Comment to the Securities and Exchange Commission On "The Enhancement and Standardization of Climate-Related Disclosures for Investors" Proposed Rule

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This comment is submitted to the Securities and Exchange Commission on the proposed rule for "The Enhancement and Standardization of Climate-Related Disclosures for Investors."[1] It is organized as follows:

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[1] The proposed rule has been published in the Federal Register at https://www.govinfo.gov/content/pkg/FR-2022-04-11/pdf/2022-06342.pdf.

Summary

Firm-specific greenhouse gas emissions, even if defined broadly, are not material information for investors because such firm-specific emissions would yield climate impacts effectively equal to zero. Accordingly, firm-specific emissions cannot affect the prospective returns to investment in that firm. Only under an assumption of government policies penalizing GHG emissions can such information be material, and such policies for the most part have not proven politically viable.

The estimation of climate "risks" by public companies would be futile, politicized, distorted by an imperative to avoid regulatory and litigation threats, and largely arbitrary. Global GHG emissions can be material, but the model-driven estimation of global risks has proven difficult in the extreme, subject to profound disagreement in the peer-reviewed literature. That reality is demonstrated by the fact that the mainstream climate models have overestimated the actual temperature record by a factor of over two.

The obvious effect of the proposed rule would be creation of powerful incentives for public companies to undertake climate analysis driven not by the actual evidence and the peer-reviewed literature on climate phenomena. Instead, they will be driven to undertake such analysis, whether in response to regulatory directives or to political pressures, under assumptions and methodologies insulating them from adverse regulatory actions and litigation threats. This incentive structure would yield politicized analysis biased heavily toward published estimation of climate "risks" greater rather than smaller on the part of public companies, with no material benefits for investors. This would provide regulators and other public officials a rationale for constraining capital access for disfavored firms and sectors, resulting in a misallocation of capital and a reduction in aggregate economic performance, with no measurable climate benefits. The proposed rule cannot satisfy any plausible benefit/cost test, and should be discarded.

The SEC recognizes the litigation threat explicitly but fails to note that the litigation problem is created by virtually any "risk" analysis. Should, say, a severe storm follow a company's conclusion that climate risks are unimportant in its specific context, the plaintiff attorneys will not be far behind, even though attribution of a given weather event to GHG emissions generally, and *a fortiori* to emissions attributable to a given firm, is deeply problematic. Should a firm calculate its GHG emissions as high relative to other companies or sectors, it will expose itself to purported causes of action as a "cause" of the asserted costs of the anthropogenic climate change "crisis." This proposed rule guarantees adverse litigation for public companies under almost any set of assumptions, a cost not estimated by the SEC.

No public company and few, if any, government administrative agencies are in a position to evaluate climate phenomena, whether ongoing or prospective, with respect to which the scientific uncertainties are vastly greater than commonly asserted. The range of alternative assumptions about central parameters is too great to yield clear implications for the climate "risks" facing specific public companies, economic sectors, and geographic regions. Those central parameters include the choices among climate models, the assumed sensitivity of the climate system to increases in the atmospheric concentration of greenhouse gases (GHG), ensuing conclusions about the relative contributions of natural and anthropogenic influences upon climate

phenomena, the assumed future increase in atmospheric GHG concentrations through, say, 2100, and the analytic assumptions underlying calculations of the effects of aerosol emissions on cloud formation, about which surprisingly little is known. That short list is far from exhaustive.

The SEC attempts to circumvent this obvious reality by asserting that "… that the science of climate modelling has progressed in recent years and enabled the development of various software tools and … climate consulting firms are available to assist registrants in making this determination." Apart from the SEC recognition that the proposed rule will create (or expand) an industry of consultants, the assertion that "the science of climate modelling has progressed in recent years and enabled the development of various software tools" is deeply disingenuous. The mainstream climate models have a poor track record in terms of predicting the actual temperature trend of recent decades, having consistently overstated that trend by a factor of over two.

Application of the Environmental Protection Agency climate model suggests strongly that climate policies, whether implemented by the U.S. government alone or as an international cooperative policy, would have temperature effects by 2100 that would be virtually undetectable or very small. Such policies cannot satisfy any plausible benefit/cost test.

That observation is strengthened by the analysis presented in the proposed rule. The SEC estimate of the attendant change in external costs per fiscal year is an increase from $3.86 billion to $10.24 billion, an increase of 165 percent. "Internal" burden hours are projected to rise from 18.8 million hours to 43.5 million hours, or about 131 percent. These costs are almost certainly biased downward, in that the proposed rule would create powerful incentives to retain consultants and other outside experts to conduct the requisite measurements, again as the proposed rule recognizes explicitly.

If public companies are driven to use the same (or similar) sets of assumptions about central parameters, a very real danger would arise of more-or-less homogeneous predictions inconsistent with historical, ongoing, and prospective climate phenomena. If public companies opt to use sets of assumptions that differ in important dimensions, the ensuing predictions about future climate phenomena ("risks") would vary substantially, yielding very large uncertainties in terms of the information made available to investors. But — again — firm-specific greenhouse gas emissions, even if defined broadly, are not material information for investors because such firm-specific emissions would yield climate impacts effectively equal to zero.

It is reasonable to hypothesize also that the aggregate benefits (that is, positive "risks") of increasing GHG concentrations, as reported by the National Oceanic and Atmospheric Administration and in the peer-reviewed literature, will be excluded from such analytic efforts. It is reasonable to hypothesize further that such analyses will exclude the risks of climate policies, prominent among which are the large and adverse implications of artificial increases in energy costs. Such policy risks are likely to be greater when implemented by bureaucracies insulated from democratic accountability.

Anthropogenic climate change is "real" in that increasing atmospheric concentrations of GHG have yielded effects that are detectable. But they are much smaller than commonly asserted; and there is no evidence in support of the ubiquitous assertions of a climate "crisis," whether

ongoing or looming, and no evidence in support of the even more extreme "existential threat" argument. Moreover, the available analysis suggests that the financial risks of anthropogenic climate change in the aggregate are much smaller than many assert: Both the central integrated assessment model and the IPCC in its most alarmist analyses calculate that anthropogenic climate change unmitigated by policy initiatives would reduce global per capita incomes by less than 1.5 percent by the end of this century, a figure almost certainly not statistically significant, and in any event at a time when the world is certain to be vastly wealthier than currently.

Because the perceived "climate "risks" confronting public companies are dependent upon crucial choices among alternative assumptions, the evaluation of such "risks" would be largely arbitrary given that the "correct" assumptions are very far from obvious. This means that a requirement, whether formal or informal, that climate "risks" be reported to investors would weaken the materiality standard for disclosures by those institutions, even apart from the larger non-materiality reality noted above.

"Materiality" always has meant the disclosure of information directly relevant to the ongoing or prospective financial performance of the given public company. When "risk" analysis becomes an arbitrary function of choices among assumptions complex, opaque, and far from obvious, the traditional materiality standard inexorably will be diluted and rendered far less useful for the investment and capital markets, an outcome diametrically at odds with the ostensible objectives of those advocating the evaluation of climate "risks." Moreover, the "risks" of anthropogenic climate change are far from the only such mass-geography "risks." A bias toward focusing only on climate "risks" would distort the allocation of capital.

For all of these reasons, the analysis of the materiality issue published recently by Commissioner Allison Herren Lee is deeply problematic. Her argument simply shunts aside the massive analytic problems inherent in the analysis of climate "risks," instead emphasizing a general stance that in the pursuit of capital investments, companies driven by market forces will not disclose even material risks fully as a matter of competitive market outcomes in the absence of regulatory mandates. Commissioner Lee ignores the powerful long-term incentives of public companies — always interested in reducing the cost of obtaining capital from investors and lenders — to preserve their credibility by offering full and truthful information to the capital market. It is perhaps unsurprising that a regulator views market incentives as insufficient to engender an efficient outcome in terms of resource allocation, and that a regulatory strengthening of such incentives automatically would yield an allocational improvement. That stance is very far from obviously correct.

The combination of very great climate uncertainties and the litigation threat will create a demand from the business sector for detailed regulations on how to structure the analysis of climate risks. Because the uncertainties attendant upon the future effects of increasing atmospheric concentrations of GHG are so great, a top-down regulatory approach for the evaluation of any attendant "risks" is itself very risky. A wiser approach would entail allowing market forces to make such "risk" determinations in a bottom-up fashion, thus avoiding an obvious politicization of the allocation of capital.

The proposed rule would distort the allocation of capital away from economic sectors disfavored by certain political interest groups pursuing ideological agendas. This would represent the return of Operation Choke Point, an illegal past attempt to politicize access to capital, one deeply corrosive of our legal and constitutional institutions.

Protection of those institutions is consistent only with formal policymaking by the Congress through enactment of legislation, rather than with powerful pressures, whether formal or informal, exerted by the SEC or other regulatory agencies. This institutional protection would preserve the traditional roles of the private sector and of the government, respectively, as part of the larger permanent objectives of maximizing the productivity of resource use under free market competition, and of preserving the political accountability of the policymaking process under the institutions of democratic decisionmaking as constrained by the constitution.

I. Climate Uncertainties and Choices Among Crucial Assumptions

Notwithstanding ubiquitous assertions that climate science is "settled," that a crisis is upon us or looming large, and that government policies must address the "existential threat" posed by anthropogenic climate change, in reality the uncertainties attendant upon the prospective effects of increasing atmospheric concentrations of greenhouse gases (GHG) are very substantial.[2] Moreover, no evidence supports the "crisis" narrative, as discussed below. These realities are illustrated by the ranges of various estimates published by the Intergovernmental Panel on Climate Change (IPCC) in its most recent Assessment Reports, by the wide range of temperature paths projected by the mainstream climate models, and by the scientific literature more generally.[3]

The evaluation of climate "risks" afflicting retirement programs would require choices among the available climate models — as noted above, the "safe" choice for plan managers would be the EPA model — choices among alternative assumptions about the path of future atmospheric concentrations of GHG, choices among assumptions about the effect of increasing GHG concentrations upon the climate system, that is, the "sensitivity" of the climate system and thus the relative importance of natural and anthropogenic influences upon climate phenomena, and deeply problematic assumptions about such feedback effects as cloud formation and precipitation dynamics, which are understood only poorly.[4] That list is very far from exhaustive.

The mainstream climate models have found it very difficult to predict the historical and current climate record even in terms of global averages; as an example, the models have been

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[2] See, e.g., Benjamin Zycher at https://www.nationalaffairs.com/publications/detail/the-case-for-climate-change-realism.

[3] See, e.g., Box SPM.1 on alternative paths for future temperature changes in the IPCC Sixth Assessment Report, at https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf; and Figure 2.5 in the IPCC Fifth Assessment Report (2013), at https://www.ipcc.ch/report/ar5/syr/synthesis-report/. On the wide range of temperature projections yielded by the mainstream climate models, see Figure 2 in the testimony of John R. Christy before the U.S. House Committee on Science, Space, and Technology, March 29, 2017, at https://science.house.gov/imo/media/doc/Christy%20Testimony_1.pdf?1. On the general state of scientific uncertainty in the context of climate phenomena, see e.g., Judith Curry, "Uncertainty About the Climate Uncertainty Monster," *Climate Etc.*, May 19, 2017, at https://judithcurry.com/2017/05/19/uncertainty-about-the-climate-uncertainty-monster/.

[4] See, e.g., Judith Curry, "The Cloud-Climate Conundrum," *Climate Etc.*, June 2, 2016, at https://judithcurry.com/2016/06/02/the-cloud-climate-conundrum/.

unable to explain the warming observed from 1910-1945.[5] That period of warming cannot have been the result of increased atmospheric concentrations of GHG, in that such concentrations had increased only from about 278 ppm in 1750 to about 300 ppm by 1910, and 310 ppm by 1945.[6]

Another example: Every climate model predicts that increasing atmospheric concentrations of GHG should result in an enhanced heating effect in the mid- and upper troposphere over the tropics. The satellite, weather balloon (radiosonde), and reanalysis data for the most part do not show that effect; some analyses find it, but at a level orders of magnitude smaller than predicted by the models.[7] In the latest iteration (CMIP-6) of the suite of climate models, applied in the 6th Assessment Report, the average predicted tropospheric temperature increase for 1979-2019 is 0.40 degrees C per decade. (The CMIP-5 suite of models on average predicted 0.44 degrees C per decade for 1979-2019; accordingly, there has been little improvement in the average performance of the models over the past eight or so years despite substantial expenditures on such research.) The actual record as measured by the satellites: 0.16 degrees C per decade.[8] The climate models on average have overstated the temperature record by a factor of more than two.

Consider only the effect of varying assumptions about the future path of atmospheric GHG concentrations. IPCC in the 5th (2013) Assessment Report used four such alternative paths: Representative Concentrations Pathways 2.6, 4.5, 6, and 8.5.[9] The 6th Assessment Report replaces the RCPs with "Shared Socio-Economic Pathways (SSPs) that for benefit/cost analytic purposes do not differ in any material dimension from the RCPs; instead IPCC claims that the SSPs "look at a far greater range of options/scenarios" with "a greater focus on lower degrees of warming … like 1.5°C and 2°C."[10] The IPCC characterization of warming of 1.5°C and 2°C as "lower" is laughable, in that the satellite temperature record for the middle troposphere for 1979-2021 shows a warming trend of about 0.16°C per decade, or 1.6°C per century.[11] The following table illustrates the range of temperature effects ("anomalies") by 2100 under the four RCPs.

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[5] See the HadCRUT5 reconstructions of temperature anomalies at https://crudata.uea.ac.uk/cru/data/temperature/. Interestingly enough, the Russian climate models from the Institute for Numerical Mathematics (models INM-CM4 and INM-CM4.8) do the best job of predicting the past and the present. See http://www.glisaclimate.org/node/2220 and https://www.researchgate.net/publication/329748540_Simulation_of_the_modern_climate_using_the_INM-CM48_climate_model.

[6] See the NOAA reconstruction of carbon dioxide emissions and concentrations for 1750-2019 at https://www.climate.gov/sites/default/files/CO2_emissions_vs_concentrations_1751-2019_lrg.gif.

[7] The tropics for the most part are water, and emissions of additional GHG would warm the earth slightly, resulting in an increase in ocean evaporation. In the climate models, as the water vapor rises into the mid troposphere, it condenses, releasing heat. This seems straightforward, but efforts to demonstrate this phenomenon with satellite measurements have proven very difficult. See Ross McKitrick and John R. Christy, "Pervasive Warming Bias in CMIP6 Tropospheric Layers," *Earth and Space Science*, Vol. 7, Issue 9 (September 2020), at https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2020EA001281; and Ross McKitrick, "New Confirmation That Climate Models Overstate Atmospheric Warming," *Climate Etc.*, August 25, 2020, at https://judithcurry.com/2020/08/25/new-confirmation-that-climate-models-overstate-atmospheric-warming/.

[8] See the Coupled Model Intercomparison Project, Phase 6, at https://pcmdi.llnl.gov/CMIP6/. See also, e.g., the recent presentation by Professor John R. Christy at https://www.youtube.com/watch?v=D2Cd4MLUoN0.

[9] The figures (2.6, etc.) are not temperature effects; they are theoretical calculations of "radiative forcings" in watts per square meter. For an introduction, see G.P. Wayne, "The Beginner's Guide to Representative Concentration Pathways," *Skeptical Science*, August 2013, at https://skepticalscience.com/docs/RCP_Guide.pdf.

[10] See https://www.ipcc.ch/site/assets/uploads/2021/06/Fact_sheet_AR6.pdf.

[11] See https://www.drroyspencer.com/latest-global-temperatures/ and the links shown for the respective atmospheric layers. See also CMIP-5 at https://pcmdi.llnl.gov/mips/cmip5/; and CMIP-6 at https://pcmdi.llnl.gov/CMIP6/.

Central Parameters of IPCC AR5 RCP Scenarios

Year 2100	-------Representative Concentration Pathway------ 2.6	4.5	6	8.5
GHG concentration (ppm)	490	650	850	1370
Average increase 2018-2100 (ppm)	1.1	3.0	5.5	11.9
Temperature anomaly 2100 (°C)	1.5	2.4	3.0	4.9

Source: G.P. Wayne, "The Beginner's Guide to Representative Concentration Pathways," *Skeptical Science*, August 2013.
Note: RCP 2.6 (sometimes denoted RCP3PD) predicts radiative forcing of 3 Wm^2 before 2100, declining to 2.6 Wm^2 by 2100. "PD" stands for "peak and decline."

Neither the SEC nor other government agencies nor the managers of public companies are in a position to evaluate the strengths and weaknesses of alternative RCP assumptions, or of the other crucial parameters underlying climate projections — "risks" — in the context of GHG emissions.[12] The IPCC in the 2013 Assessment Report provides a range of estimates for the "likely" equilibrium sensitivity of the climate system of 1.5 degrees to 4.5 degrees, with a mean of 3 degrees.[13] Many of the more extreme or "alarmist" assertions of the effects of anthropogenic climate change assume RCP8.5 and a climate sensitivity of 4.5 degrees (or even higher). The numerous estimates reported in the peer-reviewed literature do not support that assumption, instead supporting an assumption of 2 degrees or even less; the range estimated from the actual data is 1.5 to 2.3 degrees C.[14] IPCC in the AR6 changed the "likely" ECS range to 2.5-4 degrees, with a median of 3.25 degrees, higher than in the AR5, despite the findings in the recent peer-reviewed literature.[15]

[12] Note that RCP8.5 is a popular assumption among those advocating strong climate policies, but it is a scenario essentially impossible. Under RCP8.5, atmospheric concentrations of GHG rise at almost 12 parts per million (ppm) through 2100 as an annual average; the average for 1985-2019 was about 1.9 ppm, and the single largest increase was about 3 ppm in 2016. See the data reported by NOAA at https://www.esrl.noaa.gov/gmd/ccgg/trends/global.html. See 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/.

[13] The equilibrium sensitivity of the climate system is the temperature increase that would result from a doubling of atmospheric concentrations of GHG, after the climate system were to adjust fully.

[14] See Patrick J. Michaels and Paul C. Knappenberger, *Lukewarming: The New Climate Science That Changes Everything*, Washington D.C.: Cato Institute, 2016; and the recent presentation by Professor John R. Christy at https://www.youtube.com/watch?v=D2Cd4MLUoN0.

[15] See p. 93 at https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_TS.pdf. The equilibrium sensitivity of the climate system is the temperature increase that would result from a doubling of atmospheric concentrations of GHG, after the climate system were to "finalize" all attendant adjustments. See also https://judithcurry.com/2021/10/06/ipcc-ar6-breaking-the-hegemony-of-global-climate-models/#:~:text=With%20regards%20to%20equilibrium%20climate,range%20to%202.5%2D4.0%20C.

Again with respect to the enormous complexities inherent in the analysis of climate phenomena and "risks": Neither the SCE nor other government agencies nor the managers of public companies are in a position to evaluate them in ways that would yield useful information for investors. Even government agencies and international bodies wholly dedicated to such analyses find the task daunting, yielding formidable scientific complexities and controversies. Instead, the company managers will be driven to adopt assumptions — actually, to retain consultants who will do so — minimizing the degree to which their analyses might subject them to political attacks, adverse regulatory actions, and litigation.[16] This is very different from an objective effort to evaluate climate phenomena and to estimate a reasonable range of prospective effects of increasing GHG concentrations, that is, climate "risks."

The combination of very great climate uncertainties and the litigation and regulatory threats will create a demand from the business sector for detailed regulations on how to structure the analysis of climate risks. Regulatory agencies are hardly better suited to conduct such analysis in an objective and neutral manner. Both firm managers and government agencies will have powerful incentives to use the EPA climate model, used by most federal agencies to evaluate the effects of climate policies; precisely because it is the U.S. government model, it would be difficult to attack the managers of retirement programs for choosing it.[17] For the earlier suite of climate models (CMIP-5), the EPA model provided predictions close to the average of those models under a given set of underlying assumptions, equilibrium climate sensitivity in particular. For the new suite (CMIP-6), the EPA model provides predictions cooler than the average of those models, not because the EPA model now is providing predictions more consistent with the historical evidence, but because the CMIP-6 models have incorporated a range of climate sensitivity assumptions and estimates higher on average than those in the CMIP-5 iteration.[18]

Again, company managers conducting climate "risk" analysis will have powerful incentives to choose among assumptions on future emissions and atmospheric concentrations, climate sensitivity, and other crucial parameters so as to insulate themselves from political attack, adverse regulatory actions, and litigation. They thus will be led toward analytic homogeneity, yielding a very real danger of an artificial "risk" "consensus" regardless of the actual evidence, and perhaps largely inconsistent with it. Any such consensus would be an artifact of the political pressures and litigation and regulatory risks to which they would be subjected; it would have nothing to do with "science" and certainly would not provide investors with material information. Moreover, these perverse incentives imply directly that any rule mandating the disclosure of climate risks to investors would provide no actual information improving investment choices.

If, implausibly, those conducting climate "risk" analysis were to opt to use models and/or sets of assumptions that differ in important dimensions, the ensuing predictions about future climate phenomena ("risks") would vary substantially or hugely, yielding very large uncertainties in terms of "risk" implications. What would the SEC do under that condition, how would the firms

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[16] This is discussed further below in section VI.

[17] This is the Model for the Assessment of Greenhouse Gas Induced Climate Change (MAGICC), at www.magic.org. The summary analysis presented below uses version 5.3. Versions 6.0 and 7.0 are available, but the differences in predictions on temperatures and other climate phenomena are trivial.

[18] Private communication with Professor John R. Christy, March 14, 2021. See also CMIP-5 at https://pcmdi.llnl.gov/mips/cmip5/; and CMIP-6 at https://pcmdi.llnl.gov/CMIP6/.

respond, and — again — what would such decisions have to do with "science"?

Those political pressures will lead public companies and the relevant government agencies not to consider the benefits of increasing atmospheric concentrations of GHG, as reported by the National Oceanic and Atmospheric Administration (NOAA), and in the peer-reviewed literature. Examples are planetary greening, increased agricultural productivity, increased water use efficiency by plants, and reduced mortality from cold.[19] Nor will such analysis include important dimensions of the adverse impacts of government climate policies, which as a core imperative must have the effect of increasing energy costs artificially, notwithstanding common assertions that alternative energy sources are competitive in terms of costs.[20] In short, government policies that force or induce retirement plans to evaluate the climate "risks" confronting their operations and markets will yield confusion rather than material information. One result of such confusion would be important distortions in capital markets due to a weighting of climate "risks" above those posed by other important phenomena, whether natural or manmade.

II. The Evidence on Climate Phenomena and the Effects of Climate Policies in the EPA Climate Model

The available body of evidence does not support the ubiquitous assertions that a climate "crisis" is upon us or looming large. This means that the asserted climate "risks" threatening the pecuniary interests of participants in retirement and pension systems are far less obvious than often assumed.

That anthropogenic climate change is "real" — that increasing GHG concentrations are having detectable effects — is 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.[21] The latest research in the peer-reviewed literature suggests that mankind is responsible for about two-tenths of a degree of the approximate

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[19] 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. 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.

[20] See Benjamin Zycher, *The Green New Deal: Economics and Policy Analytics*, American Enterprise Institute, 2019, at http://www.aei.org/wp-content/uploads/2019/04/RPT-The-Green-New-Deal-5.5x8.5-FINAL.pdf?x91208. See also the Energy Information Administration at https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf, Table 1b (including the costs of backup by gas turbines or battery systems); and the Institute for Energy Research at https://www.instituteforenergyresearch.org/wp-content/uploads/2019/06/IER_LCOE2019Final-.pdf.

[21] On the surface (land/ocean) temperature record, see UK Met Office, Hadley Centre/University of East Anglia Climatic Research Unit, "Tim Osborn: HadCRUT4 Global Temperature Graphs," https://crudata.uea.ac.uk/~timo/diag/tempdiag.htm. 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.

temperature increase of 1.1 degrees C since 1880.[22]

The "crisis" assertions are unsupported by the evidence reported in the peer-reviewed, official, or scientific literature. There is little trend in the number of "hot" days for 1895–2017; 11 of the 12 years with the highest number of such days occurred before 1960.[23] 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.[24] 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 2005–20 reporting period.[25] A 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.[26]

Global mean sea level has been increasing at about 3.3 mm per year since satellite measurements began in 1992. The tidal-gauge data before then show annual increases of about 1.9 mm per year, but that comparison does not show an acceleration in sea-level rise because the two datasets are not comparable. 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, etc. Accordingly, the data are unclear as to whether there is occurring an acceleration in sea level rise; it is reasonable to hypothesize that there

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[22] See https://crudata.uea.ac.uk/cru/data/temperature/HadCRUT5.0Analysis_300.png. See also 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.

[23] 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.

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

[25] 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.

[26] See 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. For a chart showing the temperature record over one million years, see Institute for Energy Research, "Temperature Fluctuations over the Past Million Years," https://www.instituteforenergyresearch.org/wp-content/uploads/2020/03/temperature-flucturations.png.

has been such an acceleration simply because temperatures are rising due to both natural and anthropogenic influences, as noted above, and such increases should result in more melting ice and the thermal expansion of water. But because rising temperatures are the result of both natural and anthropogenic causes, we do not know the relative contributions of those causes to any such acceleration.[27]

The Northern and Southern Hemisphere sea ice changes tell different stories; the arctic sea ice has been declining, while the Antarctic sea ice has been stable or growing.[28] U.S. tornado activity shows either no trend or a downward trend since 1954.[29] Tropical storms, hurricanes, and accumulated cyclone energy show little trend since satellite measurements began in the early 1970s.[30] The number of U.S. wildfires shows no trend since 1985, and global acreage burned has declined over past decades.[31] The Palmer Drought Severity index shows no trend since 1895.[32]

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[27] 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 water. 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 topic not to be addressed here. 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/.

[28] See 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. It appears to be the case that the Antarctic eastern ice sheet — about two-thirds of the continent — is growing, while the western ice sheet (and the peninsula) may be shrinking. No agreed explanation for this phenomenon is reported in the literature.

[29] For the historical data reported by the NOAA, see National Ocean and Atmospheric Administration, "Historical Records and Trends," https://www.ncdc.noaa.gov/climate-information/extreme-events/us-tornado-climatology/trends.

[30] For data on global tropical cyclone activity, see Ryan N. Maue, "Global Tropical Cyclone Activity, updated March 16, 2021, at http://climatlas.com/tropical/.

[31] For the reported U.S. wildfire data, see National Interagency Fire Center, "Total Wildland Fires and Acres (1926–2019)," https://www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html. On the decline in global area burned over past decades, see 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.

[32] 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.

U.S. flooding over the past century is uncorrelated with increasing GHG concentrations.[33] The available data do not support the ubiquitous assertions about the dire impacts of declining pH levels in the oceans.[34] Global food availability and production have increased more or less monotonically over the past two decades on a per capita basis.[35] The IPCC itself in the *Fifth Assessment Report* was deeply dubious about the various severe effects often asserted to be looming as impacts of anthropogenic warming.[36]

If we apply the Environmental Protection Agency climate model, under the highest IPCC climate sensitivity assumption (4.5 degrees C as reported in the AR5), net-zero U.S. GHG emissions effective immediately would yield a reduction in global temperatures of 0.173 degrees C by 2100. That effect would be barely detectable given the standard deviation (about 0.11 degrees C) of the surface temperature record.[37] The entire Paris agreement: about 0.178 degrees C. A 50 percent reduction in Chinese GHG emissions: 0.184 degrees C. Net-zero emissions by the entire Organization for Economic Cooperation and Development: 0.352 degrees C. A global 75 percent reduction in GHG emissions implemented immediately and maintained strictly would reduce global temperatures in 2100 by 0.540 degrees C.[38] Note that GHG emissions in 2020 fell by about 6.4 percent as a result of the COVID-19 economic downturn.[39] Can anyone believe that even larger GHG reductions — and the attendant economic costs — are plausible politically? Is there a believable benefit/cost model that would justify such policies?

III. The Incoherence, Non-Materiality, and Infeasibility of the Proposed Reporting Requirements for Scope 1, Scope 2, and Scope 3 Greenhouse Gas Emissions

The "risks" of anthropogenic climate change — recall from the discussion above that the relative contributions of natural and anthropogenic influences upon changing climate phenomena are not known — for any given firm (or investor) are a function of well-mixed global concentrations of GHG in the atmosphere. Even at a global level, the uncertainties and scientific controversies are formidable, and the possible impacts ("risks") of aggregate GHG emissions and concentrations at a regional or sectoral or firm-specific level would be deeply speculative. Moreover, the impact of the GHG emissions of any given firm is effectively equal to zero; recall from the discussion above that all such emissions from the U.S. would contribute 0.173 degrees

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[33] 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&.

[34] See 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.

[35] 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.

[36] 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, http://www.climatechange2013.org/images/uploads/WGIAR5_WGI-12Doc2b_FinalDraft_Chapter12.pdf.

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

[38] Author computations using MAGICC 5.3. The MAGICC model can be found at http://www.magicc.org/.

[39] See https://www.nature.com/articles/d41586-021-00090-3.

of warming globally by the year 2100, using the EPA climate model.

Accordingly, the question of the "risks" posed investors by a given firm's GHG emissions is incoherent; the firm's GHG emissions pose no such "risks" at all because the future climate effects of those emissions are effectively zero. This is true even for such firms as the large integrated fossil-fuel producers "responsible" for GHG emissions vastly greater than average.[40] Precisely because firm-specific GHG emissions create no climate impacts in isolation, and therefore create no "risks," information about the given firm's GHG emissions, whether at the Scope 1, Scope 2, or Scope 3 level, is not material in terms of the purported climate "risks" confronting investors, who might be interested in the climate change question writ large, and therefore the attendant purported impact upon a given firm or industry, but that has nothing to do with the given firm's emissions.

The scope 3 reporting requirement as delineated in the proposed rule is particularly problematic. First, a supplier to a given firm presumably is a supplier to many firms; how are the supplier's GHG emissions to be allocated among its various customers? That the possibility of double or multiple counting of a given firm's "Scope 3" emissions is both obvious and very far from a trivial concern. That the supplier's customers themselves in many cases are suppliers to others is a truism that illustrates the enormous complexity of this proposed requirement. The reporting requirements as envisioned in the proposed rule are unlikely to prove feasible.

Moreover, consider the actual proposed language of the Scope 3 requirement:

> **§ 229.1504 (Item 1504) GHG emissions metrics**: (c) Scope 3 emissions. (1) Disclose the registrant's total Scope 3 emissions if material. A registrant must also disclose its Scope 3 emissions if it has set a GHG emissions reduction target or goal that includes its Scope 3 emissions.[41]

For the reasons just discussed, such information is not material. And the language provides an obvious disincentive for firms to undertake such reporting of Scope 3 emissions if it has not already "set a GHG emissions reduction target or goal that includes Scope 3 emissions." Does the SEC actually view these disclosures as "material" or not?

The only sense in which firm-specific emissions data can be viewed as "material" in the context of future government policies to constrain such emissions or to penalize them. If that is the underlying rationale for the SEC assumption of the materiality of such information, it should specify what policies it anticipates will be promulgated by Congress and/or by the executive branch, how they will be implemented, and how they would affect specific firms.[42] At a more general level, the SEC should explain why the likelihood of such actions has increased, given the historical reality that such policies have proven very difficult to enact as a political and legal

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[40] Such "responsibility" is a deeply problematic concept, in that the production of fossil fuels and agricultural products and cement and the myriad other goods and services yielding GHG emissions is driven by the demands of the users of such products. Why are they not "responsible" for anthropogenic climate change?

[41] See p. 21468 at https://www.govinfo.gov/content/pkg/FR-2022-04-11/pdf/2022-06342.pdf.

[42] Note that executive branch actions can be reversed by equivalent executive actions by a future administration. The same is true for congressional actions, but perhaps with lower probabilities.

matter.

IV. Further Observations on the Materiality of Climate "Risks"

It is clear that those in support of the proposition that public companies evaluate the "risks" of anthropogenic climate change to their operations and investor prospects view such analyses as "material" in terms of disclosures to investors.[43] Several problems are attendant upon that premise, in substantial part for the reasons discussed above. Any such projections of climate phenomena and resulting "risks" to investors — far into the future — are very far from trivial methodologically. Which climate model(s) should businesses use? Which assumptions about future emissions, about the sensitivity of the climate system, about policies to be adopted internationally, about the climate effects of those policies, *ad infinitum*, should public companies incorporate into those models? What confidence should be attached to the predictions made by the models? Are those public companies — even very large ones — in a position to do such analysis in a credible fashion? If not, whom should they retain to do that analysis for them, and how should they evaluate the differences among the available alternative providers of such analyses?

Note that the concept of "risk" by its very nature implies a range of possible outcomes delineated by a statistical distribution of likelihoods around some mean and with some standard deviation. "Uncertainty" clearly is a more accurate term than "risk" in this context, in that the mean and/or standard deviation of the relevant statistical distributions are very unlikely to be known. The reality is that a "climate risk" disclosure requirement would be deeply speculative, and the level of detail and the scientific sophistication that would be needed to satisfy such a requirement is staggering. Such "disclosures" and supporting analysis and documentation would take up thousands of pages, with references to thousands more, and the premise that this "disclosure" requirement would facilitate improved decision making by investors in public companies is difficult to take seriously.

If climate "risks" are deemed material in terms of disclosure requirements, why not others that are uncertain or speculative? Climate "risks" are hardly the only ones potentially relevant to investors in public companies, and all are difficult to evaluate and to incorporate into investment decisions. What about massive volcanic eruptions? Asteroid impacts? Powerful earthquakes? Tsunamis? The potential problem of mass contagion is one with which we are far more familiar now than was the case only somewhat more than two years ago. The use of bioweaponry by terrorists, nuclear war, gamma ray storms, and on and on. Is climate "risk" the most important? If that is the hypothesis, what is the basis for it? Why are those others, and many more, not worthy of incorporation into disclosure requirements for public companies? What distortions would result from attention only to climate change and not others?

Because the perceived "climate "risks" confronting public companies are dependent upon crucial choices among alternative assumptions, the evaluation of such "risks" would be largely arbitrary given that the "correct" assumptions are very far from obvious. This means that a requirement, whether formal or informal, that climate "risks" be disclosed by public companies would weaken the materiality standard for disclosures by those institutions. "Materiality" always

[43] See a legal summary of the SEC disclosure requirements for public companies for material information at http://www.legalandcompliance.com/securities-resources/sec-requirements-for-public-companies/.

has meant the disclosure of information directly relevant to the financial performance of the given public company. When "risk" analysis becomes an arbitrary function of choices among assumptions complex, opaque, and far from obvious, the traditional materiality standard inexorably will be diluted and rendered far less useful for the investment and financial markets, an outcome diametrically at odds with the ostensible objectives of those advocating the evaluation of climate "risks."

For these reasons, the analysis of the materiality issue published recently by Commissioner Allison Herren Lee is deeply problematic.[44] Her argument simply shunts aside the massive analytic problems inherent in the analysis of climate "risks," instead emphasizing a general stance that market forces will not induce the full disclosure of even material risks as a matter of competitive market outcomes in the absence of regulatory mandates. Commissioner Lee ignores the powerful long-term incentives of public companies — always interested in reducing the cost of obtaining capital from investors and lenders — to preserve their credibility by offering full and truthful information to the capital market.[45] It is perhaps unsurprising that a regulator views market incentives as insufficient to engender an efficient outcome in terms of resource allocation, and that a regulatory strengthening of such incentives automatically would yield an allocational improvement. That stance is very far from obviously correct.

V. Benefit/Cost Analytic Parameters of the Proposed Rule

Consider Table 4 in the proposed rule, presenting the SEC estimate of the attendant increase in paperwork costs.[46] External costs per fiscal year are projected to rise from $3.86 billion to $10.24 billion, an increase of 165 percent. "Internal" burden hours are projected to rise from 18.8 million hours to 43.5 million hours, or about 131 percent. These costs are almost certainly biased downward, in that the proposed rule would create powerful incentives to retain consultants and other outside experts to conduct the requisite measurements, both complex and infeasible; the proposed rule recognizes this explicitly:

> We recognize that determining the likely future impacts on a registrant's business may be difficult for some registrants. Commenters have noted that the science of climate modelling has progressed in recent years and enabled the development of various software tools and that climate consulting firms are available to assist registrants in making this determination.[47]

Apart from the SEC recognition that the proposed rule will create (or expand) an industry of consultants, the assertion that "the science of climate modelling has progressed in recent years and enabled the development of various software tools" is deeply disingenuous. As noted above, the CMIP-6 models for the 1979-2019 period on average predict mid-tropospheric temperature increases of 0.40 degrees C per decade, while the CMIP-5 models on average predicted 0.44

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[44] See Commissioner Lee's analysis at https://www.sec.gov/news/speech/lee-living-material-world-052421#.
[45] See, e.g., Benjamin Klein and Keith B. Leffler, "The Role of Market Forces in Assuring Contractual Performance," *Journal of Political Economy*, vol. 89, No. 4 (August 1981), pp. 615-641, at https://www.jstor.org/stable/1833028?seq=1.
[46] See Table 4 at p. 21461 at https://www.govinfo.gov/content/pkg/FR-2022-04-11/pdf/2022-06342.pdf.
[47] See p. 21352 at https://www.govinfo.gov/content/pkg/FR-2022-04-11/pdf/2022-06342.pdf.

degrees C per decade. The actual satellite record is 0.16 degrees C per decade. Is the difference between 0.44 degrees and 0.40 degrees a significant improvement? And this inability of the models to predict the actual record is at a global basis; how likely are the consultants to improve upon the IPCC performance at regional, sectoral, and firm-specific levels?

Because firm-specific emissions data are not material — as discussed above, a given firm's Scope 1, Scope 2, and Scope 3 GHG emissions would yield changes in future climate phenomena effectively equal to zero — the estimated costs of implementing the requirements of the rule, even if the SEC estimates are taken seriously, cannot be justified in the context of investor protection.

Note also, that the available analysis suggests that the prospective financial risks of anthropogenic climate change, at least in the aggregate, are much smaller than many assert. Consider the predictions from the integrated assessment models, the 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.[48] 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.[49]) 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 latest report, it finds that the damage from anthropogenic climate change unmitigated by policy initiatives will reduce global GDP by 2.6 percent by 2100.[50] By that year, IPCC projects that individual incomes on average will be at least 400 percent greater than is the case today.[51]

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[48] 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.

[49] See, e.g., David Kreutzer, "Discounting Climate Costs," Heritage Foundation, June 16, 2016, at https://www.heritage.org/environment/report/discounting-climate-costs. 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.

[50] 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.

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

VI. Additional Observations and Conclusions

No plausible list of the SEC's areas of expertise includes climate science and policy, the central implication of which is straightforward: The SEC does not actually understand what such a "disclosure" rule should demand. It does not know precisely what it wants companies to "disclose." It does not know how public companies are to evaluate such hugely complex topics as future climate phenomena disaggregated by sector and geographic region. It does not know which climate model(s) companies should use, what assumptions companies should adopt on future atmospheric concentrations of GHG, on the amount of warming that any given assumption would yield, on the relative importance of natural and manmade ("anthropogenic") influences on climate phenomena, on the magnitude of mitigation to be yielded by human adaptations. The SEC's casual assertion that "… the science of climate modelling has progressed in recent years and enabled the development of various software tools and that climate consulting firms are available to assist registrants in making this determination" bespeaks a profound misunderstanding of the fundamental analytic problems attendant upon this proposed rule.

This proposed rule would have the obvious effect of threatening companies with actual risks of regulatory actions and litigation. The SEC recognizes this explicitly:

> Indirect costs may include heightened litigation risk and the potential disclosure of proprietary information.[52]
>
> For example, the proposed rules may result in additional litigation risk since the proposed climate-related disclosures may be new and unfamiliar to many registrants.[53]

The SEC fails to note that the litigation problem is created by virtually any "risk" analysis. Should, say, a severe storm follow a company's conclusion that climate risks are unimportant in its specific context, the plaintiff attorneys will not be far behind, even though attribution of a given weather event to GHG emissions generally, and *a fortiori* to emissions attributable to a given firm, is deeply problematic.[54] Should a firm calculate its GHG emissions as high relative to other companies or sectors, it will expose itself to purported causes of action as a "cause" of the asserted costs of the anthropogenic climate change "crisis." This proposed rule guarantees adverse litigation for public companies under almost any set of assumptions, a cost not estimated by the SEC.

Because the SEC already requires disclosure of risks material to the given firm, we must ask what the SEC is trying to achieve. Commissioner Lee argues that because firms must compete for capital, a disclosure rule is needed because firms have incentives to hide material risks. This simply is not correct: Firms are long-lived entities, at least in principle or expectationally, so that their long-run interest is served by preservation of their credibility. Disclosure of climate "risks" would require thousands of pages of analysis based upon tens of thousands of pages of supporting documentation; any suggestion that this process would provide material information to investors

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[52] See p. 21439 at https://www.govinfo.gov/content/pkg/FR-2022-04-11/pdf/2022-06342.pdf.
[53] See p. 21443 at https://www.govinfo.gov/content/pkg/FR-2022-04-11/pdf/2022-06342.pdf.
[54] See Ross McKitrick at https://link.springer.com/article/10.1007/s00382-021-05913-7. See also https://judithcurry.com/2021/08/18/the-ipccs-attribution-methodology-is-fundamentally-flawed/.

is not to be taken seriously.

A mandate from the SEC that public companies evaluate climate "risks" is likely to distort the allocation of capital away from economic sectors disfavored by certain political interest groups pursuing ideological agendas. Accordingly, the SEC climate "risk" proposed rule would prove in practice a mechanism with which to use private-sector resources for political purposes generally, and to constrain the availability of capital to industries disfavored politically. It is, therefore, fundamentally an effort to return to Operation Choke Point, the blatantly illegal attempt by the Obama administration to deny credit to certain industries.[55] That effort and the proposed SEC climate "risk" rule are obvious circumventions of the formal policymaking process; it is Congress from which authorization for such expansions of government power should originate. This would preserve our constitutional institutions generally, and the political accountability of government officials in particular.

[55] See https://www.americanbanker.com/opinion/theres-no-downplaying-the-impact-of-operation-choke-point.