Economic Consensus Favors Climate Action

A Response to the Department of Energy's Climate Report

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This report does not purport to present the views, if any, of NYU School of Law.

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Executive Summary

Do the benefits of ambitious action to reduce greenhouse gas emissions justify the costs? Not according to a recent draft report published by the U.S. Department of Energy (DOE) titled "A Critical Review of Impacts of Greenhouse Gas Emissions on the U.S. Climate" (Draft Report).[1] That report alleges widespread agreement among economists that climate change's impacts "are too small to justify aggressive abatement policy" and that taking meaningful action to mitigate climate change "would be worse than doing nothing" due to its costs.[2]

Yet few economists agree with the report's assessment. As detailed in this response, surveys of economic experts find large and increasing concern for climate change and a broad consensus that significant mitigation is warranted. Moreover, as further detailed below, economic evidence finds that climate change will cause significant damage in numerous ways—including by limiting economic growth and increasing mortality—and that many actions to address climate change are cost-effective given those high damages and the relatively low cost of many emission-reduction technologies.

Energy Secretary Chris Wright says that he commissioned the Draft Report in large part because "media coverage often distorts" the effects of climate change.[3] No doubt, policy should be based on rigorous, evidence-based, and evenhanded assessments—the types of assessments that academics who study the economics and science of climate change pursue. But the Draft Report does not offer that rigorous and even-handed assessment. Rather, it itself is a one-sided document that distorts the literature.

As explained in Part I of this response, the Draft Report presents a highly skewed assessment of the economics literature, focusing on a small number of studies while ignoring the vast majority of relevant evidence. The studies that the report cites are often outdated or unrepresentative. For instance, the Draft Report frequently ignores robust and consensus-based assessment reports, meta-analyses and elicitations that compile the views of many subject-matter experts, and updates to the very studies it cites.

As explained in Part II, while the Draft Report claims that economists broadly oppose widespread climate action, it provides limited and decontextualized support for this claim and ignores substantial counterevidence. For instance, a recent survey of hundreds of experts found that 74% of economists who have published peer-reviewed articles on climate change believe that immediate and drastic action is necessary,[4] with more than five times as many

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1 John Christy et al., Report to U.S. Energy Secretary Christopher Wright: A Critical Review of Impacts of Greenhouse Gas Emissions on the U.S. Climate viii (2025) [hereinafter Draft Report].

2 *Id.* at 116.

3 *Id.* at viii.

4 Peter Howard & Derek Sylvan, Inst. for Pol'y Integrity, *Gauging Economic Consensus on Climate Change* 11 fig.2 (2021).

respondents as not concluding that steep emission reductions to achieve a temperature target between 1.5°C to 2°C above pre-industrial levels would be cost-benefit justified.[5]

As explained in Part III, the Draft Report's claims that climate change will have minimal or beneficial impacts on economic growth, public health, and agriculture are similarly unsupported, cherry-picked, and widely rejected by mainstream climate economics. In each area, numerous studies conclude that climate change is likely to have significant adverse impacts. To reach the opposite conclusion, the Draft Report once again relies on limited, unrepresentative, and decontextualized findings.

As explained in Part IV, the Draft Report's claim that the social cost of carbon (SCC) is too uncertain to distinguish from zero is widely rejected by economic consensus. For instance, a recent meta-analysis and elicitation of economic experts finds a median SCC of $283 per metric ton, with experts generally rejecting the likelihood that the SCC is zero or negative while recognizing the significant potential that it could be very high.[6]

Finally, as explained in Part V, the Draft Report fails to comply with the standards and best practices for information quality and scientific integrity. For instance, under longstanding federal guidance and practice, the report should have undergone formal, objective peer review. Yet it is not even clear that the report authors will respond to public comments before federal agencies rely on the report's findings, as DOE has apparently disbanded the working group that authored the report.[7]

For these myriad reasons, the federal government should withdraw the Draft Report. Moreover, if any agencies meaningfully rely on the Draft Report to justify their actions (including deregulation), those actions are likely to be arbitrary and capricious.

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5 *Id.* at 28 fig.14 (finding that 66% of respondents find it likely or extremely likely that the expected benefits of mid-century net-zero greenhouse gas emission targets likely outweigh the expected costs, with just 12% responding that this is unlikely or extremely unlikely).

6 *See* Frances C. Moore et al., *Synthesis of Evidence Yields High Social Cost of Carbon Due to Structural Model Variation and Uncertainties*, 121 Procs. of the Nat'l Acads. Scis. 3 fig.1 (2024).

7 *See* Jeff Brady & Julia Simon, *Trump's Energy Department Disbands Group That Sowed Doubt About Climate Change*, NPR (Sept. 13, 2025), https://perma.cc/YEH5-YLG8.

I. The Draft Report Reflects a Highly Skewed and Unrepresentative Review of the Economics Literature

The Draft Report is highly limited, selective, and unrepresentative in its sampling of the literature, immediately calling its accuracy into question.

For one, the report cites a relatively limited selection of papers, particularly when compared with consensus-based climate reports such as those from the Intergovernmental Panel on Climate Change (IPCC) and National Climate Assessment (NCA) that draw far different conclusions. It is also unclear why the report selected the papers it relies on. On many instances, for instance, the report selects older over newer studies, cites unreviewed studies, or ignores obvious counter-evidence such as meta-analyses or expert elicitations. And even then, the report often misstates the conclusions of the work that it does cite, and many of the authors of those works have already registered their objections.[8]

The contrast in rigor between the Draft Report and consensus-based assessments is stark. The IPCC and NCA reports were developed using transparent, structured, and multi-year processes involving hundreds of natural and social scientists with heterogeneous backgrounds and disciplines. IPCC's sixth assessment report (AR6), for instance, took six years to produce starting in 2017 and ending with the synthesis report published in 2023.[9] AR6 consists of three reports that total thousands of pages, written by 782 authors, with more than 66,000 citations and about 200,000 review comments.[10] The Fifth National Climate Assessment (NCA5) was written over three years[11] and had over 500 authors[12] and approximately 8,200 references.[13] In sharp contrast to these thorough and consensus-based assessments, the Draft Report contains 141 pages and has approximately 350 citations,[14] of which, according to our count, 100 were not published in

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8 *E.g.* Ayesha Tandon et al., Carbon Brief, *Factcheck: Trump's Climate Report Includes More Than 100 False or Misleading Claims* (Aug. 13, 2025), https://perma.cc/3972-NSWW.

9 IPCC Sixth Assessment Report: Background, https://perma.cc/8K5Q-HG85 (last accessed Aug. 20, 2025).

10 The Working Group 1 report had 234 authors, over 14,000 citations, and over 78,000 review comments. Press, IPCC Sixth Assessment Report Working Group 1, https://perma.cc/Z9HV-7EFG (last accessed Aug. 20, 2025). The Working Group 1 report had 270 authors, over 34,000 citations, and over 62,000 review comments. IPCC Sixth Assessment Report Working Group 2, https://perma.cc/QAE7-3RZU (last accessed Aug. 20, 2025). The Working Group 3 report had 278 authors, over 18,000 citations, and over 59,000 review comments. IPCC Sixth Assessment Report Working Group 3, https://perma.cc/ZKN6-9NQL (last accessed Aug. 20, 2025).

11 Climate Central, New National Climate Assessment, https://perma.cc/3HVB-J92T (last accessed Aug. 20, 2025).

12 Nat'l Inst. of Env't Health & Scis., Fifth National Climate Assessment Released (Dec. 2023), https://perma.cc/5HWN-R8CW.

13 Env't Prot. Agency, EPA Tools and Resources Webinar: Fifth National Climate Assessment 8 (Nov. 20, 2024), https://perma.cc/FA2H-5J2R.

14 This number was produced by counting the references at the end of each chapter.

peer-reviewed journals. In other words, the Draft Report has about 188 times fewer citations than AR6, and over 23 times fewer than NCA5.

Notably, those more thorough reports reach drastically different conclusions than the Draft Report on the economics of climate change (and many other things). For instance, AR6 highlights that "effective, and low-cost options for mitigation and adaptation are already available"[15] and that "[e]conomy-wide policy packages, such as public spending commitments and pricing reforms, can meet short-term economic goals while reducing emissions and shifting development pathways towards sustainability."[16] Given the high costs that climate change will reap on society, AR6 concludes that the "economic and social benefit of limiting global warming to 2°C exceeds the cost of mitigation in most of the assessed literature," with that finding "robust against a wide range of assumptions about social preferences on inequalities and discounting over time."[17] Consistent with these findings, NCA5 reports that climate change "directly impacts the economy through increases in temperature, rising sea levels, and more frequent and intense weather-related extreme events . . ., which are estimated to generate substantial and increasing economic costs in many sectors."[18] These reports are balanced: they recognize and factor in the potential benefits of climate change, including CO_2 fertilization and lower shipping costs due to decreased ice in the Arctic,[19] although they find that the downside of climate change far exceeds the upside.[20] The Draft Report generally disregards these consensus-based assessments.

The Draft Report's disregard for thorough and consensus-based assessments is part of a larger pattern of cherry-picking evidence to fit a conclusion. This pattern is blatant in many other ways. For instance, in addition to ignoring comprehensive, multi-year climate assessments, the report also overlooks empirical surveys of economic experts on the impacts of climate change, which are discussed further in the next section.[21] On numerous occasions, the Draft Report cites to outdated research while either ignoring or downplaying more recent research. For instance, when discussing the SCC in Chapter 11, the Draft Report often discusses the outdated FUND model (discussing versions published in 1997 and 2017)[22] and a previous version of DICE (i.e., DICE-2016R2),[23] but mostly ignores more up-to-date models, such as GIVE, DSCIM, and FrEDI used by the Environmental Protection Agency (EPA).[24] In discussing climate economics, the Draft Report highlights the IPCC's fifth assessment report multiple times[25] while ignoring the

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15 IPCC, Climate Change 2023 Synthesis Report: Summary for Policymakers 28 (2023).

16 *Id.* at 32.

17 IPCC, Climate Change 2023: Synthesis Report 88 (2023).

18 U.S. Global Change Research Program, Fifth National Climate Assessment 19-5 (2023) [hereinafter NCA5].

19 *See* IPCC, Climate Change 2022: Impacts, Adaptation and Vulnerability—Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change 737, 749, 2338 (2022); NCA5, *supra* note 18, at 1-24, 10-14.

20 *E.g.* NCA5, *supra* note 18, at 1-5, 19-6.

21 *See infra* Part II.

22 Draft Report, *supra* note 1, at 121–23.

23 *Id.*

24 *See* Draft Report, *supra* note 1, at 121 (briefly noting that EPA used newer damage models but not discussing them).

25 *E.g. id.* at 116 (referencing AR5 in first sentence of Chapter 11 summary).

conclusions highlighted above in AR6. The Draft Report also relies on alternative media to support key arguments,[26] while in some cases focusing on outdated papers with well-established identification problems.[27]

Even with this extensive cherry-picking, the Draft Report still fails to consistently identify papers that support its desired results. Since the report's publication, experts have identified more than 100 false or misleading claims in the report.[28] In the economics section, for instance, Dr. Richard Tol noted that the Draft Report's claim that there is "no evidence" that climate change will have "a negative effect on global growth" is false, highlighting his own 2024 meta-analysis "find[ing] that the then-available studies jointly point to a negative impact of climate change on global economic growth."[29]

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[26] For instance, the Draft Report cites numerous times to various essays published by Roger Pielke Jr. in Substack. *E.g. id.* at 100, 115, 127. As noted above, approximately 100 of the Draft Report's roughly 350 citations were not published in peer-reviewed journals.

[27] Notably, the Draft Report focuses on DICE-2016's results. *See id.* at 118. However, that model has known problems with its climate modeling. *See* Martin C. Hansel, *Climate Economics Support for the UN Climate Targets*, 10 Nature Climate Change 781 (2020) (highlighting "key limitations" in DICE-2016). The author of DICE-2016, Dr. William Nordhaus, has since released a newer version of the model finding much higher climate damages. William Nordhaus, *Projections and Uncertainties about Climate Change in an Era of Minimal Climate Policies*, 10 Am. Econ. J.: Econ. Pol'y 333 (2018). This is all discussed further below in Part II.

[28] Ayesha Tandon et al., Carbon Brief, *Factcheck: Trump's Climate Report Includes More Than 100 False or Misleading Claims* (Aug. 13, 2025).

[29] *Id.* (quoting Draft Report, *supra* note 1, at 120) (citing Richard S.J. Tol, *A Meta-Analysis of the Total Economic Impact of Climate Change*, 185 Energy Policy 113,992 (2024)).

II. Economists Broadly Favor Climate Mitigation, and the Draft Report's Statements to the Contrary Are Based on Outdated and Cherry-Picked Evidence

The Draft Report asserts that "economists have long been reluctant to endorse attempts to . . . aggressively reduce [greenhouse gas] emissions because the costs would not be worth it."[30] But empirical evidence demonstrates the opposite. Today, a clear economic consensus favors aggressive action to reduce greenhouse gas emissions.

Surveys of expert economists who have published on climate change evince their broad and growing concern for climate change and support for significant mitigation. In 2021, Policy Integrity surveyed 738 economists who have published climate-related research in the field's highest-ranking academic journals—the largest-ever expert survey on the economics of climate change.[31] In that study, 74% of surveyed economists stated that "immediate and drastic action is necessary" in response to climate change, with just 1% stating that climate change "is not a serious problem."[32] Moreover, 76% of respondents found it extremely likely (40%) or likely (36%) that "climate change will have a long-term, negative impact on the growth rate of the global economy," with just 5% of respondents finding this unlikely (3%) or extremely unlikely (2%).[33] And 66% of respondents found it extremely likely (35%) or likely (31%) that "the expected benefits of mid-century net-zero [greenhouse gas emission] targets," consistent with a global average surface temperature limit of 1.5° to 2°C according to many projections, are "likely to outweigh the expected costs," with just 12% finding that unlikely (9%) or extremely unlikely (3%).[34] As this survey illustrates, economists are broadly concerned with climate change and think that "drastic action is necessary" to mitigate it.

These findings are not new—in fact, prior surveys of economic experts also reported broad concern with climate change. For instance, Policy Integrity's 2015 survey of 365 experts who had "published an article related to climate change in a highly ranked, peer-reviewed economics or

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30 Draft Report, *supra* note 1, at 117.

31 Howard & Sylvan (2021), *supra* note 4, at i.

32 *Id.* at 11 fig.2. 24% responded that "some action should be taken now" and 2% responded that "more research is needed before action is taken." *Id.*

33 *Id.* at 15 fig.5. 19% responded "not clear," with less than 1% responding that they "anticipate no climate damages." *Id.*

34 *Id.* at 28 fig.14. 18% responded "not clear," with another 4% expressing no opinion. *Id.*

environmental economics journal since 1994"[35] found that 89% believed that climate change would be a very serious (56%) or somewhat serious (33%) problem for the United States if nothing is done to limit it in the future.[36] In that same survey, 77% of respondents believed that the United States should necessarily commit to reducing greenhouse gas emissions,[37] with 50% concluding that "immediate and drastic action is necessary" to mitigate climate change.[38]

The differences between the 2015 and 2021 surveys indicate a growing concern for climate change, with nearly 80% of economists in the 2021 survey reporting an increase in concern over climate change over the previous five years.[39] As discussed further below, this increase in concern is consistent with the fact that climate change has become a more pressing problem over time as mitigation has been limited. Together, these two survey findings indicate that many economists have now been significantly concerned about climate change for a decade or longer, as in the 2015 survey, half of the respondents (a plurality) said that "immediate and drastic action is necessary."[40] We enclose the 2015 and 2021 surveys herein.

Notably, the findings of these 2021 and 2015 surveys are consistent with meta-analyses of economic studies about the impacts of climate change (i.e., analyses that survey and collate existing analyses). For instance, as discussed further below, one recent meta-analysis of 147 different SCC estimates published between 2000–2020 found a mean damage estimate of $231 per metric ton, which increased to $283 after published authors were surveyed about the extent that unquantified parameters would affect their estimates.[41] These values are consistent with the need for substantial action to mitigate climate change—specifically, they indicate that actions that mitigate net emissions at a cost of less than $231 or $283 per ton are benefit-cost justified (all else being equal)—further indicating a broad economic consensus for substantial climate mitigation.

In drawing the opposite conclusion, the Draft Report ignores these findings. Instead, it cites earlier work of Dr. William Nordhaus, a Nobel Laureate economist who has published extensively in the climate-change literature.[42] Specifically, the Draft Report discusses Nordhaus's DICE-2016R2 model, which, the Draft Report notes, found under certain conditions an optimal warming of 3.5°C and concluded that capping warming at 2.5°C would be "worse than doing

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35 Peter Howard & Derek Sylvan, Inst. for Pol'y Integrity, *Expert Consensus on the Economics of Climate Change* 1 (2015).

36 *Id.* at 11 fig.3.

37 *Id.* at 17 fig.9 (77% responding that the U.S. Government should commit to reducing greenhouse gas emissions "regardless of the actions other countries have taken thus far").

38 *Id.* at 10 fig.2. 43% responded that "some action should be taken now," with 5% responding that "more research is needed before action is taken," 1% responding that climate change "is not a serious problem" and 1% not responding. *Id.*

39 *See* Howard & Sylvan (2021), *supra* note 4, at 12 fig.3 (41% of respondents reporting that their level of concern for climate change has "strongly increased" over the past five years, 38% reporting it has "somewhat increased," 18% reporting that it has "remained unchanged," and 1% or less reporting each that it has "somewhat decreased," "strongly decreased," or expressing no opinion).

40 *See supra* note 38 and accompanying text.

41 Moore et al., *supra* note 6, at 1, 3.

42 *See* Draft Report, *supra* note 1, at 118.

nothing at all."[43] (Under other conditions, Dr. Nordhaus found a lower optimal temperature.[44]) The Draft Report states that "Nordhaus'[s] work has generally supported modest global climate policy, with aggressive measures largely deferred to later in the century,"[45] and quotes another economist who likewise stated, back in 2017, that "mainstream climate economics takes global warming seriously, but perplexingly concludes that the optimal economic policy is to almost do nothing about it."[46]

But these select quotes and papers paint a misleading portrait. For one, numerous high-profile economists have long supported imminent and extensive climate action, belying DOE's claim that there ever was a "consensus" among climate economists against climate mitigation. This includes Dr. Nicholas Stern,[47] Dr. Martin Weitzman,[48] Dr. Geoffrey Heal,[49] Dr. Robert Pindyck,[50] and Nobel Laureate Dr. Joseph Stiglitz,[51] who all critiqued early integrated assessment models for not fully capturing the extent of climate-change damages. And as noted above, a survey of over 300 expert economists published in 2015 found that half of the respondents then concluded that "immediate and drastic action is necessary" to address climate change,[52] a percentage that has grown over time.[53] Even ten years ago, therefore, there was no economic consensus against extensive actions to mitigate climate change.

Today, in light of the growing body of evidence, economists including Dr. Nordhaus more broadly conclude that extensive and imminent climate action is warranted. After the publication of DICE-2016R2, in fact, it became clear that Dr. Nordhaus's climate model was poorly calibrated, as it

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43 *Id.* (citing William Nordhaus, *Projections and Uncertainties About Climate Change in an Era of Minimal Climate Policies*, 10 Am. Econ. J.: Econ. Pol'y 333 (2018)).

44 For instance, Dr. Nordhaus found that a recalibration of the model to lower discount rates consistent with the Stern Review implies an optimal temperature of 2.5°C. Nordhaus, *supra* note 43, at 348. Similarly, adopting an alternative damage function from Howard and Sterner (2017), Nordhaus found an optimal temperature of 3°C. *Id.* at 334.

45 Draft Report, *supra* note 1, at 118.

46 *Id.* at 117 (quoting Servaas Storm, *How the Invisible Hand is Supposed to Adjust the Natural Thermostat: A Guide for the Perplexed*, 23 Sci. Eng'g Ethics 1307 (2017)).

47 Nicholas Stern, Stern Review: The Economics of Climate Change (2006) (supporting relatively low discount rates in assessing climate change impacts). The Stern Review has over 10,000 citations on Google Scholar, highlighting its importance in the field.

48 Martin L. Weitzman, *On Modeling and Interpreting the Economics of Catastrophic Climate Change*, 91 Rev. Econ. & Stats. 1 (2009) (calling for more robust modeling of fat tails representing grave climate damage). This article has over 2,400 citations on Google Scholar, with close to 1,000 more for Dr. Weitzman's companion pieces.

49 Geoffrey Heal & Antony Millner, *Reflections: Uncertainty and Decision Making in Climate Change Economics*, 8 Rev. Env't Econ. & Pol'y 120 (2014) (suggesting augmentation of integrated assessment models with other decisionmaking frameworks to account for uncertainty).

50 Robert S. Pindyck, *The Social Cost of Carbon Revisited*, 94 J. Env't Econ. & Mgmt. 140 (2009) (rejecting integrated assessment models for a substantial average SCC calculation).

51 Nicholas Stern & Joseph E. Stiglitz, *The Social Cost of Carbon, Risk, Distribution, Market Failures: An Alternative Approach* (Nat'l Bur. Econ. Rsch. Working Paper 28472, 2021) (highlighting the need to improve modeling of market failures in assessing climate change impacts).

52 *See supra* note 38 and accompanying text.

53 *See supra* notes 32 and 39 and accompanying text.

found that a 2°C temperature target was infeasible and thus produced unreliable results.[54] When experts updated his DICE model to correct for this issue, they concluded that "UN climate targets may be optimal" under Dr. Nordhaus's approach.[55]

Since then, Dr. Nordhaus himself has corrected his model and produced far different results supporting more substantial climate mitigation.[56] Using an improved climate model and other up-to-date information, Nordhaus now finds an optimal temperature increase of 2.6°C in 2100.[57] Moreover, the latest version of DICE finds that a 2°C temperature increase is optimal under a lower discount rate of 2%, consistent with the latest evidence as discussed below.[58] Although Dr. Nordhaus's findings now support the chorus of economists supporting more drastic and imminent climate action, the Draft Report pays virtually no attention to his more recent work, briefly noting it while inexplicably focusing on his earlier and miscalibrated model.[59]

Indeed, it is unsurprising that economists have supported more aggressive climate action over time as the impacts of climate change have increased and mitigation has been limited. As the Draft Report notes, for instance, Dr. Nordhaus since the 1990s has advocated for a global carbon tax that ramps upwards over time.[60] With significant delays in expansive global and U.S. climate action, the need for more aggressive climate action has increased.[61] Today, accordingly, most economists in the field support imminent and aggressive climate action.[62] The Draft Report is simply wrong to state the opposite.

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54 Martin C. Hansel et al., *Climate Economics Support for the UN Climate Targets*, 10 Nature Climate Change 781, 781–82 (2021). This finding was consistent with a prior recommendation from the National Academies of Sciences, Engineering, and Medicine, which noted the omission of key climate feedbacks in DICE and called for an adoption of more sophisticated simple climate model that meets certain criteria, such as the Finite Amplitude Impulse Response (FAIR) model. *See* Nat'l Acads. of Scis., Eng'g & Med., Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide 109 (2017).

55 Hansel et al., *supra* note 54, at 781.

56 Lint Barrage & William Nordhaus, *Policies, Projections, and the Social Cost of Carbon: Results from the DICE-2023 Model*, 121 Procs. Nat'l Acad. Scis. 1518, 1520 tbl.1 (2024).

57 *Id.* at 1523.

58 *Id.*

59 *See* Draft Report, *supra* note 1, at 121 (briefly mentioning Barrage & Nordhaus (2024)).

60 *Id.* at 118.

61 William Nordhaus, *Why the Global Warming Skeptics Are Wrong*, 59 N.Y. Rev. of Books 32 (2012).

62 *See supra* note 32 and accompanying text.

III. Overlooking Critical Evidence, the Draft Report Understates the Likely Economic Impact of Climate Change in Key Sectors

Beyond misstating the topline economic consensus, the Draft Report also downplays economic evidence that climate change will cause significant damage in numerous key damage sectors—most notably, temperature-related mortality, economic growth, and agriculture. While the Draft Report suggests that climate change may reduce mortality and boost economic growth and agricultural production, the weight of economic evidence finds the opposite for all three. This section addresses each in turn.

***Mortality*:** The Draft Report suggests that climate change is likely to have a limited or positive impact on temperature-related mortality, highlighting the fact that far more individuals currently die of cold weather than hot weather.[63] But one conclusion does not flow from the other: Although it is true that more individuals currently die of cold weather, studies find that climate change will produce a sharp increase in mortality from extreme heat, and that this increase will very likely exceed any decrease in cold weather-related mortality from rising temperatures.[64] Surveying the full literature on different mortality impacts, a recent meta-analysis of nearly 400 studies finds "net increases in mortality risk associated with increased average annual temperatures (ranging

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63 Draft Report, *supra* note 1, at 111–13.

64 *E.g.* Pierre Masselot et al., *Estimating Future Heat-Related and Cold-Related Mortality Under Climate Change, Demographic and Adaptation Scenarios in 854 European Cities*, 31 Nature Med. 1294 (2025) ("[W]ith no adaptation to heat, the increase in heat-related deaths consistently exceeds any decrease in cold-related deaths across all considered scenarios in Europe. Under the lowest mitigation and adaptation scenario (SSP3-7.0), we estimate a net death burden due to climate change increasing by 49.9% and cumulating 2,345,410 . . . climate change-related deaths between 2015 and 2099. This net effect would remain positive even under high adaptation scenarios, whereby a risk attenuation of 50% is still insufficient to reverse the trend under SSP3-7.0."); Tamma Carleton et al., *Valuing the Global Mortality Consequences of Climate Change Accounting for Adaptation Costs and Benefits*, 137 Q. J. Econ. 2037 (2022) ("Using a revealed-preference approach to recover unobserved adaptation costs, we estimate that the mean global increase in mortality risk due to climate change, accounting for adaptation benefits and costs, is valued at roughly 3.2% of global GDP in 2100 under a high-emissions scenario. Notably, today's cold locations are projected to benefit, while today's poor and hot locations have large projected damages."); R. Daniel Bressler, *The Mortality Cost of Carbon*, 12 Nature Comm'ns 4467 (2021) ("[A]dding 4,434 metric tons of carbon dioxide in 2020—equivalent to the lifetime emissions of 3.5 average Americans—causes one excess death globally in expectation between 2020–2100."); Sameed Ahmed M. Khatana et al., *Projections of Extreme Temperature–Related Deaths in the US*, 7 J. Am. Med. Ass'n (2024) ("In this cross-sectional study of mortality and temperature data, extreme temperature–related deaths in the contiguous US were projected to increase substantially by mid-21st century (2036-2065) under different greenhouse gas emissions increase scenarios."); Kevin R. Cromar et al., *Global Health Impacts for Economic Models of Climate Change: A Systematic Review and Meta-Analysis*, 19 Ann. Am. Thorac. Soc. 1203 (2022).

from 0.1% to 1.1% per 1°C) . . . for all global regions."[65] Moreover, mortality risk due to climate change results from additional sources beyond temperature fluctuation: mortality may arise from a range of other impacts including infectious diseases, climate-mediated changes in storms, and wildfire.[66]

Applying this literature, EPA has found substantial mortality costs per ton of carbon dioxide emissions. In its 2023 update to the social cost of greenhouse gases, EPA used the aforementioned meta-analysis of climate change's effects on temperature-related deaths in one of its damage modules and found a health cost of $104 per metric ton of carbon dioxide emissions (for 2030 emissions, in 2020$).[67] For its other damage module, EPA applied a different study of mortality impacts from temperature extremes and found an even higher damage cost: $179 per metric ton.[68] Thus, contrary to the Draft Report's suggestions, the best evidence finds that climate change is likely to have an adverse and significant mortality cost.

***Economic Growth*:** The Draft Report also suggests that climate change "might have some negative economic effects but they are too small to justify aggressive abatement policy."[69] But this conclusion is based on limited data, and a fuller range of data shows the opposite.

Earlier this year, an EPA working paper performed a comprehensive analysis of eight econometric studies that assessed the impacts of climate change on U.S. economic growth. All eight of the papers found that climate change would reduce U.S. gross domestic product, with that decline between 0.4%–3.1% in 2100 in seven of the eight papers (the eighth paper projected far greater damages than the other seven, at 15.3% of U.S. GDP in 2100).[70] Applying these estimates, the working paper found that each metric ton of carbon dioxide emissions in 2030 reduces U.S. economic growth to the equivalent of $10–$64 for those seven studies, with an average reduction between those seven studies of $27 (the eighth, outlier study produced a per-ton GDP damage estimate of $996).[71] This damage figure alone would justify meaningful climate action, contrary to the suggestion of the Draft Report. And of course, this figure accounts for U.S. economic output only and does not include non-market impacts, like effects on health or mortality that account for most of existing climate-damage estimates (or effects on growth in other countries and their potential feedback on U.S. economic growth). When EPA added U.S. nonmarket health damages to these econometric studies, it derived an aggregate U.S. damages range of $31–$85 per metric ton.[72]

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65 Cromar et al., *supra* note 64, at 1203.

66 Env't Prot. Agency, EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances 83 (2023) (citing literature) [hereinafter EPA SC-GHG Report].

67 EPA SC-GHG Report, *supra* note 66, at 55 (explaining that EPA used Cromar et al. (2022), *supra* note 64, in the GIVE module); *id.* at 81 tbl.3.1.4 (finding $104 in health damages in the GIVE module, at a 2% Ramsey discount rate).

68 *Id.* at 52 (explaining that EPA used Carleton et al. (2022), *supra* note 64, in the DCISM module); *id.* at 81 tbl.3.1.4 (finding $179 in health damages in the DCISM module, at a 2% Ramsey discount rate).

69 Draft Report, *supra* note 1, at 120.

70 Elizabeth Kopits et al., Economic Damages from Climate Change to U.S. Populations: Integrating Evidence from Recent Studies 24–25 (EPA Working Paper 25-01, 2025).

71 *Id.* at 26 tbl.4.

72 *Id.* at 30 tbl.6.

This finding is consistent with expert consensus. In the 2015 and 2021 surveys discussed above, around three-quarters of expert respondents stated that climate was likely or very likely to have a long-term negative effect on global economic growth.[73] Moreover, in the 2021 expert survey, 89% of economists responded that climate change was extremely likely (55%) or likely (34%) to exacerbate inequality between countries, compared to 2% that thought it was unlikely (1%) or extremely unlikely (1%).[74]

***Agriculture*:** Focusing largely on a study from one of the report's authors, the Draft Report also implies that climate change is likely to increase agricultural crop yields.[75] But this too is not supported by the weight of evidence.

In recent years, numerous studies have produced the opposite conclusion, concluding that climate change is likely to reduce rather than increase global agricultural yields.[76] For instance, one recent study performs a meta-analysis of the existing literature and finds "projected yield responses of -22% (maize), -9% (rice), -15% (soy), and -14% (wheat) from 2015 to 2080–2100 under the business-as-usual scenario of SSP5-8.5, which reduce to -3.8%, -2.7%, 1.4%, and -1.5% respectively under the lower emissions scenario of SSP1-2.6."[77] Moreover, as the aforementioned 2015 survey finds, economists overwhelmingly expect climate change to have negative impacts on U.S. agriculture.[78] As this evidence demonstrates, there is not robust support for the Draft Report's suggestion that climate change will increase net agricultural production.

The Draft Report also overstates the importance of agriculture in recent SCC estimates. Specifically, the report claims that increases in projected agricultural damages largely drive the increase in climate-damage estimates that EPA published in 2023.[79] But EPA's estimates were only modestly driven by increases in agricultural damages: Even if agricultural damages were zeroed out, EPA would still have produced an SCC estimate of about $200.[80]

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73 Howard & Sylvan (2021), *supra* note 4, at 15 fig.5; Howard & Sylvan (2015), *supra* note 35, at 15 fig.6.

74 Howard & Sylvan (2021), *supra* note 4, at 17 fig.6.

75 Draft Report, *supra* note 1, at 107 (citing Ross R. McKitrick, *Extended Crop Yield Meta-Analysis Data Do Not Support Upward SCC Revision*, 15 Sci. Reports 5575 (2025)).

76 *E.g.* Andrew Hultgren et al., *Impacts of Climate Change on Global Agriculture Accounting for Adaptation*, 642 Nature 644 (2025); Christine Li et al., *Predicting Changes in Agricultural Yields Under Climate Change Scenarios and Their Implications for Global Food Security*, 15 Sci. Reports 2858 (2025); Jonas Jagermeyr et al., *Climate Impacts on Global Agriculture Emerge Earlier in New Generation of Climate and Crop Models*, 22 Nature Food 873 (2021); Frances C. Moore et al., *New Science of Climate Change Impacts on Agriculture Implies Higher Social Cost of Carbon*, 8 Nature Comm'ns 1607 (2017).

77 Li et al., *supra* note 76, at 2858.

78 Howard & Sylvan (2015), *supra* note 35, at 12 (stating that 94% of surveyed economists expected negative effects on domestic agriculture production).

79 *See* Draft Report, *supra* note 1, at 106 (citing EPA SC-GHG Report, *supra* note 66).

80 *See* EPA SC-GHG Report, *supra* note 66, at 81 tbl.3.1.4 (showing that agricultural impacts were responsible for an average of $54 across GIVE and DSCIM).

IV. The Draft Report Erroneously Concludes that the Social Cost of Greenhouse Gases Is Too Uncertain to Value

In addition to questioning sector-based assessments, the Draft Report challenges the social cost of greenhouse gases in its entirely, arguing that it is "not intrinsically informative as to the economic or societal impacts of climate change" because it is heavily dependent on uncertain assumptions.[81] The Draft Report notes the variation in different SCC estimates, emphasizing a single point estimate of $18.67 (with an uncertainty range that goes below zero in 24 percent of model runs) to emphasize the supposedly strong "evidence consistent with the SCC not being significantly greater than zero."[82] Yet once again, the report presents a deeply misleading characterization of the literature.

While some SCC estimates are indeed low, the vast majority are far higher. The Draft Report selectively chooses to highlight a single estimate at the low end of the range, yet more rigorous analyses paint a clearer picture. As noted above, a recent meta-analysis from Moore et al. (2024) finds a mean SCC of $231/metric ton from 1,823 estimates in 147 peer-reviewed studies published between 2000 to 2020, conditioned on a discount rate of 2.5%.[83] Moore et al. (2024) also surveyed the authors of these estimates and found that respondents believe that existing estimates are too low due to "under-sampling of model structures, incomplete characterization of damages, and high discount rates."[84] They surveyed experts on the extent that various structural assumptions would affect SCC estimates, and using these responses, the authors found a mean SCC of $283/metric ton for 2020 emissions.[85] As this study reveals, economists broadly agree that SCC estimates should be at least $200/metric ton or more, in line with or above recent EPA estimates.[86]

To support its claim that the SCC is highly uncertain, the Draft Report casts the social discount rate as a normative judgement, resulting in a high level of uncertainty with no clear answer.[87] However, over the last decade, four different expert elicitations have supported a discount rate of 2%.[88] Combined with revealed preference data on ten-year treasury bills, which support a

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81 Draft Report, *supra* note 1, at 116; *see also id.* at 122.

82 *Id.* at 123 (citing Lewis (2022)).

83 Moore et al., *supra* note 6, at 2–3. Without conditioning on the discount rate, the truncated mean 2020 social cost of carbon is $132, still far exceeding the single estimate that the Draft Report provides.

84 *Id.* at 1, 5, Appx. 18.

85 *Id.* at 1, 5, 6.

86 *See* EPA SC-GHG Report, *supra* note 66 (central SCC estimate of $230 for 2030 emissions).

87 *See* Draft Report, *supra* note 1, at 122.

88 Moritz Drupp et al., *Discounting Disentangled*, 10 Am. Econ. J.: Econ. Pol'y 109, 111 (2018); Peter H. Howard &

risk-free rate of 2%,[89] this represents strong and stable evidence for using a central discount rate of 2%.[90] (Given that 90% of social discount rate experts support a rate in the range of 1% to 3%, this represents a good range for sensitivity analysis.[91]) This economic consensus strongly contrasts with the situation descripted in the Draft Report of "some economists" supporting lower consumption rates.[92] The Draft Report provides this assessment despite recent peer-reviewed publications, notably published after the aforementioned expert elicitations, showing that consumption discount rates are the appropriate rate in climate contexts and the appropriate central rate in benefit-cost analysis more generally.[93]

While using a near-term discount rate of 2% is well-reasoned, some critical evidence points to lower risk-free social discount rates. For instance, sophisticated models based on Treasury yields identify a range of 0.5% to 1.3% with a central estimate of 0.7%.[94] Recent medium-run forecasts from the Congressional Budget Office also support rates lower than 2%.[95] Expert elicitations peg the median risk-free social discount rate at about 2%[96] and support a central discount rate of 1% when accounting for the effects of relative prices.[97] As this evidence shows, the use of a 2% near-term discount rate for the SCC is, if anything, likely on the high end.

The Draft Report also questions the appropriate use of the equilibrium climate sensitivity (ECS)—that is, the amount of long-term warming resulting from a doubling in atmospheric greenhouse gas concentrations—and notes that lower ECS values produce lower SCC values.[98] But many

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Derek Sylvan, *Wisdom of the Experts: Using Survey Responses to Address Positive and Normative Uncertainties in Climate-Economic Models*, 162 Climatic Change 213, 219 (2020); Robert S. Pindyck, *The Social Cost of Carbon Revisited*, 94 J. Env't Econ. & Mgmt. 140 (2019); Christina Gollier et al., *The Discounting Premium Puzzle: Survey Evidence from Professional Economists*, 122 J. Env't Econ. & Mgmt. 102882 (2023). Due to the normative aspect of discount rates, the median rates are the appropriate way to select a discount rate, as it is consistent with a time-consistent voting procedure. *See also* Peter H. Howard et al., *U.S. Benefit-Cost Analysis Requires Revision*, 380 Science 803 (2023) (letter from nearly 20 experts expressing strong support for use of discount rates "close to 2%" in regulatory analysis).

89 *See* EPA SC-GHG Report, *supra* note 66, at 67–70; Off. of Mgmt. & Budget, Circular A-4: Regulatory Analysis 76–77 (2023).

90 Howard and Sylvan (2020), *supra* note 88, at 223; Drupp et al. (2018), *supra* note 88, at 118; Gollier et al. (2023), *supra* note 88, at 10. Even if a higher mean discount rate is used assuming a non-normative parameter, a rate of approximately 2.3% is supported across the three studies.

91 Drupp et al., *supra* note 88, at 128; Moore et al., *supra* note 6, at 3, 28.

92 Draft Report, *supra* note 1, at 122.

93 *See* Circular A-4 (2023), *supra* note 89, at 75–81; Qingran Li & William A. Pizer, *Use of the Consumption Discount Rate for Public Policy Over the Distant Future*, 107 J. Env't Econ. & Mgmt. 1 (2021); Qingran Li & William A. Pizer, *Discounting for Public Benefit-Cost Analysis* 3 (Res. for the Future Issue Brief 21-05, 2021); Richard G. Newell, William A. Pizer & Brian C. Prest, *The Shadow Price of Capital: Accounting for Capital Displacement in Benefit–Cost Analysis* (Res. for the Future Working Paper 23-07, 2023).

94 Michael D. Bauer & Glenn D. Rudebusch, *The Rising Cost of Climate Change: Evidence from the Bond Market,* at 12 tbl.1 (Working Paper, 2021) (finding an average equilibrium real rate of interest over the past decade of 1.3% using ten-year Treasury notes and 0.7% using one-year Treasury notes).

95 Cong. Budget Office, The Long Term Budget Outlook 2025 to 2055 at 32 tbl.301 (2025) (forecasting nominal interest rate on 10-year Treasury notes of 1.5% over the next 30 years).

96 *See supra* note 88 and accompanying text.

97 Drupp et al., *supra* note 88, at 123 (supporting a discount-rate range of 0% to 2% with a central estimate of 1%).

98 Draft Report, *supra* note 1, at 122–23.

existing SCC values, including those published by EPA in 2023, use the best available science to estimate the ECS, taking uncertainty into account. To estimate the effect of greenhouse gas emissions on temperature change in assessing the SC-GHG, EPA used the Finite Amplitude Impulse Response (FaIR) model,[99] which was developed by researchers at Oxford University and has been used by the United Nations Intergovernmental Panel on Climate Change (IPCC) and many other research groups.[100] The FaIR model has been widely recognized for its ability to capture uncertainty in the magnitude of climate change in response to increases in greenhouse gas emissions: For instance, the National Academies explained in its 2017 report that FaIR is "consistent with the current, peer-reviewed scientific understanding of the relationships over time between CO_2 emissions, atmospheric CO_2 concentrations, and CO_2-induced global mean surface temperature change, including their uncertainty," specifically praising the model for its "uncertainty characterization."[101] Using that model, EPA found that the equilibrium climate sensitivity ranged from 2.05 to 5.03 degrees Celsius within a 90-percent confidence interval.[102] As EPA explained, this range "reflect[s] uncertainty in both emissions and physical climate processes that are consistent with the latest projections coming out of the Sixth Assessment Report" from the IPCC.[103] EPA incorporated this full range into its SCC estimates.[104] Thus, while lower ECS estimates do decrease the SCC, EPA already accounted for this possibility in its valuations using the best available evidence and consistent with international expert consensus.

Discounting and ECS values are just two examples of how EPA incorporated the best available empirical data to construct its SCC values. For other examples, we enclose a comment letter that we recently submitted to EPA, jointly with ten other organizations, explaining that the agency's 2023 values remain the best available and appropriately account for uncertainty.[105]

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99 EPA SC-GHG Report, *supra* note 66, at 35; Corinne Hartin et al., *Advancing the Estimation of Future Climate Impacts Within the United States*, 14 Earth Sys. Dynam. 1015, 1017 (2023) (describing use of FaIR model to estimate territorial SC-GHG).

100 EPA SC-GHG Report, *supra* note 66, at 35; *see also* Env't Prot. Agency, Response to Public Comments on the November 2021 Proposed Rule and the December 2022 Supplemental Proposed Rule, EPA-HQ-OAR-2021-0317-4009 at A-3-3 (2023) (noting that FaIR "is one of the most widely used reduced complexity models used to generate projections of global temperature change").

101 Nat'l Acads. of Scis.., *supra* note 54, at 13 (laying out key criteria for climate model); *id.* at 14 (noting that FaIR "satisfies the[se] criteria").

102 EPA SC-GHG Report, *supra* note 66, at 37 tbl.2.2.1; *see also id.* at 38 tbl.2.2.2 (reporting results for transient climate response, i.e. the amount of immediate warming from a doubling in atmospheric greenhouse gas concentrations).

103 *Id.* at 38.

104 *See, e.g.*, *id.* at 39 fig.2.2.2 (projecting global mean surface temperature change out to 2300, with full range of uncertainty).

105 Inst. for Pol'y Integrity et al., Comments on Failure to Value Greenhouse Gas Emissions in "Repeal of Greenhouse Gas Emissions Standards for Fossil Fuel-Fired Electric Generating Units" (Aug. 7, 2025). Parts II.A–B on pages 7–18 are most relevant here.

V. The Draft Report Fails To Comply With Standards for Information Quality and Scientific Integrity, Including Standards for Peer Review

The Draft Report fails to comply with well-established and bipartisan principles of information quality and scientific integrity. The Information Quality Act, as implemented by guidelines from the Office of Management and Budget (OMB) and DOE, requires agencies to ensure that the information they disseminate is accurate, clear, complete, and unbiased.[106] OMB has further clarified under the Information Quality Act that "important scientific information shall be peer reviewed by qualified specialists before it is disseminated by the federal government."[107] President Trump's executive order on scientific integrity,[108] as implemented by the Office of Science and Technology Policy,[109] reinforces that scientific information should be free of conflicts and personal influences, should be transparent and undergo peer review by experts from a range of relevant disciplines when the information is influential, and should cautiously avoid overstatements.

The Draft Report falls short of all these standards. Instead of structuring a scientific inquiry as a search for accurate conclusions based on evidence, the Draft Report defines its objective as a deliberately biased search for "evidence and perspective that challenge the mainstream consensus."[110] One author of the Draft Report admitted that the team had a particular "narrative" in mind.[111] As a highly "influential"[112] synthesis of information on risks to health and the environment,[113] representing a novel shift in agency position from previous peer-reviewed

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106 Pub. L. 106-554, 114 Stat. 2763 (2000); OMB, Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies, 67 Fed. Reg. 8452 (Feb. 22, 2022); Dep't of Energy, Final Report Implementing Updates to the Department of Energy's Information Quality Act Guidelines (2019), http://perma.cc/W5ZZ-LMHJ.

107 OMB, M-05-03, Final Information Quality Bulletin for Peer Review 2 (Dec. 16, 2004), https://perma.cc/97RT-Q96Z [hereinafter OMB Peer Review Bulletin].

108 Exec. Order No. 14,303, 90 Fed. Reg. 22,601 (May 23, 2025).

109 Memorandum from Dir. Michael J. Kratsios, OSTP, Agency Guidance for Implementing Gold Standard Science in the Conduct & Management of Scientific Activities (June 23, 2025), https://perma.cc/C6V8-CV7A.

110 Draft Report, *supra* note 1, at x.

111 Heartland Inst., The End of Official Climate Alarmism, Interview with Dr. Judith Curry at 54:11 (Aug. 1, 2025), https://www.youtube.com/watch?v=TNdfQk8Mgmc ("They would have liked us to make a different point . . . but that's not the point we're making . . . as part of our narrative.").

112 OMB Peer Review Bulletin, *supra* note 107, at 23–26 (applying heightened standards to highly influential scientific assessments). EPA has already relied on the Draft Report in a proposed rulemaking, evincing its influence.

113 Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies, 67 Fed. Reg. at 8460 (explaining that "analysis of risks to human health, safety and the environment" is subject to heightened information quality standards).

disseminations,[114] the Report should have undergone formal, objective peer review prior to dissemination to the public. Instead, only a limited number of DOE staff conducted an internal review, and changes made in response to those reviews have not been made publicly available.[115] As this report has documented, the Draft Report favored skewed, misleading, incomplete presentations of evidence over a complete, accurate description of consensus findings. The Report thus violates the standards of the Information Quality Act and President Trump's executive order on scientific integrity.[116]

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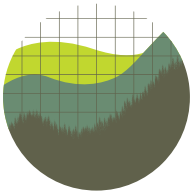
[114] *See* OMB Peer Review Bulletin, *supra* note 107, at 12 ("The need for rigorous peer review is greater when the information . . . presents conclusions that are likely to change prevailing practices[] or is likely to affect policy decisions that have a significant impact.")

[115] Draft Report, *supra* note 1, at x (recognizing a "team of anonymous DOE and national lab reviewers whose input helped improve the final report").

[116] *See* Pub. L. 106-554, 114 Stat. 2763 (2000) (requiring OMB to issue guidelines to "maximizing the quality, objectivity, utility, and integrity of information" of agency-disseminated information); *see, e.g.*, Exec. Order No. 14303 § 1 (highlighting the importance of "[r]eproducibility, rigor, and unbiased peer review" in agency science).

Conclusion

The Draft Report presents a highly skewed portrait of climate economics, disregarding the wealth of economic evidence that climate change will result in considerable damage and that many actions to address it are cost-benefit justified. DOE should withdraw the Draft Report and continue to rely on consensus-based reports like NCA5 and AR6. If DOE or other federal agencies meaningfully rely on the Draft Report in setting policy, their actions are likely to be arbitrary and capricious.



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