, in our scientific opinion there is no real science that supports the proposed rule. All the purported "science" cited to support the proposed rule is merely government opinion from the Intergovernmental Panel on Climate Change (IPCC) and the U.S. Global Climate Research Program (USGCRP). Government determined science, rather than science determined by scientific method, is not science, as the Lysenko periods in Russia tragically reminds us.

Worse, the Administration's "net-zero" fossil fuel CO₂ emissions policy will cause disastrous results for people worldwide, the country and the West, comparable to the disastrous results caused by Lysenko's Russian government-controlled science. This is because, contrary to common reporting, CO₂ is essential to life. Without CO₂, there would be no photosynthesis, no food and no human or other life.

Further, more CO₂ means more food, especially in regions suffering from drought because more CO₂ increases the resistance of plants to droughts. Thus increasing CO₂ by using fossil fuels should be promoted to increase the amount of food available to people worldwide.

Since the mid-1850s, CO₂ increased from about 280 ppm to about 410 ppm today, resulting in a 20% increase in the food available worldwide.

Doubling CO₂ with fossil fuels from 400 ppm to 800 ppm would increase food for people all over the world by more than 40%, while continuing their use of fossil fuels for low-cost energy, with no chance of there being catastrophic global warming or extreme weather caused by fossil fuel CO₂.

Thus, with all due respect, the Department of Transportation should not adopt the proposed rule. If the rule is adopted, it should be ruled invalid by the courts.

CURRICULUM VITAE

William Happer, Ph. D

I am a Professor Emeritus in the Department of Physics at Princeton University.

I began my professional career in the Physics Department of Columbia University in 1964, where I served as Director of the Columbia Radiation Laboratory from 1976 to 1979. I joined the Physics Department of Princeton University in 1980.

I invented the sodium guidestar that is used in astronomical adaptive optics systems to correct for the degrading effects of atmospheric turbulence on imaging resolution. I have published over 200 peer-reviewed scientific papers. I am a Fellow of the American Physical Society and of the American Association for the Advancement of Science and a member of the American Academy of Arts and Sciences, the National Academy of Sciences and the American Philosophical Society.

I served as Director of Energy Research in the U.S. Department of Energy from 1991 to 1993. I was a co-founder in 1994 of Magnetic Imaging Technologies Incorporated (MITI), a small company specializing in the use of laser-polarized noble gases for magnetic resonance imaging. I served as Chairman of the Steering Committee of JASON from 1987 to 1990.

I served as Deputy Assistant to the President and Senior Director for Emerging Technologies at The National Security Council in the White House from 2018 to 2019.

I am the Chair of the Board of Directors of the CO2 Coalition, a non-profit (501 (c)(3) organization established in 2015 to educate thought leaders, policy makers and the public about the vital contribution made by carbon dioxide to our lives and our economy.

Richard Lindzen, Ph. D

I am an Alfred P. Sloan Professor of Atmospheric Science Emeritus at MIT. After completing my doctorate at Harvard in 1964 (with a thesis on the interaction of photochemistry, radiation and dynamics in the stratosphere), I did postdoctoral work at the University of Washington and at the University of Oslo before joining the National Center for Atmospheric Research as a staff scientist. At the end of 1967, I moved to the University of Chicago as a tenured associate professor, and in 1971 I returned to Harvard to assume the Gordon McKay Professorship (and later the Burden Professorship) in Dynamic Meteorology. In 1981 I moved to MIT to assume the Alfred P. Sloan Professorship in Atmospheric Sciences. I have also held visiting professorships at UCLA, Tel Aviv University, and the National Physical Laboratory in Ahmedabad, India, the Hebrew University in Jerusalem, the Jet Propulsion Laboratory in Pasadena, and the Laboratory for Dynamic Meteorology at the University of Paris.

I developed our current understanding of the quasi-biennial oscillation of the tropical stratosphere, the current explanation for dominance of the solar semidiurnal and diurnal tides at various levels of the atmosphere, the role of breaking gravity waves as a major source of friction in the atmosphere, and the role of this friction in reversing the meridional temperature gradient at the tropopause (where the equator is the coldest latitude) and the mesopause (where temperature is a minimum at the summer pole and a maximum at the winter pole). I have also developed the basic description of how surface temperature in the tropics controls the distribution of cumulus convection, and led the group that discovered the iris effect where upper level cirrus contract in response to warmer surface temperatures. I have published approximately 250 papers and books. I am an award recipient of the American Meteorological Society and the American Geophysical Union. I am a fellow of the American Meteorological Society, the American Geophysical Union and the American Association for the Advancement of Science, and a member of the National Academy of Sciences and the American Academy of Arts and Sciences.

I have served as the director of the Center for Earth and Planetary Sciences at Harvard, and on numerous panels of the National Research Council. I was also a lead author on the Third Assessment Report of the UN's Intergovernmental Panel on Climate Change – the report for which the IPCC shared the Nobel Peace Prize with Al Gore. I am currently a member of the CO2 Coalition.

CO2 Coalition

The CO2 Coalition is the nation's leading organization providing facts, resources and information about the vital role carbon dioxide plays in our environment. Membership is comprised of more than 90 of the world's foremost experts on climate change and represent a wide range of expertise including atmospheric physics, geology, geology, oceanography, economics and more. The Coalition provides facts and science without political ideology to the public through publications, public presentations, commentaries and interviews. Our membership has published many thousands of peer-reviewed scientific papers wide over a wide spectrum climate-related topics.