Response To The
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

Notice of Data Availability and Request for Comment
Energy Conservation Program:
Energy Conservation Standards for Commercial Refrigerators, Freezers, and Refrigerator-Freezers

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This comment is submitted to the Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, as a response to its notice of data availability (NODA) and request for comment on its proposed rule on Energy Conservation Standards for Commercial Refrigerators, Freezers, and Refrigerator-Freezers.[1] At a general level, the EERE/DoE analysis is fatally flawed analytically, and should not be finalized as a rule. 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 Notice of Data Availability and Request for Comment at https://www.govinfo.gov/content/pkg/FR-2024-08-28/pdf/2024-19072.pdf. The CRE ECS NODA Support Document dated September 17, 2024 — the equivalent of a regulatory impact analysis for a proposed or final rule — is at https://www.regulations.gov/document/EERE-2017-BT-STD-0007-0090.

Summary

Energy "savings" as asserted by DoE in its notional CRE Standards as analyzed in the Notice of Data Availability and Request for Comment are illegitimate as a benefit of any such Standards because they shunt aside the CRE performance benefits attendant upon the higher energy use currently observed. CRE consumers, after all, are not fools. In any event, the energy savings even as estimated by DoE are trivial: about 2 tenths of one percent (0.0023) of the total energy consumed in 2023 by the residential, commercial, and industrial sectors.

The reduction in GHG emissions asserted by DoE as impacts of the Standards would be less than five one-hundredths of 1 percent of U.S. GHG emissions in 2022. The attendant decline in global temperatures would be about eight one-hundred thousandths of a degree C (0.00008°C) by 2100. Because the standard deviation of the surface temperature record is about 0.11°C, that effect would not be detectable.

DoE attempts to circumvent this reality by substituting the social cost of carbon, a fundamentally flawed parameter. It is driven by Representative Concentration Pathway 8.5, an assumed future GHG emissions/concentrations scenario so extreme that it is essentially impossible. RCP8.5 is incorporated into climate models that overstate the actual satellite temperature measurements by a factor of over 2.3. It incorporates the asserted global effects of increasing atmospheric concentrations of GHG, despite the fact that most such effects, whether consistent with the evidence or not, will be borne by individuals not residing with the U.S., and thus essentially unaffected by U.S. policies. It ignores the uninternalized social benefits of rising GHG concentrations. Examples are planetary greening, increased agricultural productivity, increased water use efficiency by plants, and reduced mortality from cold. The calculation of the SC-GHG is driven primarily by the inclusion of "co-benefits" in the form of reductions in criteria and hazardous air pollutants already regulated by EPA, a fundamental exercise in double counting. The SC-GHG employs discount rates artificially low to evaluate the purported future streams of benefits and costs engendered by GHG policies. Finally, the SC-GHG as estimated by the Biden administration mischaracterizes the GDP effects of rising GHG concentrations as projected in the central integrated assessment models.

The proposed CRE Standards are fatally flawed, and should not be finalized.

I. The Energy "Savings" Claimed Are Illegitimate as an Asserted Benefit of the Standards

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 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 equipment as refrigeration units. 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 refrigeration performance in the context of the Standards must be included in the analysis. DoE fails to ask why market forces do not yield the equipment mix asserted to be more "efficient" in the Standards; are consumers of refrigeration units/services stupid? The answer in the DoE analysis must be driven by the asserted climate externality, discussed in sections III and IV.

In order to see this clearly, suppose that DoE were to proposed a standard of zero energy use for refrigeration services, returning the economy to daily (or hourly) ice deliveries. In the DoE methodology, energy savings would be significant, but there would be no reduction in the quality of refrigeration services; net benefits would be large. Does DoE actually believe something so nonsensical? Amazingly, this implicitly is the analytic framework underlying this part of the estimated benefits asserted in the analyzed Standards. It is not to be taken seriously.

II. The Energy "Savings" Claimed as a Benefit of the Standards Are Trivial

DoE asserts that the cumulative full fuel cycle energy savings attendant upon the proposal for all commercial refrigerators, freezers, and refrigerator-freezers ("CRE") for the 2028-2057 period, over all equipment classes and efficiency levels would be about 4.6 quadrillion btu, or about 0.154 quadrillion btu annually.[3] EIA reports total energy consumption by the residential, commercial, and industrial sectors of 65.6 quadrillion btu for 2023.[4] Accordingly, the notional conservation standard presented in the published analysis would save about 2 tenths of one percent (0.0023) of the energy consumed in 2023 by the residential, commercial, and industrial sectors, and roughly half that if we include energy use by the transportation and electric power sectors.

III. The Asserted Reductions in Greenhouse Gas Emissions Attendant Upon the Standards Would Yield Future Climate Effects Indistinguishable From Zero

Accordingly, DoE relies upon a monetization of the asserted benefits attendant upon the reduction of GHG emissions caused by the CRE Standards. The total for thirty years of CRE shipments for carbon dioxide is a bit less than 75 million metric tons, or about 2.5 million metric tons per year.[5] Let us assume a total of 3 million metric tons (in CO2e) per year so as to account

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[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 Table III.76 in the DoE analysis.,

[4] See https://www.eia.gov/totalenergy/data/monthly/pdf/sec2_4.pdf. For the EIA data on energy consumption by the transportation, total end-use, and electric power sectors, see https://www.eia.gov/totalenergy/data/monthly/pdf/sec2_5.pdf.

[5] See Table 6.1 in the CRE ECS NODA Support Document dated September 17, 2024, at https://www.regulations.gov/document/EERE-2017-BT-STD-0007-0090.

for the effects of reduced emissions of other GHG.

U.S. GHG emissions in 2022 were about 6,343 million metric tons in CO2e.[6] Accordingly, the reduction in GHG emissions attendant upon the CRE Standards would be less than five one-hundredths of 1 percent. If we apply the EPA climate model to that notional reduction, under assumptions that exaggerate the effects of reductions in GHG emissions, that reduction, if achieved by 2050, would yield a decline in global temperatures of about eight one-hundred thousandths of a degree C (0.00008°C).[7] The standard deviation of the surface temperature record is about 0.11°C.[8]

IV. The Social Cost of Carbon Parameter Is Fundamentally Flawed

DoE attempts to circumvent this obvious problem by ignoring the actual prospective climate impacts of the CRE Standards, substituting instead calculations of the marginal economic damage caused by GHG emissions, that is, the "social cost of carbon," a wholly fictitious calculation designed explicitly to "justify" on benefit/cost grounds "climate" regulations and other public policies that otherwise could not satisfy any plausible benefit/cost test.[9] DoE simply multiplies the asserted GHG emissions from the CRE source of interest by the asserted SC-GHG, and thus derives "climate damages" figures wholly divorced from any analysis of actual climate phenomena.

The SC-GHG is fictitious for several reasons. *First*, it is driven by Representative Concentration Pathway 8.5, an assumed future GHG emissions/concentrations scenario so extreme that it is essentially impossible.[10] For the period ending in the year 2100, atmospheric concentrations of GHG under RCP8.5 increase at an annual average of 11.9 ppm.[11]
Pielke Jr. shows that in the 2023 Biden administration revision of the SC-GHG, the use of RCP8.5 is the central source of the large damage functions, in particular when combined with low discount rates.[12]

Second, RCP8.5 is incorporated into climate models that overstate the actual satellite temperature measurements by a factor of over 2.3. Christy has produced analytic comparisons of the model predictions of temperature changes in the mid-troposphere with the actual measurements

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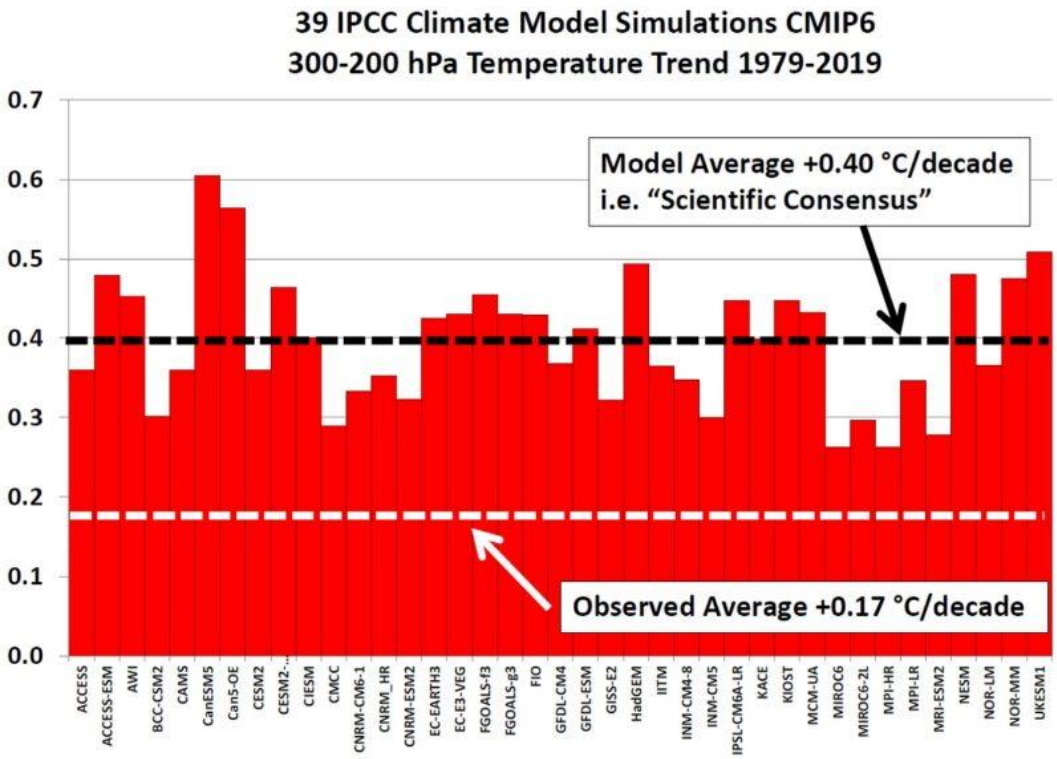
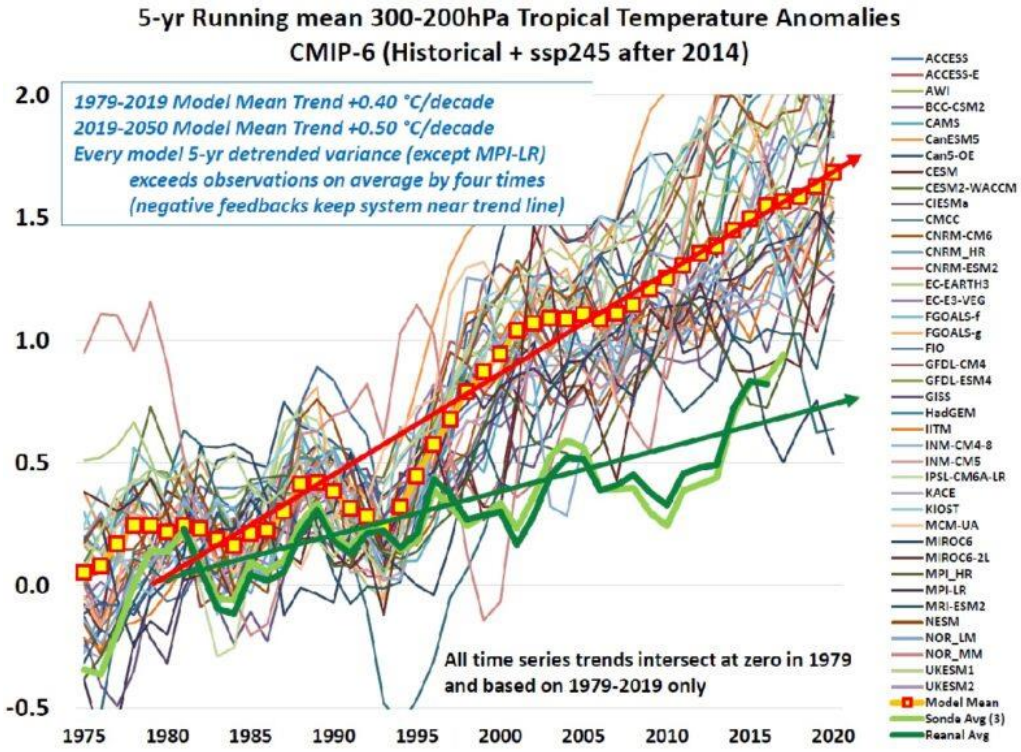
[6] See the EPA analysis at https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks.
[7] The EPA climate model is at https://magicc.org/. The two most important assumptions are an equilibrium sensitivity of the climate system of 4.5°C, and a baseline GHG concentration path defined as RCP6.
[8] See https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/1999JD900835.
[9] For a detailed discussion of the analytic weaknesses of the SCC, see Benjamin Zycher at https://www.aei.org/wp-content/uploads/2021/06/Zycher-OMB-comment-June-2021.pdf and at https://scholarship.law.tamu.edu/cgi/viewcontent.cgi?article=1154&context=lawreview. The Biden administration across all agencies has used the SCC to justify a broad array of climate regulations and policies that otherwise cannot satisfy any plausible benefit/cost test. For an example, see Benjamin Zycher at https://www.aei.org/wp-content/uploads/2023/10/Zycher-comment-NHTSA-CAFE-Cars-Light-Trucks-MY-2027-2032-Etc-RIN-2127-AM55-Oct-2023.pdf.
[10] See e.g., Kevin Murphy, "Reassessing the RCPs," *Climate Etc.*, January 28, 2019, at https://judithcurry.com/2019/01/28/reassessing-the-rcps/, and Judith Curry, "Is RCP8.5 An Impossible Scenario?", *Climate Etc.*, November 24, 2018, at https://judithcurry.com/2018/11/24/is-rcp8-5-an-impossible-scenario/.
[11] For the period 2000-2023, the annual average increase was 2.238 ppm. See the NOAA data at https://gml.noaa.gov/ccgg/trends/gl_data.html.
[12] The 2023 revision is at https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf. See Roger Pielke Jr. at https://rogerpielkejr.substack.com/p/secret-sauce.

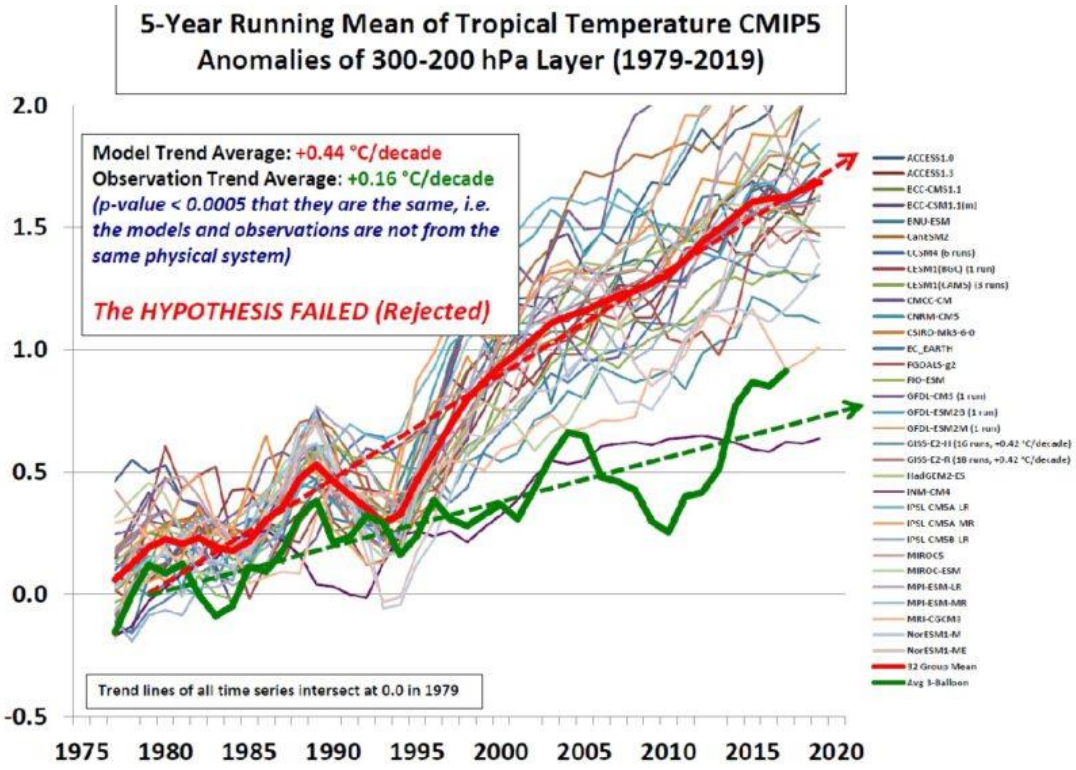
from satellites and weather balloons.[13] For the AR6, the difference between the model predictions and the measurements is illustrated in the following chart.[14]



The performance of the CMIP-6 models in contrast with the data is illustrated in the following chart as well.[15] The upshot is that the models on average overstate the observations by a factor of over 2.3. Moreover, the CMIP-6 models on average essentially are no better than the earlier CMIP-5 models, the average of which predicted mid-troposphere temperature increases of 0.44°C per decade, while the actual measurements were 0.16°C per decade.[16]

[13] A good summary discussion is at https://clintel.org/new-presentation-by-john-christy-models-for-ar6-still-fail-to-reproduce-trends-in-tropical-troposphere/?mc_cid=1f85683f49&mc_eid=5965e22311.
[14] For the AR6, the suite of models is the Coupled Model Intercomparison Project Phase 6, at https://pcmdi.llnl.gov/CMIP6/. For the AR5, CMIP-5 is at https://esgf-node.llnl.gov/projects/cmip5/.
[15] See fn. 14 *supra*.
[16] *Ibid.*


5-yr Running mean 300-200hPa Tropical Temperature Anomalies
CMIP-6 (Historical + ssp245 after 2014)
1979-2019 Model Mean Trend +0.40 °C/decade
2019-2050 Model Mean Trend +0.50 °C/decade
Every model 5-yr detrended variance (except MPI-LR)
exceeds observations on average by four times
(negative feedbacks keep system near trend line)
All time series trends intersect at zero in 1979
and based on 1979-2019 only
2.0
1.5
1.0
0.5
0.0
-0.5
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
ACCESS
ACCESS-E
AWI
BCC-CSM2
CAMS
CanESM5
Can5-OE
CESM
CESM2-WACCM
CIESMa
CMCC
CNRM-CM6
CNRM_HR
CNRM-ESM2
EC-EARTH3
EC-E3-VEG
FGOALS-f
FGOALS-g
FIO
GFDL-CM4
GFDL-ESM4
GISS
HadGEM
IITM
INM-CM4-8
INM-CM5
IPSL-CM6A-LR
KACE
KIOST
MCM-UA
MIROC6
MIROC6-2L
MPI_HR
MPI-LR
MRI-ESM2
NESM
NOR_LM
NOR_MM
UKESM1
UKESM2
Model Mean
Sonde Avg (3)
Reanal Avg



The question of why the models on average have not improved in any material sense is outside the scope of this comment.

Third, it incorporates the asserted global effects of increasing atmospheric concentrations of GHG, despite the fact that most such effects, whether consistent with the evidence or not, will be borne by individuals not residing with the U.S., and thus essentially unaffected by U.S. policies.[17] The inclusion of the purported global damages caused by GHG emissions rather than only the domestic ones, usually justified on the grounds that the purported GHG externality is global and that the adverse effects overseas of U.S. emissions will inflict costs upon the U.S. economy, is incorrect. This is in substantial part because the climate effects of U.S. GHG emissions are either very small or effectively zero. Moreover, the inclusion of global damages in the analysis of U.S. policies would create a very large distortion in terms of the efficient international adoption of climate policies. To the extent that GHG emissions create negative externalities, efficient global emissions policies would equate the marginal costs of emissions reductions across economies.

Fourth, it ignores the uninternalized social benefits of rising GHG concentrations. Examples are planetary greening, increased agricultural productivity, increased water use efficiency by plants, and reduced mortality from cold.[18] Global food availability and production

[17] Using the methodology described above, the entire Biden administration "net-zero" policy, if implemented immediately, would reduce global temperatures in the year 2100 by 0.173°C.

[18] On the carbon dioxide "greening" effect see NOAA at https://www.nasa.gov/feature/goddard/2016/carbon-dioxide-fertilization-greening-earth; and Zaichun Zhu, *et. al*., "Greening of the Earth and Its Drivers," *Nature Climate Change*, Vol. 6 (2016), pp. 791-795, at https://www.nature.com/articles/nclimate3004. On the agricultural productivity effects, see, e.g., Goudriaan and Unsworth at https://acsess.onlinelibrary.wiley.com/doi/abs/10.2134/asaspecpub53.c8; and, e.g., Jan F. Degener, "Atmospheric

have increased more or less monotonically over the past two decades on a per capita basis.[19]

Fifth, the federal government calculation of the SC-GHG is driven primarily by the inclusion of "co-benefits" in the form of reductions in criteria and hazardous air pollutants already regulated by EPA. Because no policy to reduce GHG emissions can satisfy any plausible benefit/cost test — as discussed above, their attendant future climate effects for the most part would approach zero — the SC-GHG estimates include purported "co-benefits" so as to generate significant "benefits" from GHG policies. This is particularly the case for the asserted health benefits of reductions in the emissions of fine particulates (PM2.5).[20] Like many of the other pollutants included in the co-benefits methodology, fine particulates are a criteria pollutant,[21] as distinct from HAPs. 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.[22]

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."[23] The CAA also empowers the EPA to regulate emissions of HAPs. 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.

Sixth, the SC-GHG employs discount rates artificially low to evaluate the purported future streams of benefits and costs engendered by GHG policies. The usual rationale is that future generations prefer to avoid the damages that they will bear because of the climate effects of resource allocation decisions made by the current generation, and because future generations

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CO_2 Fertilization Effects on Biomass Yields of 10 Crops in Northern Germany," *Frontiers in Environmental Science*, July 21, 2015, at https://www.frontiersin.org/articles/10.3389/fenvs.2015.00048/full. On water use efficiency by plants, see, e.g., http://www.co2science.org/subject/w/summaries/wateruse.php. On the beneficial impacts of moderate warming on mortality, see https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(14)62114-0/fulltext.

[19] See Food and Agriculture Organization of the United Nations, *World Food and Agriculture Statistical Pocketbook 2018*, 2018, Charts 28 and 46, http://www.fao.org/3/CA1796EN/ca1796en.pdf. See also Kevin D. Dayaratna, Ross McKitrick, and Patrick J. Michaels, "Climate Sensitivity, Agricultural Productivity and the Social Cost of Carbon in FUND," *Environmental Economics and Policy Studies* 22 (2020): 433–48.

[20] The EPA discussion of particulate matter regulatory actions is at https://www.epa.gov/pm-pollution/particulate-matter-pm-implementation-regulatory-actions. A severe critique of the EPA analysis of PM2.5 by the EPA Clean Air Scientific Advisory Committee in 2019 can be found at https://casac.epa.gov/ords/sab/f?p=113:12:3395659987569. A concise critique by James E. Enstrom is at http://scientificintegrityinstitute.org/PMPanel121021.pdf.

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

[22] 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.

[23] 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.

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 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. Greater wealth is the central objective of any generation, a reality shunted aside by the explicit focus in the SC-GHG upon only the climate dimension of the aggregate capital stock to be bequeathed to future generations.

By definition "climate policy" 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 purportedly increasing the production of consumption goods during some series of future time periods, such that the present value of the consumption stream is (by assertion) increased. *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 SC-GHG and climate policies, because the allocation —the investment — of resources to such endeavors imposes an opportunity cost in the form of other forgone investments. 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.[24] 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 (since replaced by the Biden administration) that a discount rate of 7 percent be the baseline parameter applied to regulatory analysis by the federal government.[25]

Seventh, the SC-GHG as estimated by the Biden administration mischaracterizes the GDP effects of rising GHG concentrations as projected in the central integrated assessment models. The available analysis suggests that the prospective financial risks of anthropogenic climate change, at least in the aggregate, are much smaller than commonly asserted. Consider the predictions from the integrated assessment models, one central example of which is the Dynamic Integrated Climate and Economy Model, for which William D. Nordhaus won the Nobel Prize in Economics in 2018.[26] 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, the

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[24] 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.

[25] See, respectively, https://obamawhitehouse.archives.gov/omb/circulars_a004_a-4/ and https://www.whitehouse.gov/wp-content/uploads/2023/11/CircularA-4.pdf.

[26] 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.

magnitude of annual changes in global economic growth, 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, as discussed above.[27]) 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°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.[28] In other words, if we assume, conservatively, global GDP growth of, say, 2 percent per year, climate change unmitigated by policy initiatives would shift the global GDP growth path backward by about 15.6 months, an approximate reduction magnitude observed commonly during economic recessions.[29] By 2100, IPCC projects that individual incomes on average will be at least 400 percent greater than is the case today, so that climate change unmitigated by policy initiatives would make individuals in 2100 "only" 398 percent wealthier than individuals today.[30]

V. Conclusions

Energy "savings" as asserted by DoE in its CRE Standards are illegitimate as a regulatory benefit, in that they ignore the refrigeration performance benefits attendant upon the greater energy use currently observed. The CRE standards as analyzed in the DoE NODA would yield energy savings trivial at most and climate effects indistinguishable from zero. The substitution of the SC-GHG in place of actual climate analysis is illegitimate because of the numerous fatal flaws of the SCC analytic framework. The CRE standards as analyzed by DoE in the NODA are fatally flawed, and should not be finalized.

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[27] 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.

[28] 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 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.

[29] See the IMF discussion at https://www.imf.org/en/Publications/fandd/issues/Series/Back-to-Basics/Recession#:~:text=In%20particular%2C%20a%20recession%20is,is%20close%20to%205%20percent.&text=The%20fall%20in%20consumption%20is,declines%20than%20that%20in%20GDP.

[30] The 400 percent figure implies average annual growth in per capita GDP of about 1.5 percent for the rest of this century. [15.6/12]*1.5=1.95. 400-1.95=398.05.