Comment
Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy

Energy Conservation Program: Energy Conservation Standards for Dishwashers Proposed Rule

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This comment is submitted to the Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy on its proposed rule on Energy Conservation Standards for Dishwashers.[1] At a general level, the proposed rule is fatally flawed analytically, and should not be finalized. This comment is organized as follows.

* Senior Fellow, American Enterprise Institute. The views expressed in this comment are solely those of the author.

[1] See the proposed rule at https://www.govinfo.gov/content/pkg/FR-2023-05-19/pdf/2023-09969.pdf.

Summary

The overwhelming bulk of the benefits asserted by the Department of Energy in its proposed rule on energy conservation standards for dishwashers are "energy savings and "climate benefits." "Energy savings" are an illegitimate "benefit" of the proposed regulation, in particular because the underlying analysis ignores the performance benefits of dishwashers not meeting the proposed standards. Even apart from that reality, the asserted energy savings are so trivial — less than $2 per dishwasher per year — that virtually any uncertainty attendant upon the DoE calculations, ignored by DoE, would render the "energy savings" indistinguishable from zero. Moreover, the DoE assertion that "the standards proposed in this document would not reduce the utility or performance of the products under consideration in this rulemaking," based upon the observation that "Manufacturers of these products currently offer units that meet or exceed the proposed standards" is deeply unserious, an utter *non sequitur* that has no place in a serious analysis of regulatory policy.

The DoE attempt to justify the proposed rule on the basis of "the need to confront the global climate crisis" is unsupported in the proposed rule. There is no evidence of a climate "threat" or "crisis" as commonly asserted, in terms of temperature trends, polar sea ice, tornadoes, tropical cyclones, wildfires, drought, flooding, or ocean alkalinity. The Intergovernmental Panel on Climate Change is deeply dubious about the various severe effects often asserted as prospective impacts of increasing atmospheric concentrations of GHG. Moreover, NASA reports significant planetary greening as a result of increasing atmospheric concentrations of carbon dioxide, and data from the United Nations Food and Agriculture Organization show that global per capita food production increased 46 percent between 1961 and 2020, and 20 percent for 2000-2020.

The "crisis" narrative is derived wholly from climate models that cannot predict the actual temperature record. In particular, the suite of climate models underlying the IPCC 5^{th} and 6^{th} Assessment Reports overstate the mid-troposphere temperature record by factors of about 2.5. Moreover, the models are fine-tuned in such a way as to deny the importance of natural influences on climate phenomena, but that is inconsistent with a large body of evidence, in particular the substantial warming observed from 1910 to 1945, and the close correlation between the satellite temperature record and the El Niño/Southern Oscillation.

The cumulative emissions reduction of 418,000 metric tons asserted in the proposed rule would be less than 5 ten-thousands of a percent of the total envisioned in the Biden net-zero policy, which would yield a reduction in global temperatures of 0.173°C by 2100, a figure that would be barely detectable given the standard deviation (0.11°C) of the surface temperature record.

Accordingly, the "climate benefit" of the proposed rule in terms of actual climate phenomena would be zero, literally, and therefore the monetized climate benefits of the proposed rule asserted by DoE are an illusion.

DoE attempts to circumvent this obvious problem by substituting in place of any such analysis an application of the "social cost of carbon" to the asserted reductions in GHG emissions attendant upon implementation of the proposed rule, as estimated on an interim basis by the Biden Administration Interagency Working Group. The interim IWG estimates are deeply flawed, in that they (1) distort the actual economic growth predictions produced by the integrated assessment models, (2) base predictions of future climate phenomena on climate models that cannot predict the past or the present, (3) incorporate "co-benefits" in the form of a reduction in the emissions of other criteria and hazardous air pollutants already regulated under different provisions of the Clean Air Act, (4) incorporate the asserted benefits of GHG reductions on a global basis, and (5) employ discount rates that are inconsistent and inappropriate.

The "consumption rate of interest" is not the correct conceptual discount rate for regulatory analysis because the regulatory reallocation of resources in pursuit of increased economic efficiency is an investment, the opportunity cost of which is the marginal social return to investment. The common argument that a low discount rate is needed to further the goal of intergenerational equity is not correct. Future generations prefer to receive a bequest of an aggregate capital stock both natural and manmade more- rather than less valuable, an objective that requires efficient resource allocation by the current generation, and therefore the application of the correct discount rate.

The proposed rule is fatally flawed, and should not be finalized.

I. Energy "Savings" Are an Illegitimate Asserted Benefit of the Proposed Rule

The conceptual purpose of any proposed regulation is the correction of some set of purported inefficiencies inherent in market allocational outcomes, usually assumed to result from some social resource or other cost not reflected in market prices. This is the standard definition of an externality.[2] The value of energy savings measured as a function of market prices *per se* represents no such divergence between market prices and resource costs apart from the climate effects (discussed below); other such assumed impacts not reflected in market prices already are regulated under different provisions of the Clean Air Act.

Accordingly, energy savings *per se* are not relevant analytically, because the economic benefits of energy savings are captured fully by purchasers of such appliances as dishwashers. There is no "externality" attendant upon energy consumption *per se*, and if "energy savings" are to be considered relevant for purposes of benefit/cost analysis, then the adverse effects or costs of a (forced) reduction in energy consumption in terms of the quality of dishwasher performance in the context of this proposed rule must be included in the analysis.[3]

DoE asserts that the average life-cycle saving in terms of energy costs would be $17-30 (in

[2] I shunt aside here the issue of whether government can be predicted to adopt policies yielding systematic allocational improvement. See section IV at https://www.aei.org/wp-content/uploads/2023/06/Zycher-comment-OMB-Proposed-Circular-A-4-Regulatory-Analysis-June-2023.docx.pdf.

[3] See the discussion below in section II.

year 2021 dollars) over an average product lifetime of 15.2 years.[4] Accordingly, the average annual consumer benefit in terms of energy cost savings asserted by DoE would be $1.12-1.97. Given the obvious uncertainties inherent in such estimates — DoE fails to report the standard deviation or other statistical moments of its estimates — those asserted benefits are so small that from an analytic standpoint they cannot be regarded as "benefits" at all.

This is particularly the case because the proposed rule obviously would force consumers of dishwashers to change their purchase choices in ways that have not and would not be observed in the absence of the proposed rule. This demonstrates that the energy cost "savings," even if we accept the underlying calculations, must be accompanied by some explicit or implicit costs in terms of forgone quality dimensions of dishwasher performance, the value of which must be greater than the value of the purported energy cost savings. That obviously is why we do not observe the allocational outcomes envisioned in the proposed rule as a result of market forces. Why does market behavior not yield the energy consumption characteristics for dishwashers envisioned in the proposed rule? Does DoE believe that consumers of dishwashers — that is, the dishwasher market — simply are stupid?

In order to see this clearly, suppose that the proposed rule were simply to outlaw entirely the use of dishwashers, and suppose that the best substitute — washing dishes by hand — used no energy at all. This conceptual experiment implies that the use of dishwashers yields benefits for consumers in the form of convenience and other such parameters. But under the DoE analytic methodology, outlawing dishwashers would create energy cost savings while imposing no costs in terms of performance characteristics. Amazingly, this implicitly is the analytic framework underlying this part of the estimated benefits asserted in the proposed rule. It is not to be taken seriously.

II. The DoE Assertion That the Proposed Rule "Would Not Reduce the Utility or Performance" of Dishwashers Is Devoid of Analytic Support

DoE attempts to circumvent this obvious problem with the following assertion.[5]

> Based on data available to DOE, the standards proposed in this document would not reduce the utility or performance of the products under consideration in this rulemaking.

The only analytic support for that conclusion offered by DoE is the assertion that "Manufacturers of these products currently offer units that meet or exceed the proposed standards."[6] That is an utter *non sequitur* in that it tells us nothing about the relative "utility or performance" of such options.[7]

III. Assertions of a "Global Climate Crisis" As a Justification for the Proposed Rule Are Inconsistent with the Evidence

DoE justifies the proposed rule in part on the basis of "the need to confront the global

[4] Respectively, see the proposed rule at Table I.2 and Table IV.12.
[5] See the proposed rule at p. 32526.
[6] See the proposed rule at p. 32566.
[7] The comment submitted by the Competitive Enterprise Institute discusses in detail the "utility and performance" problems inherent in the proposed rule.

climate crisis."[8] That asserted "need to confront the global climate crisis" is not consistent with the evidence. Anthropogenic climate change is "real" — increasing GHG concentrations are having detectable effects — and incontrovertible, but that does not tell us the magnitude of the observable impacts, which must be measured empirically. Temperatures are rising, but as the Little Ice Age ended no later than 1850, it is not easy to separate natural from anthropogenic effects on temperatures and other climate phenomena, as discussed below in section VII.[9] The latest research in the peer-reviewed literature suggests that mankind is responsible for about half of the approximate temperature increase of 1.1 degrees C since 1880.[10]

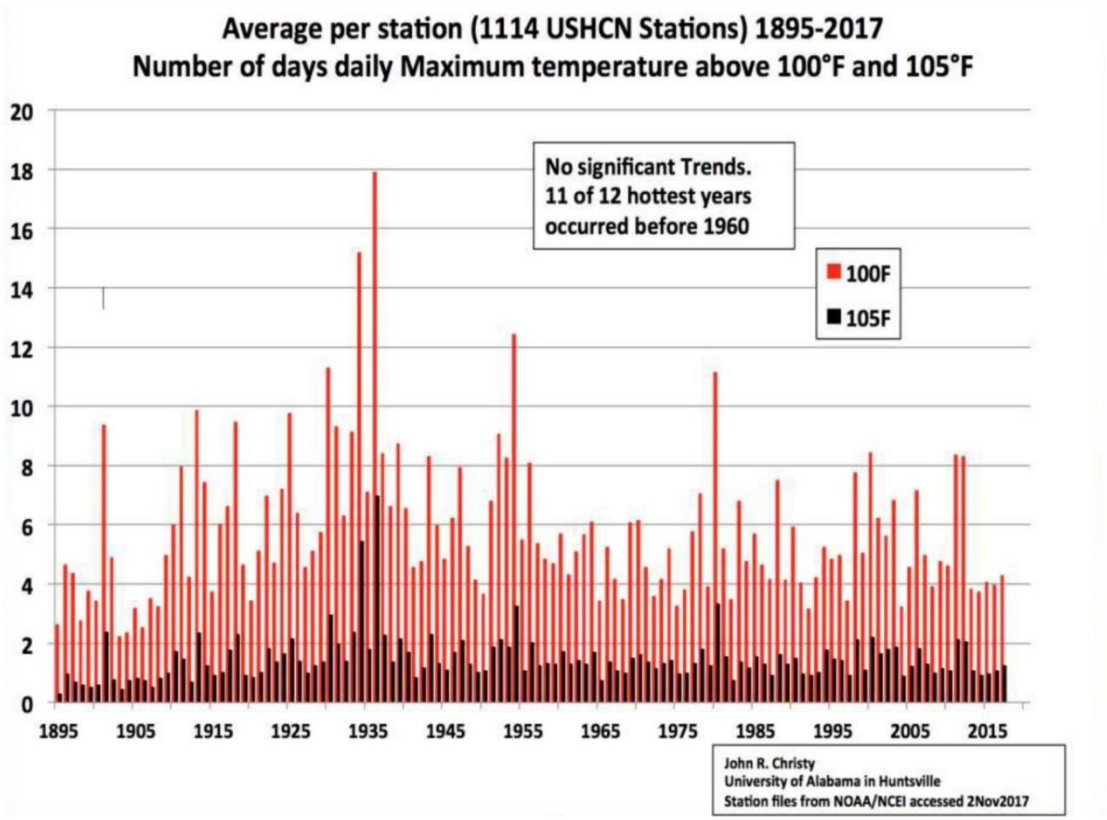
There is little trend in the number of "hot" days for 1895–2017; eleven of the 12 years with the highest number of such days occurred before 1960, as shown in the following chart.[11]

[8] See the proposed rule at p. 32525.

[9] On the Little Ice Age, see Michael E. Mann, "Little Ice Age," in *Encyclopedia of Global Environmental Change, Volume 1: The Earth System: Physical and Chemical Dimensions of Global Environmental Change*, ed. Michael C. MacCracken, John S. Perry and Ted Munn (Chichester, England: John Wiley & Sons, 2002), http://www.meteo.psu.edu/holocene/public_html/shared/articles/littleiceage.pdf.

[10] See, e.g., Nicholas Lewis, "Objectively Combining Climate Sensitivity Evidence," *Climate Dynamics*, September 19, 2022, at https://link.springer.com/article/10.1007/s00382-022-06468-x; Ross McKitrick and John Christy, "A Test of the Tropical 200- to 300 hPa Warming Rate in Climate Models"; Nicholas Lewis and Judith Curry, "The Impact of Recent Forcing and Ocean Heat Uptake Data on Estimates of Climate Sensitivity," *Journal of Climate* 31 (August 2018): 6051–71, https://journals.ametsoc.org/doi/pdf/10.1175/JCLI-D-17-0667.1; and John R. Christy and Richard McNider, "Satellite Bulk Tropospheric Temperatures as a Metric for Climate Sensitivity," *Asia-Pacific Journal of Atmospheric Sciences* 53 (2017): 511–18, https://link.springer.com/article/10.1007/s13143-017-0070-z. For a chart summarizing the recent empirical estimates of equilibrium climate sensitivity as reported in the peer-reviewed literature, see Patrick J. Michaels and Paul C. Knappenberger, "The Collection of Evidence for a Low Climate Sensitivity Continues to Grow," Cato Institute, September 25, 2014, https://www.cato.org/blog/collection-evidence-low-climate-sensitivity-continues-grow.

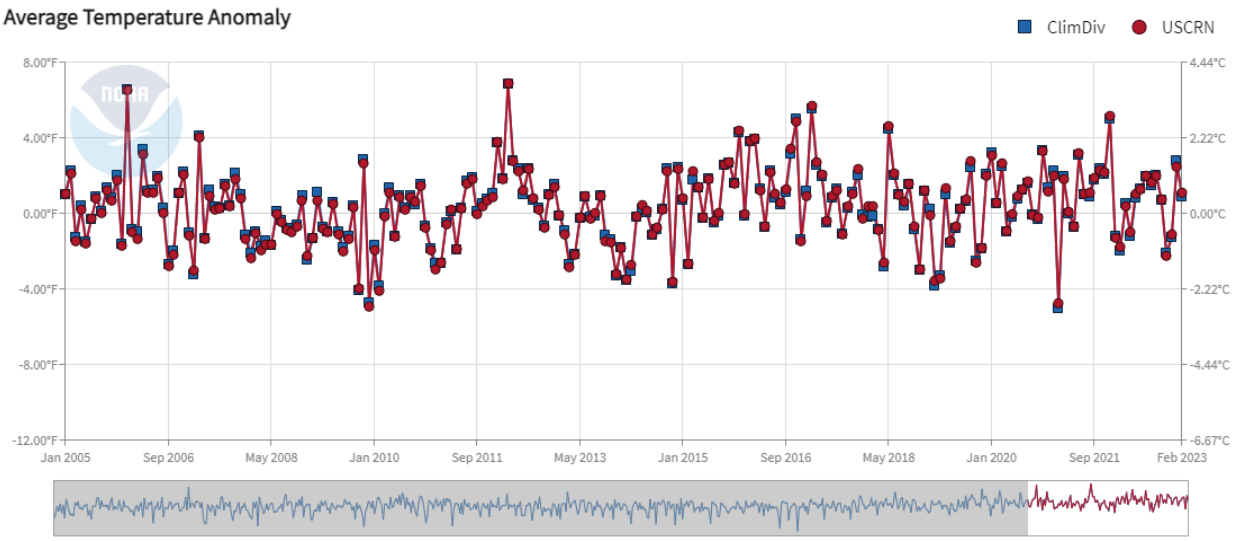
[11] For the reconstruction of the NASA data, see John R. Christy, "Average per Station (1114 USHCN Stations) 1895–2017: Number of Days Daily Maximum Temperature Above 100˚F and 105˚F," drroyspencer.com, http://www.drroyspencer.com/wp-content/uploads/US-extreme-high-temperatures-1895-2017.jpg.



NOAA has maintained since 2005 the U.S. Climate Reference Network, comprising 114 meticulously maintained temperature stations spaced more or less uniformly across the lower 48 states, 21 stations in Alaska, and two stations in Hawaii.[12] They are placed to avoid heat island effects and other such distortions as much as possible; the reported data show no trend over the available 2005–2023 reporting period, as shown in the following chart.[13]

[12] For the Climate Reference Network program description, see National Centers for Environmental Information, "U.S. Climate Reference Network," https://www.ncdc.noaa.gov/crn/.

[13] For a visualization of a prototypical station, see Willis Eschenbach, "NOAA's USCRN Revisited—No Significant Warming in the USA in 12 Years," *Watts Up with That?*, November 8, 2017, https://wattsupwiththat.com/2017/11/08/the-uscrn-revisited/. For the monthly data and charts reported by the National Oceanic and Atmospheric Administration (NOAA), see National Oceanic and Atmospheric Administration, "National Temperature Index," https://www.ncdc.noaa.gov/temp-and-precip/national-temperature-index/time-series?datasets%5B%5D=uscrn&parameter=anom-tavg&time_scale=p12&begyear=2005&endyear=2020&month=8, and the monthly data at https://www.ncei.noaa.gov/access/monitoring/national-temperature-index/time-series/anom-tavg/1/0.



Koonin notes for the U.S. as follows for 1900 through 2019:

> … the average coldest temperature of the year has clearly increased since 1900, while the average warmest temperature has hardly changed over the last sixty years and is about the same today as it was in 1900.[14]

A NOAA reconstruction of global temperatures over the past one million years, using data from ice sheet formations, shows that there is nothing unusual about the current warm period.[15]

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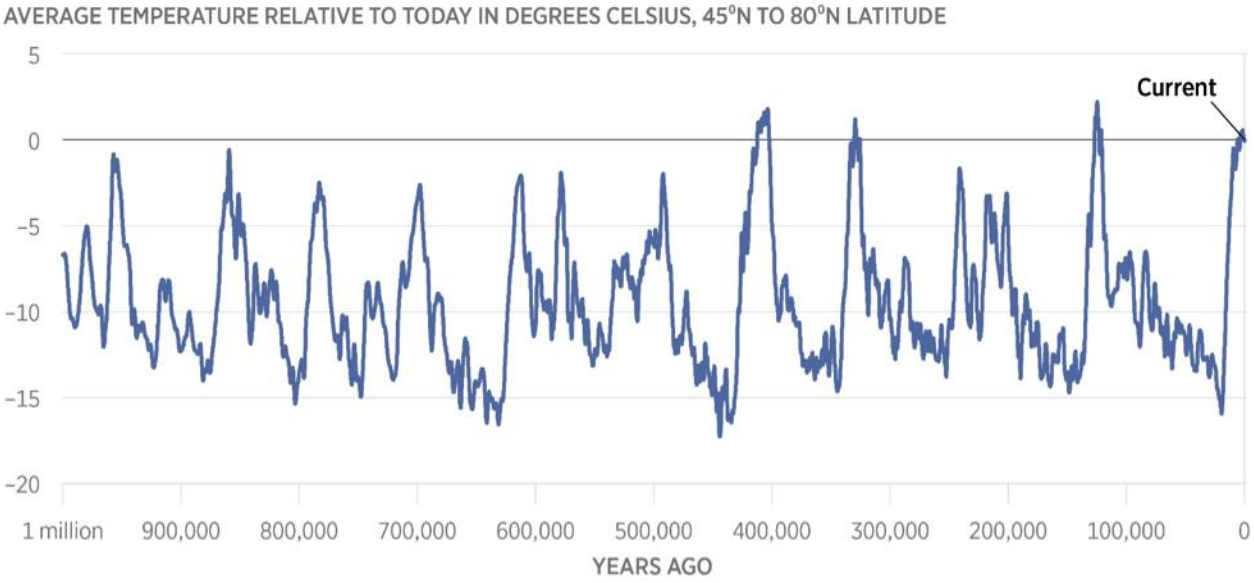
[14] See Steven E. Koonin, *Unsettled: What Climate Science Tells Us, What It Doesn't, and Why It Matters*, Dallas: BenBella Books, 2021, at p. 102.

[15] See https://www.instituteforenergyresearch.org/wp-content/uploads/2020/03/temperature-flucturations.png, from R. Bintanja and R. S. W. van de Wal, "North American Ice-Sheet Dynamics and the Onset of 100,000-Year Glacial Cycles," *Nature* 454, no. 7206 (August 14, 2008): 869–72, https://www.researchgate.net/publication/23171740_Bintanja_R_van_de_Wal_R_S_W_North_American_ice-sheet_dynamics_and_the_onset_of_100000-year_glacial_cycles_Nature_454_869-872. NOAA published the underlying data at R. Bintanja and R. S. W. van de Wal, "Global 3Ma Temperature, Sea Level, and Ice Volume Reconstructions," National Oceanic and Atmospheric Administration, August 14, 2008, https://www.ncdc.noaa.gov/paleo-search/study/11933.

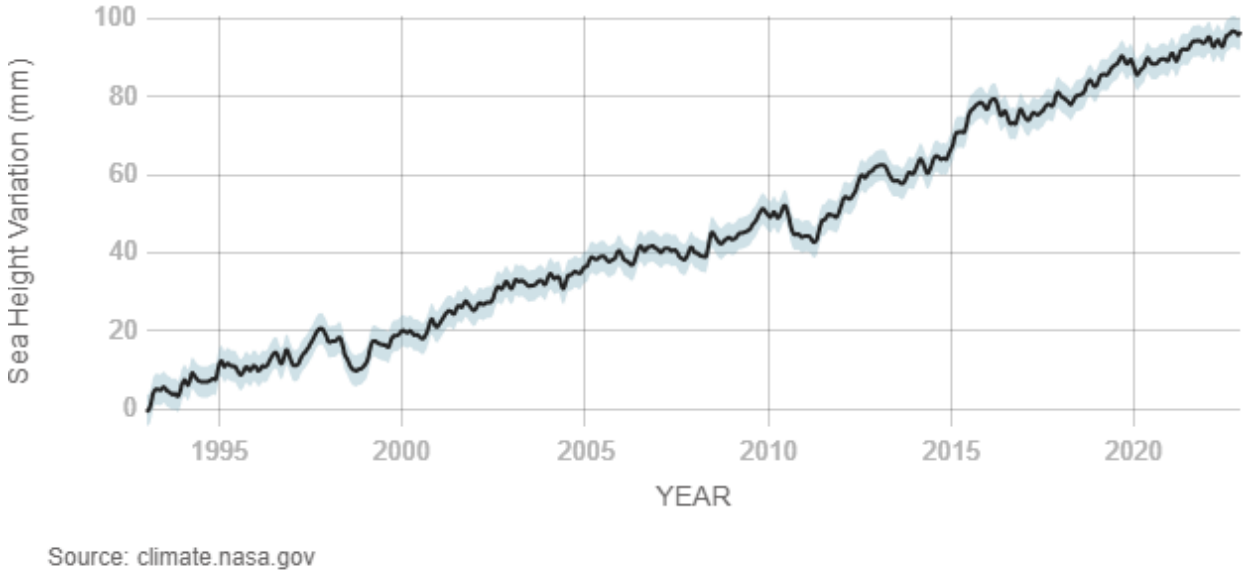
Temperature Fluctuations Over the Past Million Years



SOURCE: R. Bintanja and R.S.W. van de Wal, "Global 3Ma Temperature, Sea Level, and Ice Volume Reconstructions," National Oceanic and Atmospheric Administration, August 14, 2008, https://www.ncdc.noaa.gov/paleo/study/11933 (accessed April 5, 2016).

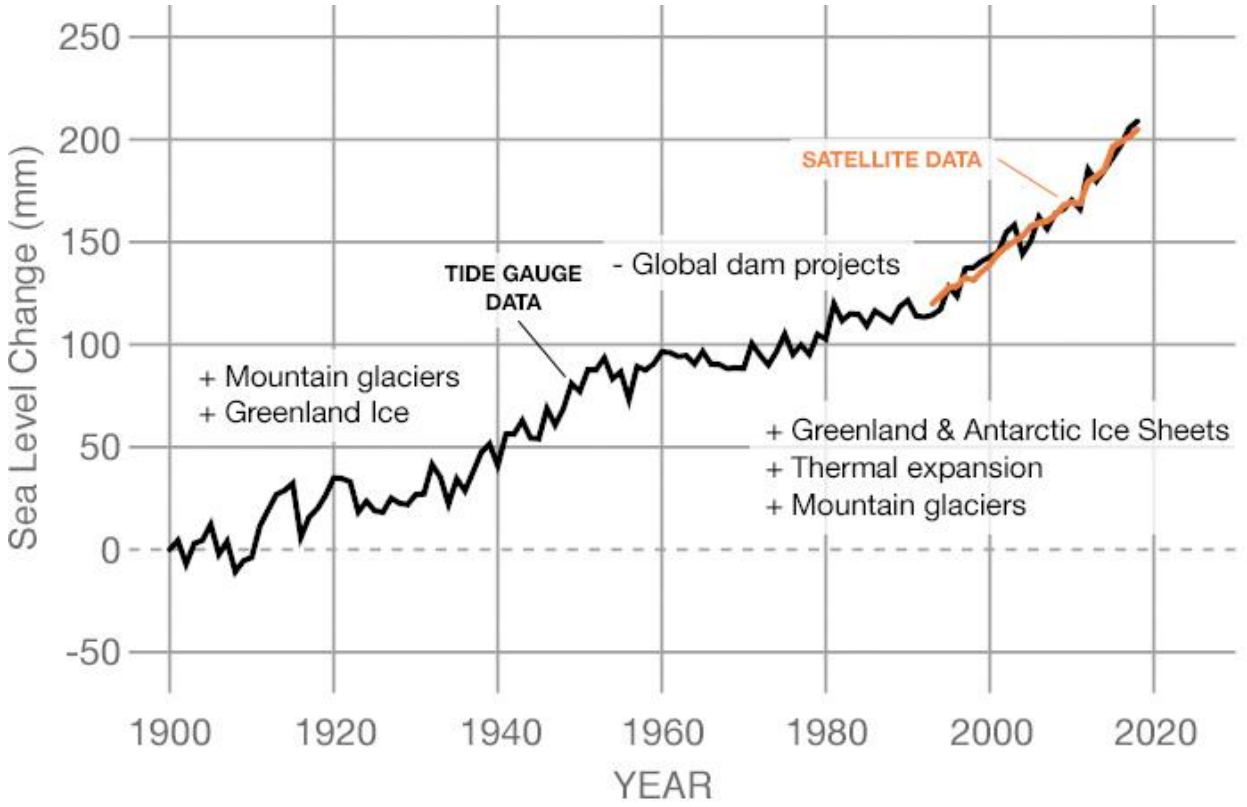
Global mean sea level has been increasing at about 3.3 mm per year since satellite measurements began in 1993, as shown in the following chart from NASA.[16] That ongoing sea level rise would be about 13 inches over the course of a century, an outcome very unlikely to prove a "crisis," in particular given the time available for adaptation.

[16] NASA reports 96.7 millimeters of sea level rise for the period 1993-2022. See the NASA data at https://climate.nasa.gov/vital-signs/sea-level/.



Source: climate.nasa.gov

The tidal-gauge data before the altimeter era show annual increases of about 1.8 mm per year, as shown in the following chart.[17]



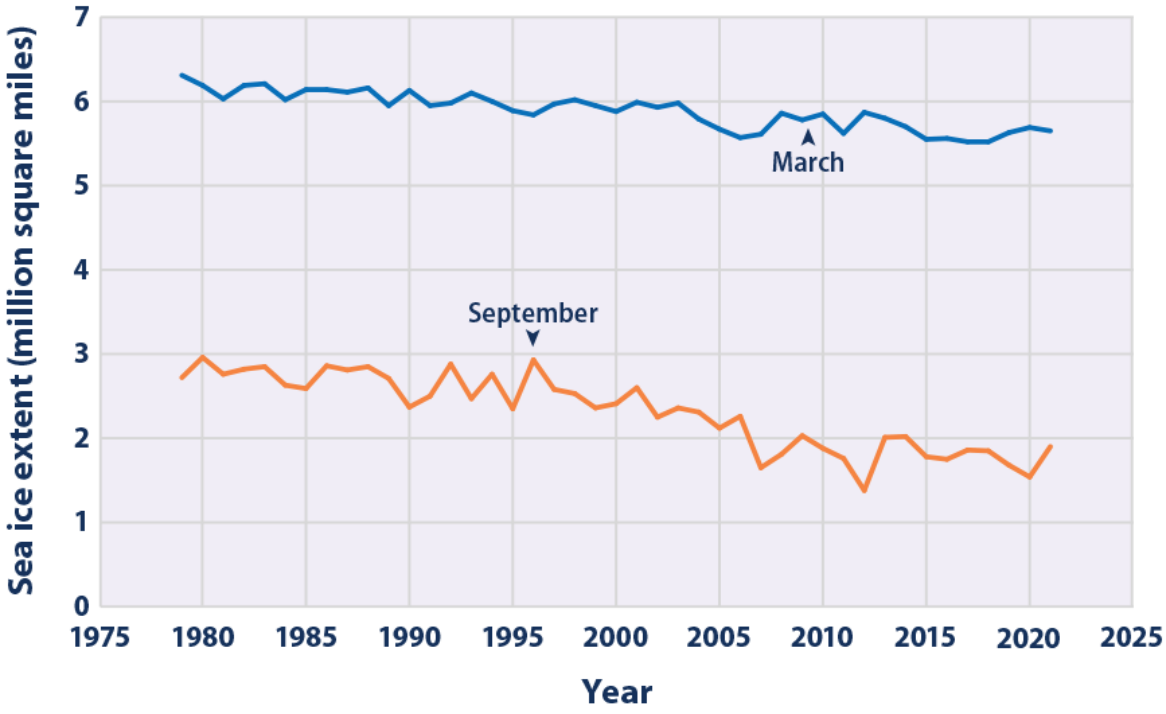
[17] *Ibid.*

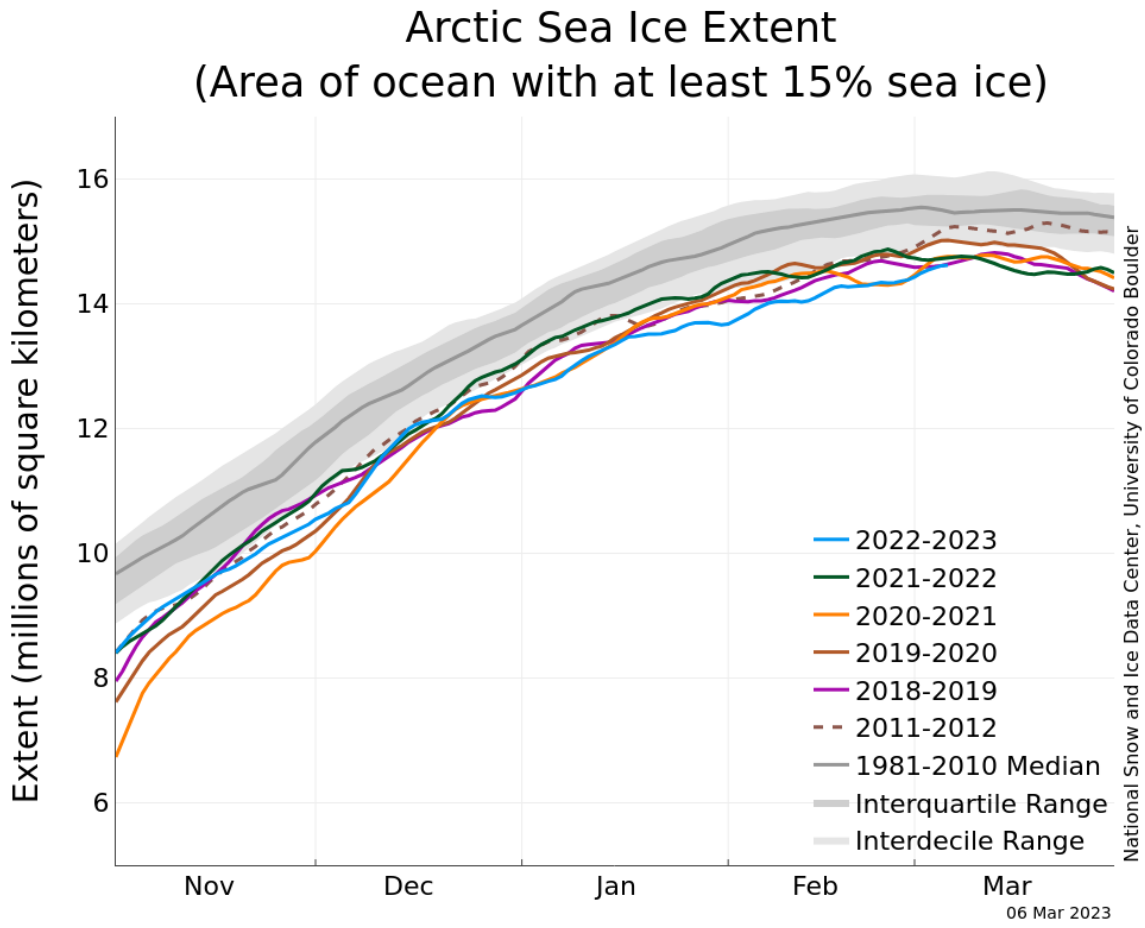
The two datasets are not directly comparable in that the tidal gauges do not measure sea levels *per se*; they measure the difference between sea levels and "fixed" points on land that in reality might not be fixed due to seismic activity, tectonic shifts, land settlement, precipitation, and other parameters. Accordingly, the data are unclear as to whether there is occurring an acceleration in sea level rise. It is reasonable to hypothesize that there has been such an acceleration simply because temperatures are rising due to both natural and anthropogenic influences, and such increases should result in more melting ice and the thermal expansion of seawater. But because rising temperatures are the result of both natural and anthropogenic causes, as discussed in section VII, we do not know the relative contributions of those causes to any such acceleration.[18]

The inconsistency of the northern and southern hemisphere sea ice changes add to the analytic complexity of anthropogenic climate change. The arctic sea ice has been declining, as shown in the following two charts.[19] For the second chart, however, note that the small number of years shown prevents a reliable derivation of inferences.

[18] See Frederikse *et. al.* at https://www.nature.com/articles/s41586-020-2591-3. As a crude approximation, the data suggest that about two-thirds of such sea level increases are due to ice melt, and one-third to thermal expansion of seawater. See Judith Curry, "Sea Level and Climate Change," Climate Forecast Applications Network, November 25, 2018, https://curryja.files.wordpress.com/2018/11/special-report-sea-level-rise3.pdf. Curry cites research from Xianyao Chen and colleagues, the central finding of which is that "global mean sea level rise increased from 2.2 ± 0.3 mm/year in 1993 to 3.3 ± 0.3 mm/year in 2014." See Xianyao Chen et al., "The Increasing Rate of Global Mean Sea-Level Rise During 1993–2014," *Nature Climate Change* 7 (June 26, 2017): 492–95, https://www.nature.com/articles/nclimate3325. Whether the trend from a 21-year period can yield important inferences is a premise problematic at a minimum. For a different empirical conclusion from the tidal gauge record, see J. R. Houston and R. G. Green, "Sea-Level Acceleration Based on U.S. Tide Gauges and Extensions of Previous Global-Gauge Analyses," *Journal of Coastal Research* 27, no. 3 (May 2011): 409–17, https://meridian.allenpress.com/jcr/article-abstract/27/3/409/28456/Sea-Level-Acceleration-Based-on-U-S-Tide-Gauges?redirectedFrom=fulltext. For an example of temporary rapid sea-level rise in the 18th century, see W. R. Gehrels et al., "A Preindustrial Sea-Level Rise Hotspot Along the Atlantic Coast of North America," *Geophysical Research Letters* 47 (2020), https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2019GL085814. For further reported evidence of an acceleration, see Hans-Otto Pörtner et al., *Special Report on the Ocean and Cryosphere in a Changing Climate*, Intergovernmental Panel on Climate Change, 2019, https://www.ipcc.ch/srocc/.

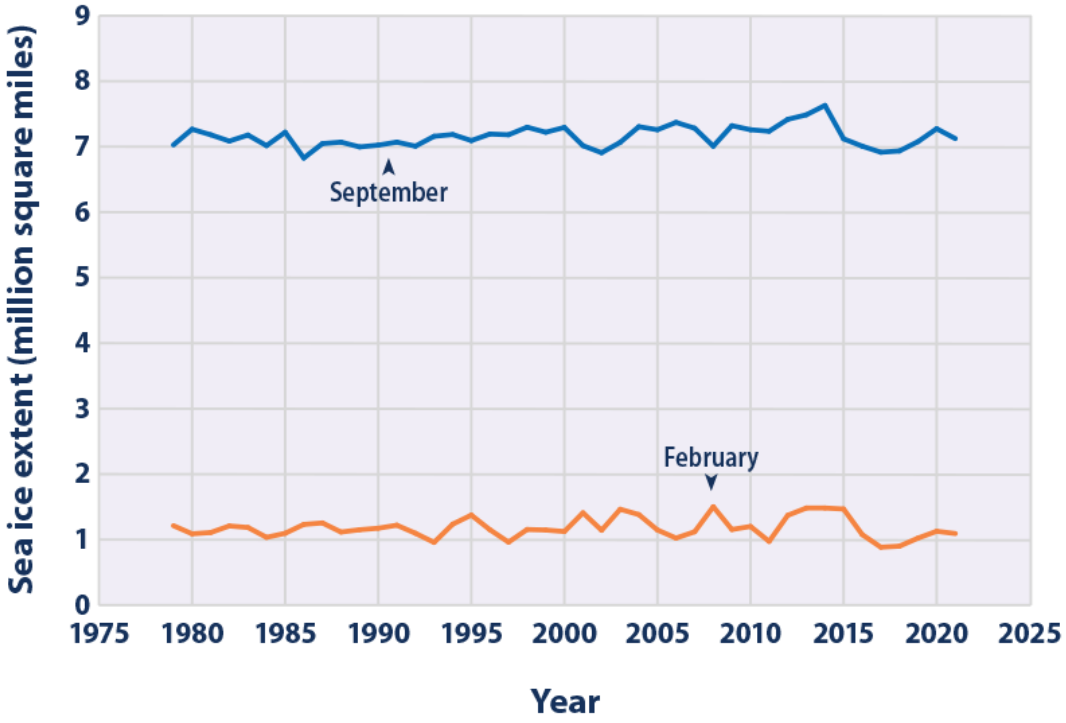
[19] See, respectively, https://www.epa.gov/climate-indicators/climate-change-indicators-arctic-sea-ice and https://nsidc.org/arcticseaicenews/.


Sea ice extent (million square miles)
7
6
5
4
3
2
1
0
March
September
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Year



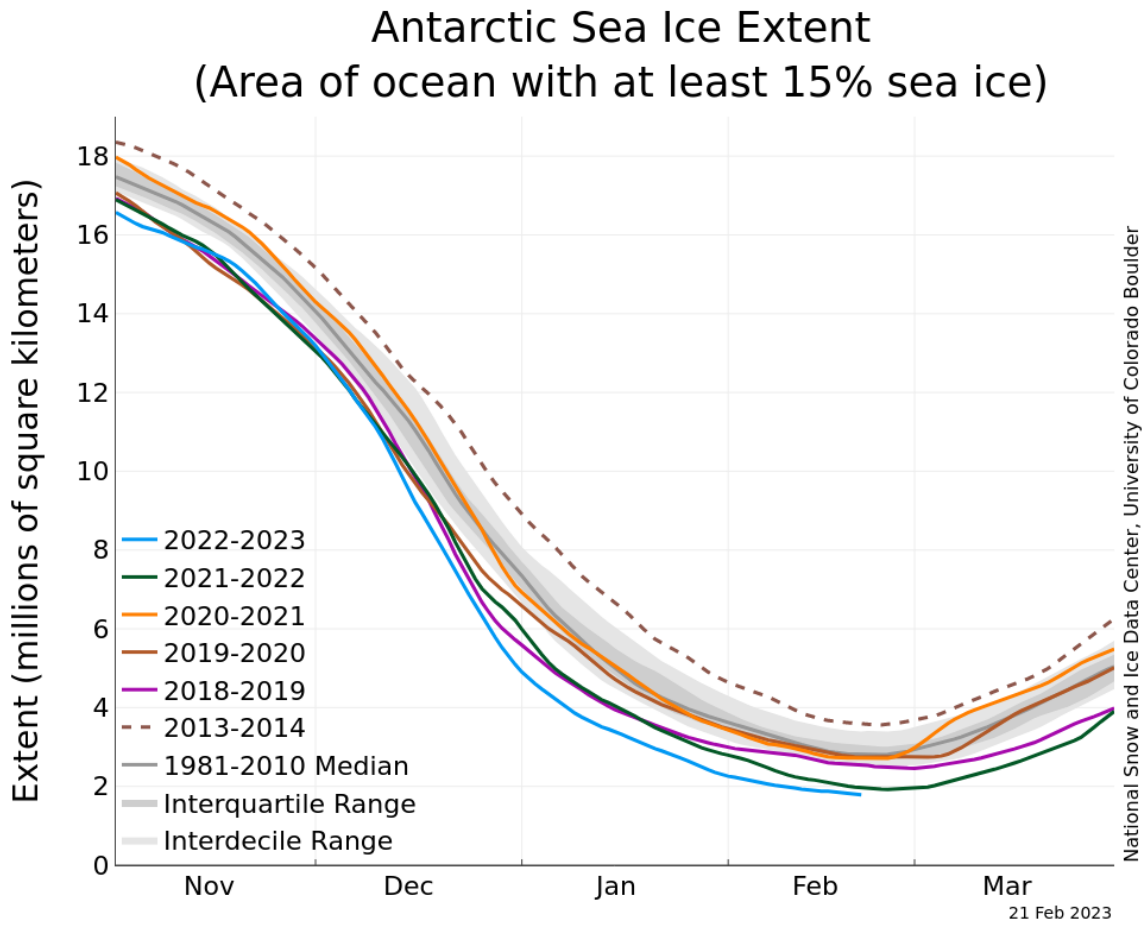
There is no long-term trend in the Antarctic sea ice extent, as shown in the following chart from the EPA.[20]

[20] See https://www.epa.gov/climate-indicators/climate-change-indicators-antarctic-sea-ice#ref5.



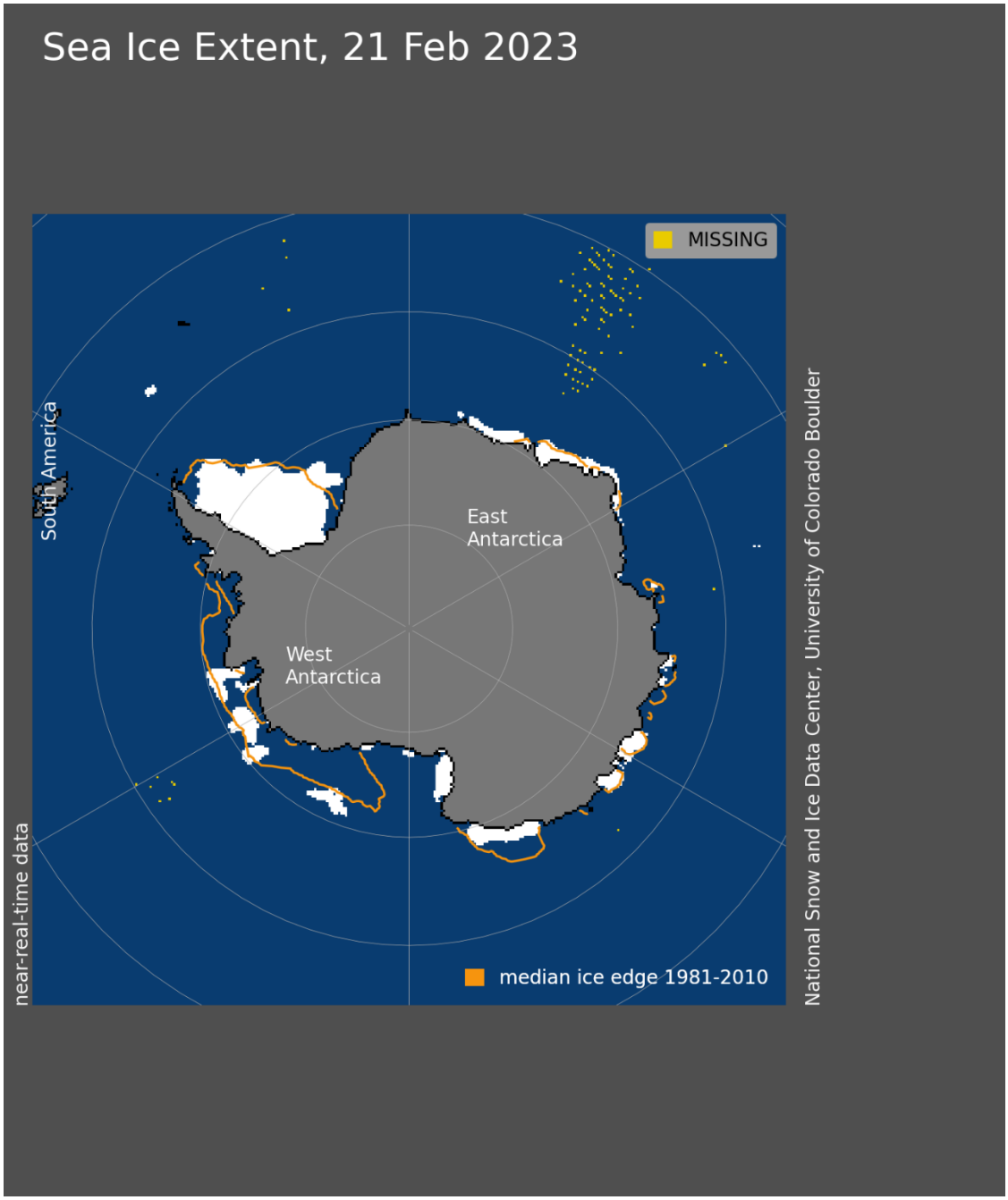
Even for the more recent years, the Antarctic sea ice appears to be stable as a matter of statistical significance, but, as noted above, it is inappropriate to derive inferences from a small number of year-to-year variations.[21]

[21] See https://nsidc.org/arcticseaicenews/2023/02/antarctic-sea-ice-minimum-settles-on-record-low-extent-again/. https://www.thegwpf.org/content/uploads/2021/12/Bates-Sea-Ice-Trends.pdf?mc_cid=dac7df538b&mc_eid=ad653edd6d; and https://www.thegwpf.org/content/uploads/2022/04/Humlum-State-of-Climate-2021-.pdf?mc_cid=dac7df538b&mc_eid=ad653edd6d. See also Patrick J. Michaels, "Spinning Global Sea Ice," Cato Institute, February 12, 2015, https://www.cato.org/blog/spinning-global-sea-ice.



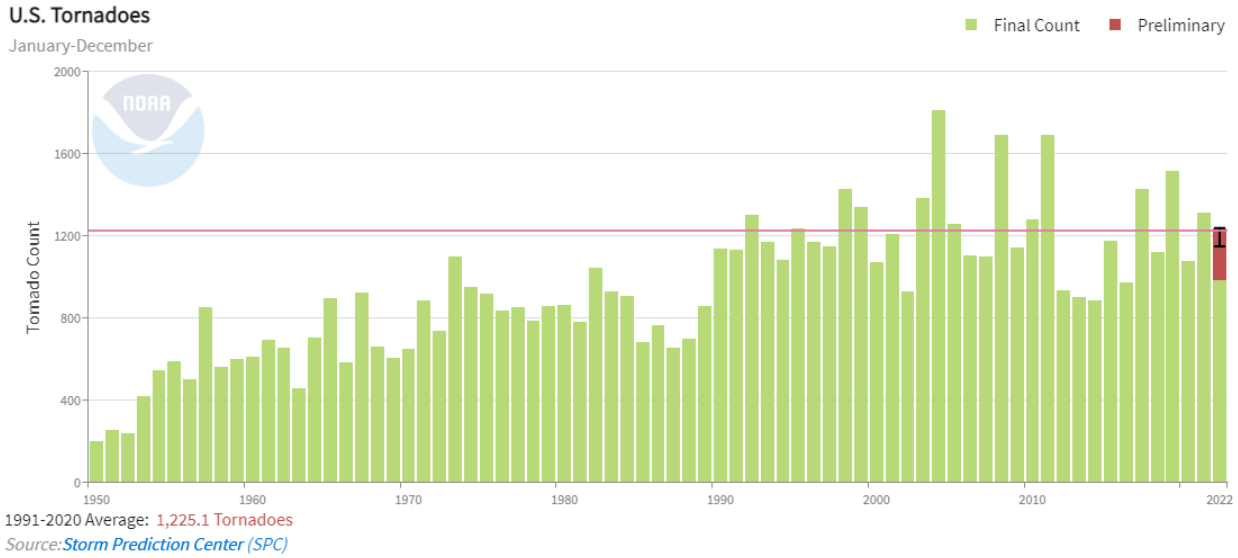
The data show that the Antarctic eastern ice sheet — about two-thirds of the continent — is growing, while the western ice sheet (and the peninsula) is shrinking, as shown in the following chart from the National Snow & Ice Data Center.[22] No agreed explanation for this phenomenon is reported in the literature.

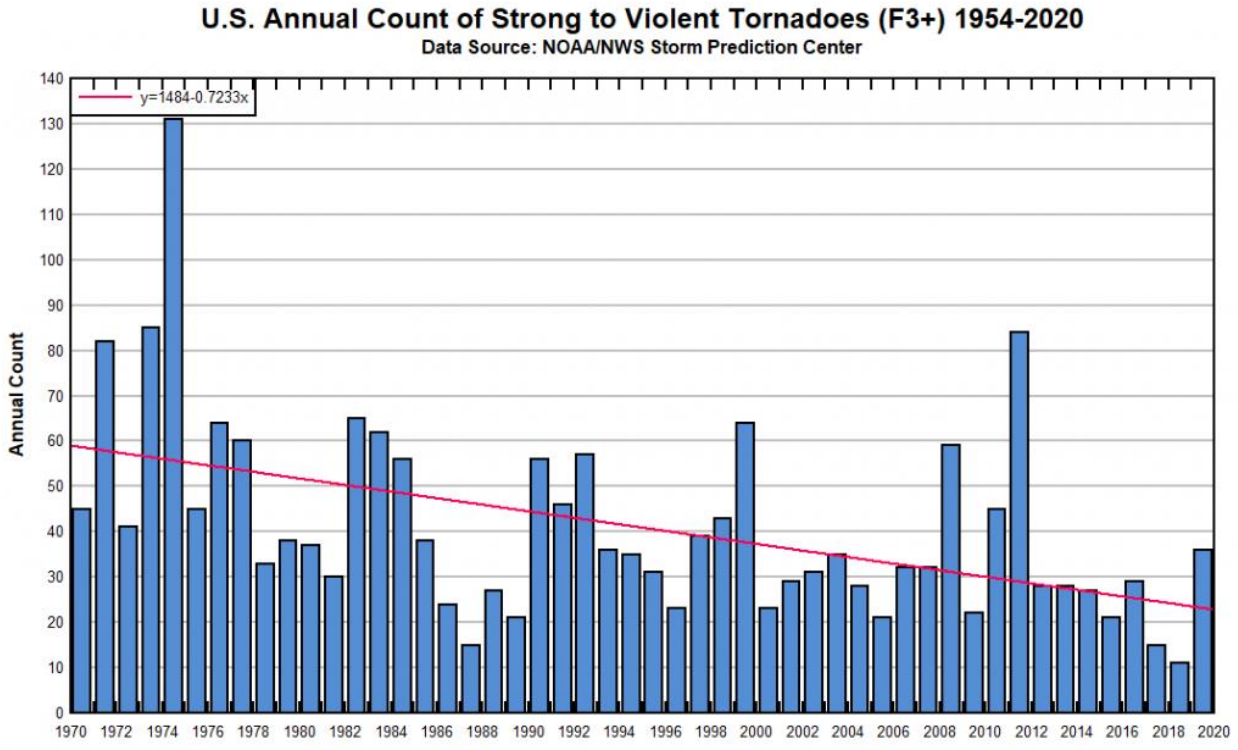
[22] See https://nsidc.org/arcticseaicenews/2023/02/antarctic-sea-ice-minimum-settles-on-record-low-extent-again/. On the eastern ice sheet, see https://www.nature.com/articles/s41561-022-00938-x. On the western ice sheet, see http://nsidc.org/greenland-today/. See also https://nsidc.org/arcticseaicenews/2023/02/antarctic-sea-ice-minimum-settles-on-record-low-extent-again/.



U.S. tornado activity for all EF ("Enhanced Fujita" scale) classes shows an upward trend since 1950, but, again, the issue of anthropogenic versus natural origins is unresolved.[23] The data for the period 1954 through 2014 for EF-3+ tornadoes show no trend or a downward trend. These trends are shown in the following two charts.[24]

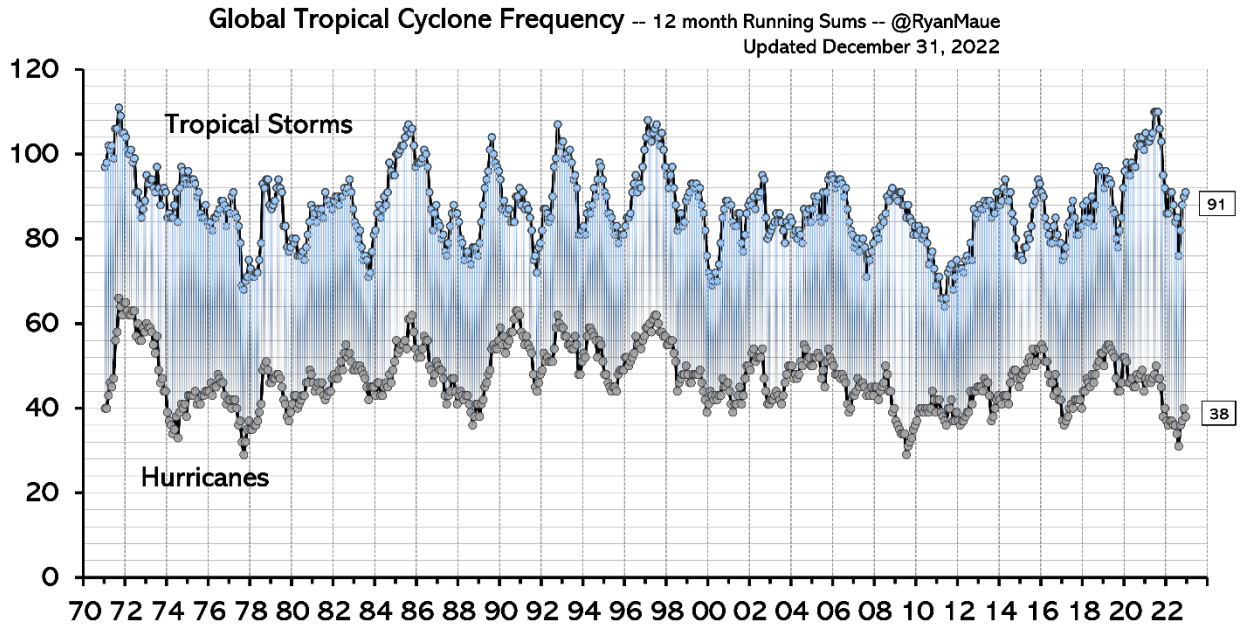
[23] See https://www.climate.gov/maps-data/dataset/monthly-and-annual-numbers-tornadoes-graphs-and-maps.
[24] See NOAA, "Historical Records and Trends," at https://www.ncdc.noaa.gov/climate-information/extreme-events/us-tornado-climatology/trends; and https://climateataglance.com/climate-at-a-glance-tornadoes/. Note that the

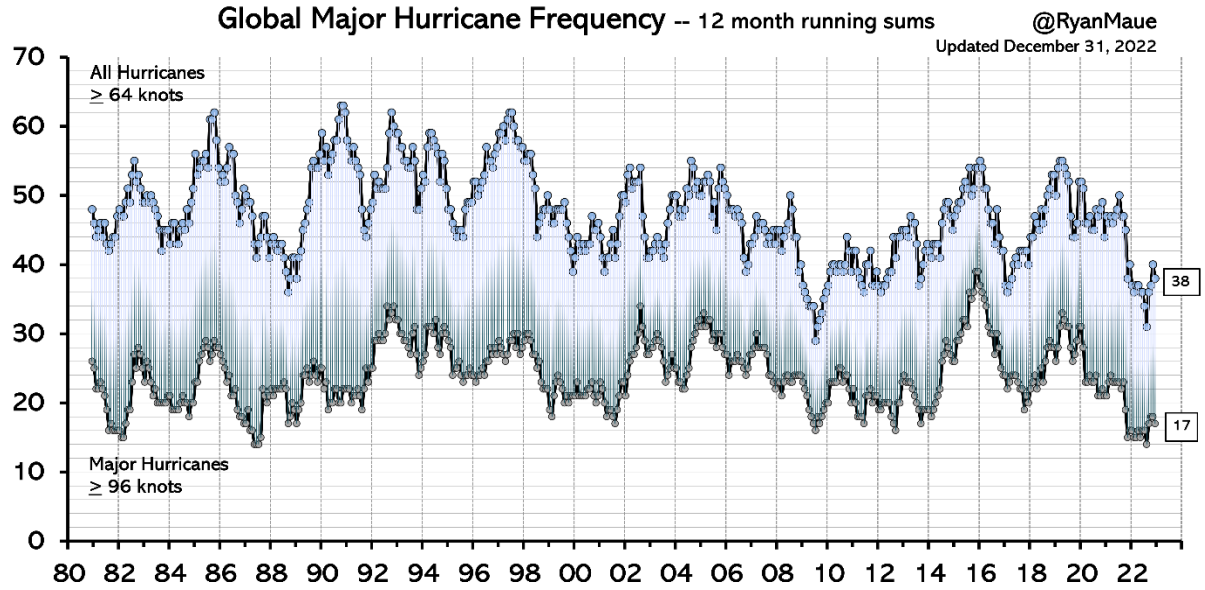




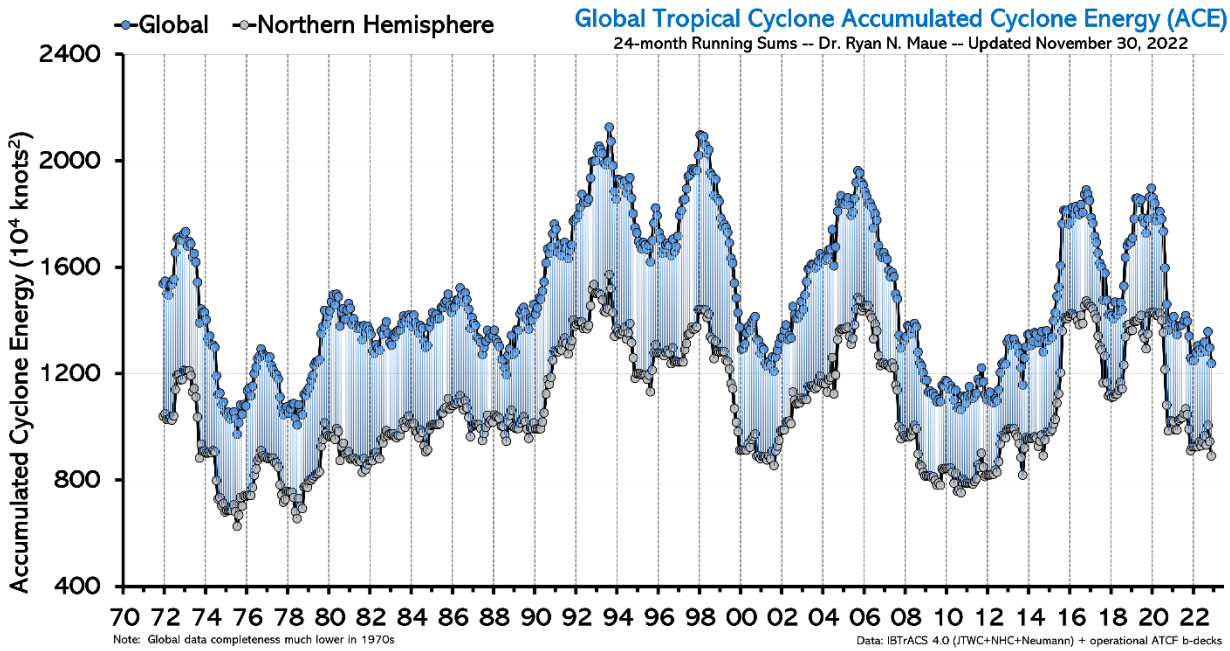
latter chart shows a heading of "1954-2020," but the bar chart begins in 1970. This discrepancy is unlikely to change the overall inference.

Tropical cyclones and accumulated cyclone energy show little trend since satellite measurements began in the early 1970s.[25]





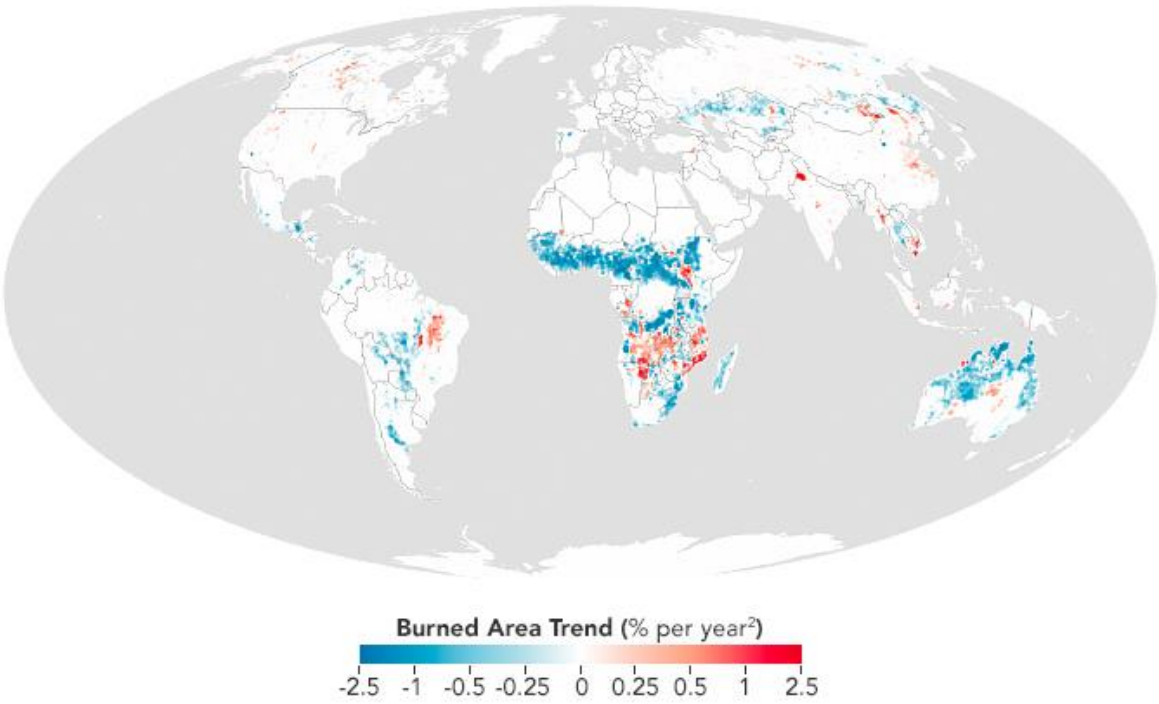
[25] For data on global tropical cyclone activity, see Ryan N. Maue, "Global Tropical Cyclone Activity, updated December 31, 2022, at http://climatlas.com/tropical/.



The number of U.S. wildfires shows no trend since 1985.[26] Global acreage burned declined sharply for 1998-2015, and by about 18 percent for the period 2003-2015 as reported by NASA, shown in the following figure.[27]

[26] For the reported U.S. wildfire data, see the EPA at https://www.epa.gov/climate-indicators/climate-change-indicators-wildfires and the National Interagency Fire Center, "Total Wildland Fires and Acres (1926–2019)," https://www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html. Note that the recent U.S. wildfire phenomenon has been observed in government forests to a degree vastly disproportionate relative to private forests. See http://nwmapsco.com/ZybachB/Articles/Magazines/Oregon_Fish_&_Wildlife_Journal/20220401_Global_Warming/Zybach_20220401.pdf.

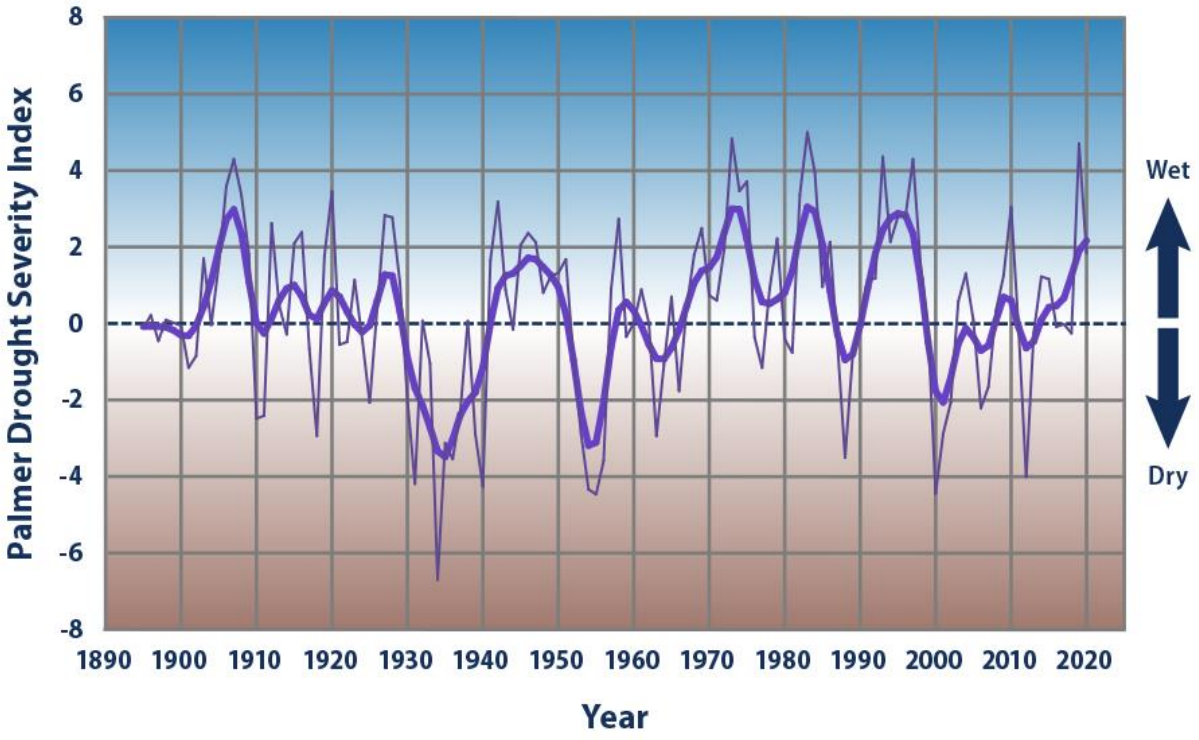
[27] On the decline in global area burned over past decades, see NASA at https://earthobservatory.nasa.gov/images/90493/researchers-detect-a-global-drop-in-fires; and Stefan H. Doerr and Cristina Santin, "Global Trends in Wildfire and Its Impacts: Perceptions Versus Realities in a Changing World," *Philosophical Transactions of the Royal Society of London, Series B, Biological Sciences* 371, no. 1696 (2016), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4874420/pdf/rstb20150345.pdf.



The Palmer Drought Severity index shows no trend since 1895, as shown in the following chart.[28] Vicente-Serrano, *et. al.* report that "Meteorological droughts do not show any substantial changes at the global scale in at least the last 120 years."[29]

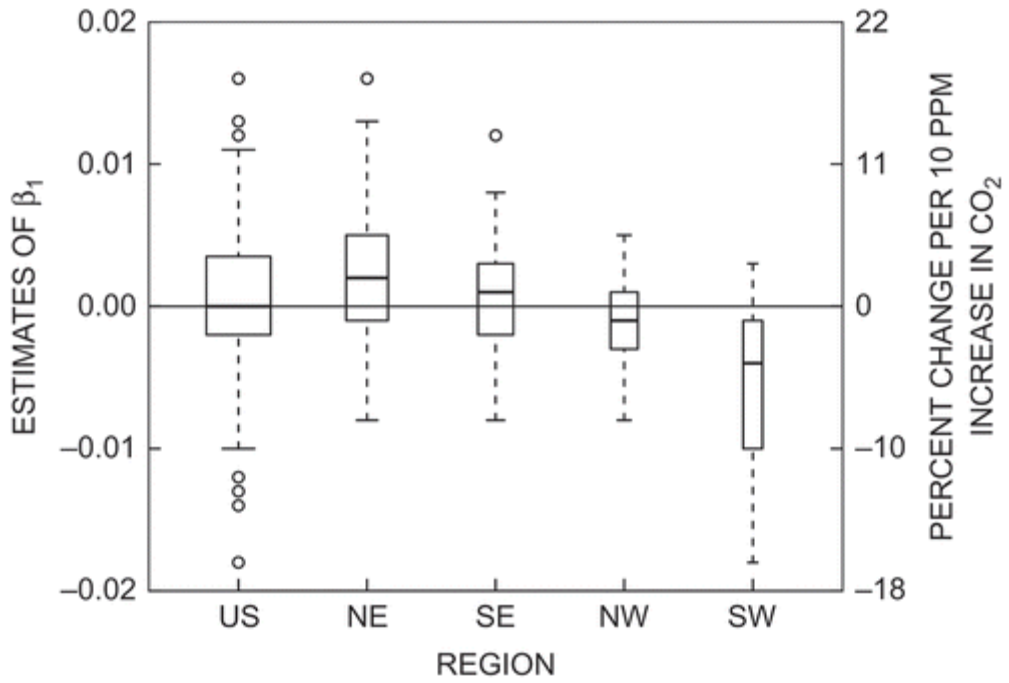
[28] See US Environmental Protection Agency, "Climate Change Indicators: Drought," https://www.epa.gov/climate-indicators/climate-change-indicators-drought; and US Department of Commerce, National Climatic Data Center, "Divisional Data Select," https://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp.

[29] See Sergio M. Vicente-Serrano, *et. al.*, "Global Drought Trends and Future Projections," *Philosophical Transactions of the Royal Society*, October 2022, at https://www.researchgate.net/publication/364672519_Global_drought_trends_and_future_projections.



U.S. flooding over the past century is uncorrelated with increasing GHG concentrations.[30]

[30] See R. M. Hirsch and K. R. Ryberg, "Has the Magnitude of Floods Across the USA Changed with Global CO_2 Levels?," *Hydrological Sciences Journal* 57, no. 1 (2012): 1–9, https://www.tandfonline.com/doi/full/10.1080/02626667.2011.621895?scroll=top&needAccess=true&.



The IPCC in the AR6 reports that "The SREX (Seneviratne et al., 2012) assessed low confidence for observed changes in the magnitude or frequency of floods at the global scale. This assessment was confirmed by AR5 (Hartmann et al., 2013)."[31]

The available data do not support the ubiquitous assertions about the dire impacts of declining pH levels in the oceans.[32] Goklany reports as follows.[33]

> There is no likelihood of the ocean's average pH getting anywhere near as low as 7 (neutral) because of elevated carbon dioxide concentrations during the next three centuries. Ocean pH currently averages about 8 and is forecast to fall by 0.2 pH units or so during the present century. This change is considerably smaller than the difference in pH between different parts of the ocean, different days in the same part of the ocean, and even different times of day in coral reef lagoons. An examination of upper-ocean pH for a wide variety of ecosystems ranging from polar to tropical, open-ocean to coastal, kelp forest to coral reefs, indicates that variations in month-long pH spanned a range of 0.024 –1.430 pH units, and found that many organisms 'are already experiencing pH regimes that are not predicted until 2100.

The IPCC in the *Fifth Assessment Report* was deeply dubious about the various severe

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[31] See https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter11.pdf at p. 1568.
[32] For a summary discussion, see https://www.mattridley.co.uk/blog/thousands-of-results-on-ocean-acidification/. A comprehensive database is at CO_2 Science, "Ocean Acidification Database," http://www.co2science.org/data/acidification/results.php. See also Alan Longhurst, *Doubt and Certainty in Climate Science*, pp. 214–25, https://curryja.files.wordpress.com/2015/09/longhurst-print.pdf.
[33] See https://www.thegwpf.org/content/uploads/2015/10/benefits1.pdf at p. 16.

effects often asserted to be looming as impacts of anthropogenic warming; an example is a collapse of the Antarctic western and Greenland ice sheets. The IPCC analysis in the *Sixth Assessment Report* is almost identical.[34]

IV. The Asserted Climate Benefits Are Illusory and the Social Cost of Carbon Parameter Is Fundamentally Flawed

DoE asserts in the proposed rule that it would yield cumulative reductions in greenhouse gas (GHG) emissions by 12.54 million metric tons for the period 2027-2056.[35] That is an annual average reduction of about 418,000 metric tons. U.S. emissions of GHG in 2021 were about 6.3 billion metric tons on a CO_2-equivalent basis.[36] If we apply the Environmental Protection Agency climate model under assumptions that exaggerate the future climate effects of reductions in GHG emissions, the global temperature reduction in 2100 attendant upon the proposed rule would be 0.0009°C, that is, nine one-hundred thousands of a degree.[37]

The Biden administration policy goal is net-zero emissions by 2050.[38] If again we apply the EPA climate model in order to estimate the prospective temperature effect of the entire Biden administration policy, under the same assumptions that exaggerate the temperature effects of reduced emissions, that policy would yield a global temperature reduction of 0.062°C by 2050, and 0.173°C by 2100.[39]

The cumulative reduction in U.S. emissions under the net-zero policy, from 6.3 billion metric tons in 2021 to net zero by 2050, would total about 88.2 billion metric tons. For the 2027-2056 time period relevant in the proposed rule, the cumulative reduction would be about 60 billion tons. Accordingly, the cumulative emissions reduction of 418,000 metric tons asserted in the proposed rule would be less than 5 ten-thousands of a percent of the total envisioned in the Biden net-zero policy, which as just noted, would yield a reduction in global temperatures of 0.173°C by 2100, a figure that would be barely detectable given the standard deviation (0.11°C) of the surface temperature record.[40] The "climate benefit" of the proposed rule in terms of actual climate phenomena would be zero, literally. Accordingly, the monetized climate benefits of the proposed rule asserted by DoE are an illusion.

DoE attempts to circumvent this obvious problem by substituting in place of any such

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[34] For the AR5, see Julie M. Arblaster et al., "Long-Term Climate Change: Projections, Commitments and Irreversibility—Final Draft Underlying Scientific-Technical Assessment," in *Working Group I Contribution to the IPCC Fifth Assessment Report (AR5), Climate Change 2013: The Physical Science Basis*, September 23–26, 2013, p. 12–78, at http://www.climatechange2013.org/images/uploads/WGIAR5_WGI-12Doc2b_FinalDraft_Chapter12.pdf. See the analogous analysis in the AR6 at p. 12-115 at https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf.

[35] See the proposed rule at p. 32516.

[36] See https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks#:~:text=In%202021%2C%20U.S.%20greenhouse%20gas,sequestration%20from%20the%20land%20sector. U.S. GHG emissions in 2005 on a CO_2-equivalent basis were about 7.5 billion metric tons; see Table ES-2 at https://www.epa.gov/system/files/documents/2023-04/US-GHG-Inventory-2023-Chapter-Executive-Summary.pdf.

[37] The EPA climate model is at https://magicc.org/.

[38] See https://www.whitehouse.gov/briefing-room/statements-releases/2023/04/20/fact-sheet-president-biden-to-catalyze-global-climate-action-through-the-major-economies-forum-on-energy-and-climate/#:~:text=President%20Biden%20has%20set%20an,by%20no%20later%20than%202050.

[39] Author computations using MAGICC version 7.0, at https://magicc.org/.

[40] See https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/1999JD900835.

analysis an application of the "social cost of carbon" (SCC) to the asserted reductions in GHG emissions attendant upon implementation of the proposed rule, as estimated on an interim basis by the Biden Administration Interagency Working Group.[41]

The interim IWG estimates are deeply flawed, in that they (1) distort the actual economic growth predictions produced by the integrated assessment models, (2) base predictions of future climate phenomena on climate models that cannot predict the past or the present, (3) incorporate "co-benefits" in the form of a reduction in the emissions of other criteria and hazardous air pollutants already regulated under different provisions of the Clean Air Act, (4) incorporate the asserted benefits of GHG reductions on a global basis, and (5) employ discount rates that are inconsistent and inappropriate.[42]

The available analysis suggests that the prospective economic growth risks of anthropogenic climate change, at least in the aggregate, are much smaller than many assert. Consider the predictions from the integrated assessment models, a central one of which is the Dynamic Integrated Climate and Economy Model, for which William D. Nordhaus won the Nobel Prize in Economics in 2018.[43] Under DICE, global gross domestic product (GDP) in 2100 varies by about 3 percent across policy scenarios, including no climate policies at all, a figure that is both very small and almost certainly not statistically significant given the vagaries of economic forecasting and the number of years remaining before the end of this century. (I exclude here Nordhaus' "Stern discounting" policy scenario, as it assumes a discount rate effectively equal to zero, a fundamental analytic error.[44]) Per capita consumption varies only by about 1.3 percent across policy scenarios, also a very small number and almost certain not to be statistically significant.

The IPCC — even in its most alarmist analyses — arrives at a conclusion very close to that reported in the DICE analysis. In its "1.5 Degree C" report, it finds that the damage from anthropogenic climate change unmitigated by policy initiatives will reduce global GDP by 2.6 percent by 2100.[45] By that year, IPCC projects that individual incomes on average will be at least

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[41] See the proposed rule at Table I.4. The interim estimates are at https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf.

[42] See Benjamin Zycher at https://scholarship.law.tamu.edu/cgi/viewcontent.cgi?article=1154&context=lawreview. The issue of discount rates is addressed in section III.

[43] See William Nordhaus and Paul Sztorc, "DICE 2013R: Introduction and User's Manual," Yale University, Department of Economics, October 2013, Figure 4 and Table 1, http://www.econ.yale.edu/~nordhaus/homepage/homepage/documents/DICE_Manual_100413r1.pdf. See also Benjamin Zycher, "The Climate Left Attacks Nobel Laureate Willian D. Nordhaus," monograph, American Enterprise Institute, July 2020, at https://www.aei.org/wp-content/uploads/2020/07/The-Climate-Left-Attacks-Nobel-Laureate-William-D.-Nordhaus.pdf.

[44] See Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge, UK: Cambridge University Press, January 2007), https://www.cambridge.org/us/academic/subjects/earth-and-environmental-science/climatology-and-climate-change/economics-climate-change-stern-review?format=PB. On the contrast between the climate predictions made by the Stern model and the actual record, see https://rogerpielkejr.substack.com/p/off-target-an-evaluation-of-the-stern?utm_source=substack&publication_id=119454&post_id=104480671&utm_medium=email&utm_content=share&triggerShare=true&isFreemail=true. See also David Kreutzer, "Discounting Climate Costs," Heritage Foundation, June 16, 2016, at https://www.heritage.org/environment/report/discounting-climate-costs.

[45] See Marco Bindi, *et. al.*, "Impacts of 1.5°C of Global Warming on Natural and Human Systems," at https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Chapter3_Low_Res.pdf, Chapter 3 of Valerie

400 percent greater than is the case today.[46]

The interim estimates of the SCC are driven by damage functions predicted by the various climate models — the EPA model in particular — the track records of which are poor.[47] McKitrick and Christy summarize the contrast between their predictions and the actual satellite record as follows:

> The tendency of climate models to overstate warming in the tropical troposphere has long been noted. Here we examine individual runs from 38 newly released Coupled Model Intercomparison Project Version 6 (CMIP6) models and show that the warm bias is now observable globally as well. We compare CMIP6 runs against observational series drawn from satellites, weather balloons, and reanalysis products. We focus on the 1979–2014 interval, the maximum span for which all observational products are available and for which models were run using historically observed forcings. For lower-troposphere and midtroposphere layers both globally and in the tropics, all 38 models overpredict warming in every target observational analog, in most cases significantly so, and the average differences between models and observations are statistically significant. We present evidence that consistency with observed warming would require lower model Equilibrium Climate Sensitivity (ECS) values.[48]

Because no policy to reduce GHG emissions can satisfy any plausible benefit/cost test — their attendant future climate effects for the most part would approach zero — federal agencies often have included purported "co-benefits," that is, the benefits of reductions in other pollutants, as factors to be considered in the evaluation of proposed regulations and projects. This is particularly the case for the asserted health benefits of reductions in the emissions of fine particulates (PM2.5).[49] Like many of the other pollutants included in the co-benefits methodology, fine particulates are a "criteria" pollutant,[50] as distinct from "hazardous air pollutants (HAP)." EPA already limits ambient levels of PM2.5 in a separate regulation, and is required under the CAA to determine every five years whether that standard "accurately reflects the latest scientific knowledge" on the health effects of exposure to particulates.[51]

Masson-Delmotte, *et. al.*, eds., IPCC Special Report, *Global Warming of 1.5°C*, at https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf.

[46] This implies average annual growth in per capita GDP of less than 1.5 percent for the rest of this century.

[47] The specifics of the CMIP5 and CMIP6 models, respectively, can be found at https://pcmdi.llnl.gov/mips/cmip5/ and https://pcmdi.llnl.gov/CMIP6/.

[48] See https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2020EA001281.

[49] The EPA discussion of particulate matter regulatory actions is at https://www.epa.gov/pm-pollution/particulate-matter-pm-implementation-regulatory-actions. For sharp critiques of the EPA analysis of the mortality and morbidity effects of fine particulate matter, see https://www.regulations.gov/document/EPA-HQ-OAR-2015-0072-0260 and https://www.sciencedirect.com/science/article/abs/pii/S0273230017301538. See also https://junkscience.com/2023/06/milloy-sets-off-greens-responds-to-politifact-inquiry-on-wildfire-smoke/#more-108474.

[50] See the EPA summary discussion at https://www.epa.gov/criteria-air-pollutants.

[51] See the EPA requirements for fine particulates at https://www.epa.gov/pm-pollution/implementation-national-ambient-air-quality-standards-naaqs-fine-particulate-matter. The CAA sections are at https://www.epa.gov/clean-air-act-overview/clean-air-act-title-i-air-pollution-prevention-and-control-parts-through-d#ia.

The Clean Air Act explicitly requires the EPA, upon finding that a given criteria pollutant endangers the public health, to promulgate a "national ambient air quality standard" (NAAQS) that "protects the public health" with "an adequate margin of safety."[52] The CAA also empowers the EPA to regulate emissions of HAP. The law mandates that costs not be considered in the establishment of the NAAQS; this means that those standards are likely to be too stringent in a benefit/cost sense. Lowering the emissions of those pollutants even more through insertion of a co-benefits calculation in a new regulation aimed at an entirely different type of emission means that the excess net costs of the regulation are likely to be driven up even more.

OMB Circular A-4 directs federal agencies conducting benefit/cost analysis of regulatory measures as follows: "Your analysis should focus on benefits and costs that accrue to citizens and residents of the United States. Where you choose to evaluate a regulation that is likely to have effects beyond the borders of the United States, these effects should be reported separately."[53] The IWG analysis incorporates explicitly in its benefit/cost calculation the purported global climate benefits from reductions in U.S. GHG emissions, presumably on the grounds that the assumed GHG externality is global in nature.

This argument is fundamentally flawed, in substantial part because the global climate effect of *all* U.S. GHG emissions is very close to zero, as discussed above. Accordingly, the global "benefits" of U.S. GHG emissions reductions would be effectively zero. Neither the IWG nor EPA can dispute this because it is the EPA climate model used directly or indirectly through the IAMs applied to the analysis of the SCC. More generally, it is the EPA climate model that is used throughout the federal government for analysis of climate and energy policies.[54]

Furthermore, the inclusion of purported global benefits in the benefit/cost analysis of U.S. GHG policies would create a very large distortion in terms of an efficient international adoption of climate policies. An efficient promulgation of climate policies internationally would attempt to achieve both an equation of the global marginal benefits and costs of GHG emission reductions, *and* an allocation of emissions reductions that equates the marginal cost of such reductions across economies. If the U.S. is to promulgate domestic policies that equate domestic marginal costs with global marginal benefits, then other countries would have powerful incentives to obtain free rides on U.S. efforts. Given that the marginal cost function for reductions in GHG emissions almost certainly is upward sloping — the marginal cost of GHG reductions rises as such reductions increase — the outcome would be a global effort to reduce GHG emissions more costly than an international effort equating marginal costs across economies.[55] That is the central implication of

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[52] See §7409 (b)(1), "National primary and secondary ambient air quality standards" at https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partA-sec7409.htm.

[53] See OMB Circular A-4, "Regulatory Analysis," September 17, 2003, at https://obamawhitehouse.archives.gov/omb/circulars_a004_a-4/.

[54] See, e.g., Environmental Protection Agency and Department of Transportation, National Highway Traffic Safety Administration proposed rule, "Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles — Phase 2," July 12, 2015, at https://www.regulations.gov/document/EPA-HQ-OAR-2014-0827-0002.

[55] This is true whether the marginal cost functions across economies are identical or differ, although the latter is far more plausible.

the imperative incorporated in the IWG analysis of the SCC: Under any assumption about the global benefits of reduced GHG emissions, that cannot be an efficient outcome unless the U.S. is the low-cost source of *all reductions* in GHG emissions, an assumption that simply is not plausible.

V. The Artificially Low Discount Rate Applied to the Asserted Climate Benefits Is Incorrect Analytically

Even under the DoE benefit/cost analysis using a 7 percent discount rate, DoE applies a 3 percent discount rate to the asserted "climate benefits," on the grounds that "the use of 7 percent is not considered appropriate for intergenerational discounting."[56]

However common that assertion, it is not correct. "Climate policy" by definition is the allocation of resources away from current consumption and from productive activities that yield consumption goods during the current time period, in favor of a reduction in GHG emissions/concentrations that purportedly would increase the production of consumption goods during some series of future time periods. That is why DoE asserts that the proposed rule would yield positive net benefits in present value terms, that is, increase the present value of the aggregate consumption stream. Accordingly, that use of resources during the current time period — again, by definition — is an investment, and it must be evaluated in comparison with the social return to alternative investments.

Therefore, it is the opportunity of cost of capital that is the appropriate discount rate to be applied to the evaluation of the asserted climate benefits of the proposed rule, because the allocation — the investment — of resources to such endeavors imposes an opportunity cost in the form of other forgone investments. Because the use of scarce resources for reductions in GHG emissions is an investment, whether promising returns low or high, the appropriate discount rate is the opportunity cost of capital for the economy as a whole. For the period 1928-2020, the average annual before-tax return to investment in the Standard and Poor 500, in real (inflation-adjusted) terms was 8.5 percent.[57] For the period 1960-2020, the figure was 7.61 percent. Such long-run historical figures are consistent with the directive in OMB Circular A-4 that a discount rate of 7 percent be the baseline parameter applied to regulatory analysis by the federal government.

DoE, citing the Interagency Working Group, asserts that "the consumption rate of interest is the theoretically appropriate discount rate in an intergenerational context."[58] That analytic argument is fundamentally flawed. First: The "consumption rate of interest" is not the correct conceptual discount rate for analysis of the proposed rule because, as just discussed, the use of resources for purposes of reductions in GHG emissions is obviously an investment, the opportunity cost of which is the marginal social return to investment. Even if we assume that the "consumption rate of interest" conceptually is the correct parameter for discounting purposes, the relevant metric is the real market rate of interest on intertemporal consumption shifts, one crude measure of which is the market rate of interest on unsecured consumer loans. Even given the recent years of low interest rates maintained by the Federal Reserve, that market rate appears to be well over 7 percent

[56] See the proposed rule at Table I.4 and p. 32553.
[57] The data on annual returns for several investment alternatives are reported by the Stern School of Management, New York University, at http://www.stern.nyu.edu/~adamodar/pc/datasets/histretSP.xls.
[58] See the proposed rule at p. 32553.

in real terms.[59] For secured loans (new autos), the real interest rate appears to be at least 3 percent.[60] but that is not the correct parameter because there is no collateral insuring against the possibility that government policies mandating reductions in GHG emissions will prove uneconomic. The DoE discount rate argument is fundamentally flawed analytically, and is inconsistent with the data for the U.S. credit market.

Note also that the use of a (low) "consumption rate of interest" for the evaluation of climate benefits only would introduce an important bias in the allocation of resources among government policies and between government and private-sector resource use. DoE does not argue that the "consumption rate of interest" should be applied to the benefit/cost analysis of all government investment and regulatory activity; only climate policies are to be so treated, on the grounds of "intergenerational equity," discussed further below. Nor would the private sector choose to use an artificially-low discount rate for the evaluation of alternative resource uses. If it is only the climate dimension of investment and consumption choice dynamics that is to be shaped by the use of a low "consumption rate of interest," it is obvious that important distortions would be the central outcome, with a smaller capital stock resulting.

Second: The implicit premise in the DoE discussion of intergenerational analysis and the discount rate is straightforward: Future generations prefer to avoid the damages that they ostensibly will bear because of the climate effects of resource allocation decisions made by the current generation, and because future generations cannot vote during the current time period, it is equitable to force the current generation to bear the costs of anthropogenic climate change that otherwise would be inflicted upon future generations.

However seemingly straightforward, that argument is not correct. Future generations prefer to receive a bequest of an aggregate capital stock, defined broadly, more- rather than less valuable, an objective very different from a maximization of the value of one dimension — climate phenomena — of that aggregate capital stock. This requires efficient resource allocation by the current generation, and therefore the application of the correct discount rate. Consider a *homo sapiens* baby borne in a cave some 50,000 years ago. Despite the fact that at birth that child would have enjoyed environmental quality effectively unaffected by mankind, and *a fortiori* climate phenomena determined by natural processes only, the baby at birth would have had a life expectancy of only about ten years.[61]

Accordingly, it is obvious that given the opportunity to choose, that child would opt for less environmental quality and greater climate risk in exchange for a longer life expectancy engendered by a more valuable aggregate capital stock yielding improved shelter, expanded food supplies, a cleaner water supply, better medical care, *ad infinitum*. Greater wealth is the central objective of any generation, a reality shunted aside by the focus in the RIA upon only the climate dimension of the aggregate capital stock to be bequeathed to future generations.

In short: DoE uses the SCC as a substitute for estimation of the actual prospective climate impacts of its proposed rule because the latter cannot be asserted to be greater than zero. But the SCC is fundamentally flawed for the reasons summarized above, and is inconsistent with the

[59] See the data reported by the Federal Reserve Bank of St. Louis at https://fred.stlouisfed.org/series/TERMCBPER24NS.
[60] See https://fred.stlouisfed.org/series/RIFLPBCIANM60NM.
[61] This life expectancy observation was provided by Professor Gail Kennedy, Department of Anthropology, University of California, Los Angeles, during a telephone interview conducted February 16, 2011.

evidence on climate phenomena and with the prospective effectives of climate policies in the EPA climate model.[62]

VI. Conclusions

"Energy savings" are an illegitimate "benefit" of the proposed regulation, in particular because the underlying analysis ignores the performance benefits of dishwashers not meeting the proposed standards. Even apart from that reality, the asserted energy savings are so trivial — less than $2 per dishwasher per year — that virtually any uncertainty attendant upon the DoE calculations, ignored by DoE, would render the "energy savings" indistinguishable from zero. Moreover, the DoE assertion that "the standards proposed in this document would not reduce the utility or performance of the products under consideration in this rulemaking," based upon the observation that "Manufacturers of these products currently offer units that meet or exceed the proposed standards" is deeply unserious, an utter *non sequitur* that has no place in a serious analysis of regulatory policy.

The DoE attempt to justify the proposed rule on the basis of "the need to confront the global climate crisis" is unsupported in the proposed rule. There is no evidence of a climate "threat" or "crisis" as commonly asserted, in terms of temperature trends, polar sea ice, tornadoes, tropical cyclones, wildfires, drought, flooding, or ocean alkalinity. The Intergovernmental Panel on Climate Change is deeply dubious about the various severe effects often asserted as prospective impacts of increasing atmospheric concentrations of GHG. Moreover, NASA reports significant planetary greening as a result of increasing atmospheric concentrations of carbon dioxide, and data from the United Nations Food and Agriculture Organization show that global per capita food production increased 46 percent between 1961 and 2020, and 20 percent for 2000-2020.

The "crisis" narrative is derived wholly from climate models that cannot predict the actual temperature record. In particular, the suite of climate models underlying the IPCC 5th and 6th Assessment Reports overstate the mid-troposphere temperature record by factors of about 2.5. Moreover, the models are fine-tuned in such a way as to deny the importance of natural influences on climate phenomena, but that is inconsistent with a large body of evidence, in particular the substantial warming observed from 1910 to 1945, and the close correlation between the satellite temperature record and the El Niño/Southern Oscillation.

The cumulative emissions reduction of 418,000 metric tons asserted in the proposed rule would be about 16 ten-billionths of a percent of the total envisioned in the Biden net-zero policy, which would yield a reduction in global temperatures of 0.173°C by 2100, a figure that would be barely detectable given the standard deviation (0.11°C) of the surface temperature record. Accordingly, the "climate benefit" of the proposed rule in terms of actual climate phenomena would be zero, literally, and therefore the monetized climate benefits of the proposed rule asserted by DoE are an illusion.

DoE attempts to circumvent this obvious problem by substituting in place of any such analysis an application of the "social cost of carbon" to the asserted reductions in GHG emissions attendant upon implementation of the proposed rule, as estimated on an interim basis by the Biden Administration IWG. The interim IWG estimates are deeply flawed, in that they (1) distort the

[62] See https://www.budget.senate.gov/imo/media/doc/Dr.%20Benjamin%20Zycher%20-%20Testimony%20-%20Senate%20Budget%20Committee.pdf.

actual economic growth predictions produced by the integrated assessment models, (2) base predictions of future climate phenomena on climate models that cannot predict the past or the present, (3) incorporate "co-benefits" in the form of a reduction in the emissions of other criteria and hazardous air pollutants already regulated under different provisions of the Clean Air Act, (4) incorporate the asserted benefits of GHG reductions on a global basis, and (5) employ discount rates that are inconsistent and inappropriate.

The "consumption rate of interest" is not the correct conceptual discount rate for regulatory analysis because the regulatory reallocation of resources in pursuit of increased economic efficiency is an investment, the opportunity cost of which is the marginal social return to investment. The common argument that a low discount rate is needed to further the goal of intergenerational equity is not correct. Future generations prefer to receive a bequest of an aggregate capital stock both natural and manmade more- rather than less valuable, an objective that requires efficient resource allocation by the current generation, and therefore the application of the correct discount rate.

The proposed rule is fatally flawed, and should not be finalized.