Columbia Law School | COLUMBIA CLIMATE SCHOOL
SABIN CENTER FOR CLIMATE CHANGE LAW

August 6, 2025

U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC. 20460

Re: Proposed Rule – Repeal of Greenhouse Gas Emissions Standards for Fossil Fuel-Fired Electric Generating Units (EPA-HQ-OAR-2025-0124; FRL-12674-01-OAR)

To Whom It May Concern:

The Sabin Center for Climate Change Law (Sabin Center) at Columbia Law School submits these comments in response to the Environmental Protection Agency (EPA)'s proposed rule repealing the greenhouse gas (GHG) emissions standards for fossil fuel-fired electric generating units.[1] EPA has not provided a reasonable legal or scientific justification for the repeal of these standards. In this comment letter, we focus on the legal and scientific errors underpinning EPA's determination that emissions from U.S. fossil fuel-fired power plants do not contribute significantly to air pollution that endangers public health and welfare. As detailed below, EPA's legal interpretation of the "cause or contribute" standard is inconsistent with the plain meaning of the statute, and EPA's factual determination on endangerment is directly refuted by a large body of scientific evidence demonstrating a clear causal link between the emissions at issue in this rulemaking and pervasive harms to human health and welfare.[2]

I. EPA's Interpretation of the "Cause or Contribute" Language in Section 111 is Incorrect

Section 111(b)(1)(A) of the Clean Air Act directs EPA to establish emission performance standards for a source category if it "causes, or contributes significantly to, air pollution which

[1] EPA, Repeal of Greenhouse Gas Emissions Standards for Fossil Fuel-Fired Electric Generating Units, 90 Fed. Reg. 25,752 (June 17, 2025) [hereinafter "Proposed Rule"].
[2] In this comment letter we focus on the unreasonableness of EPA's "significant contribution" finding. We believe that there are other errors in EPA's analysis, including EPA's interpretation of Section 111(b)(1)(A) as requiring pollutant-specific endangerment findings after a source category has been listed, and EPA's analysis of whether carbon capture and sequestration (CCS) technologies are adequately demonstrated. The Sabin Center has submitted separate comment letter on the CCS determination and other aspects of the proposal. *See* Comment Letter from the Sabin Center for Climate Change Law and CCS Experts, EPA-HQ-OAR-2025-0124; Comment Letter from Climate Mayors, C40 and the Sabin Center for Climate Change Law, EPA-HQ-OAR-2025-0124.

may reasonably be anticipated to endanger public health or welfare."[3] A plain reading of this text is that it requires a scientific determination focused solely on: (i) the type and amount of air pollution generated by the source category, and (ii) the public health and welfare effects attributable to that air pollution. There is no provision in Section 111(b) that authorizes EPA to consider regulatory costs or other policy considerations when making this determination.

Nonetheless, EPA has proposed to interpret Section 111(b)(1)(A) as *requiring* consideration of "policy issues" that are not specified in the statute, including the cost and efficacy of emission control measures, the impact on the affected industry, and the administration's policy preferences (e.g., supporting fossil fuels and eliminating environmental regulations).[4] Specifically, EPA asserts that a "determination of significant contribution must consider whether such determination would have an influence or effect on the targeted air pollution and the public health or welfare impacts attributed to such air pollution" and this "necessarily entails considering the policies that would inform the resulting regulation."[5]

Based on this interpretation, EPA proposes to find that GHG emissions from U.S. fossil fuel-fired power plants do not contribute significantly to dangerous GHG pollution because any hypothetical regulations that EPA would enact to control those emissions would not have a significant effect on GHG pollution.[6] EPA maintains that regulatory action would be ineffective "because GHG emissions from [fossil fuel-fired power plants] are a small and decreasing part of global emissions; cost-effective control measures are not reasonably available; and because this Administration's priority is to promote the public health or welfare through energy dominance and independence secured by using fossil fuels to generate power."[7]

EPA's interpretation of Section 111(b)(1)(A) is illogical, unprecedented, and inconsistent with both the text and structure of the Clean Air Act and court decisions interpreting it. Section 111(b)(1)(A) directs EPA to make a determination regarding the effects of emissions from a source category, not the effects of subsequent regulatory action. The statute explicitly directs EPA to consider costs and the availability of emission control measures at a different stage in the rulemaking process – specifically, when determining the "best system of emissions reduction" (BSER) to inform performance standards for a listed source category.[8] The BSER determination is a separate determination that comes after the cause-or-contribute finding.[9] Congress clearly did not envision that EPA should consider costs or other policy considerations in the initial determination as to whether a source category contributes to air pollution that may endanger public health and welfare.

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[3] 42 U.S.C. § 7411(b)(1)(A).
[4] Proposed Rule, 90 Fed. Reg. at 25,765.
[5] *Id.* at 25,755.
[6] *Id.*
[7] *Id.*
[8] 42 U.S.C. § 7411(a).
[9] 42 U.S.C. §§ 7411(b)(1)(B); 7411(a)(1).

Moreover, nothing in Section 111 authorizes EPA to predicate an endangerment finding (or any subsequent regulatory action) on an administration's policy to prioritize "continued and increased reliance on fossil fuels."[10] This interpretation would give EPA unfettered discretion to avoid regulation based simply on an administration's policy preference *not to regulate* a particular sector. This runs directly counter to the directives in the Clean Air Act that EPA "shall" list source categories that cause or contribute to dangerous pollution and "shall" promulgate emission standards for those source categories – this language is mandatory, not discretionary.[11]

EPA's interpretation is also inconsistent with legal precedent.[12] The Supreme Court has interpreted similar provisions of the Clean Air Act as barring consideration of costs or other policy factors. For example, Section 202 contains nearly identical language to Section 111, directing EPA to determine whether motor vehicle emissions "cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health and welfare."[13] In *Massachusetts v. EPA,* the Supreme Court held that EPA's obligation under Section 202 was to make a "scientific judgment" as to whether air pollution contributes to endangerment, and that it was impermissible for EPA to base its decision on policy considerations that are "divorced from the statutory text."[14] Similarly, in *Whitman v. American Trucking Associations,* the Supreme Court held that EPA cannot consider costs when establishing National Ambient Air Quality Standards (NAAQS) under Section 109(b), because that section calls for a scientific determination regarding the effects of air pollution on public health, and "[n]owhere are the costs of achieving such a standard made part of that initial calculation."[15] The Court recognized that it would be improper to "infer" EPA's authority to consider costs when there are so many other provisions of the Clean Air Act that expressly authorize EPA to consider implementation costs.[16]

More recently, the D.C. Circuit explicitly rejected the argument that EPA should consider the effect of regulatory action when deciding whether to regulate GHG emissions from motor vehicles in *Coalition for Clean Air Regulation v. EPA*. Industry petitioners argued that EPA's authority to regulate GHG emissions was conditioned on its ability to show that the "resulting emission control strategy or strategies will have some significant degree of harm reduction or effectiveness in

[10] Proposed Rule, 90 Fed. Reg. at 26,766.
[11] 42 U.S.C. §§ 7411(b)(1)(A)-(B).
[12] EPA cites the Supreme Court's decision in *Michigan v. EPA* as the basis for considering costs in its Section 111(b)(1)(A) "cause or contribute" determination. However, that case is inapposite, as it dealt with EPA's obligations when deciding whether regulation is "appropriate and necessary" under Section 112(n)(1)(A). The Court specifically recognized that EPA's obligations and authority in this context were different than when it is tasked with making determinations about the effects of emissions on "health and safety." Michigan v. EPA, 576 U.S. 743, 755-56 (2015) (noting that "appropriate and necessary" is far more comprehensive criterion than "requisite to protect the public health", and that a "natural" reading of the public health directive "does not encompass cost").
[13] 42 U.S.C. § 7521(a)(1).
[14] Massachusetts v. EPA, 549 U.S. 497, 500 (2007).
[15] Whitman v. Am. Trucking Associations, 531 U.S. 457, 465 (2001).
[16] *Id*. at 465, 467.

addressing the endangerment."[17] The D.C. Circuit disagreed, finding that EPA's decision to regulate was appropriately based on its finding that there was a "significant risk of harm" and that there was nothing in the Clean Air Act which conditioned EPA's regulatory authority on "evidence of a particular level of mitigation."[18] In other words: the Clean Air Act does not require EPA to find that mitigation measures will have a "significant" effect on endangerment, even when EPA has reached the second step of the regulatory process (i.e., defining the best system of emissions reduction); "only a showing of significant *contribution* is required."[19]

Accordingly, EPA has erred in its in interpretation of the factors that it may consider when determining whether emissions from a source category will cause or contribute to air pollution that may reasonable be anticipated to endanger public health and welfare. EPA's obligation under Section 111(b)(1)(A) is to make a purely scientific judgment regarding the effects of air pollution attributable to the source category. As detailed below, a wealth of scientific evidence demonstrates that GHG emissions from fossil fuel power plants make a significant contribution to air pollution, which endangers public health or welfare.

II. EPA's Factual Determination on Endangerment is Refuted by Scientific Evidence

Because EPA misinterpreted its legal obligations under Section 111(b)(1)(A), the proposed rule contains almost no analysis – and does not reach a clear conclusion – on the question of whether GHG emissions from U.S. fossil fuel-fired power plants "contribute significantly" to pollution which may reasonably be anticipated to endanger public health or welfare. However, EPA does suggest it would have reached the same conclusion ("no significant contribution") even if it had applied the correct standard.[20]

Specifically, EPA asserts that GHG emissions from U.S. fossil fuel-fired power plants are a "small and decreasing part of global emissions" (approximately 3 percent of total global emissions in 2022)[21] and that this "3 percent contribution figure… suggests that the risks to public health and welfare attributed to anthropogenic climate change would not be meaningfully different even if the fossil fuel-fired EGU source category were to cease all GHG emissions."[22] EPA also suggests that the chain of causation between GHG emissions and harms may be too "attenuated" to support a finding of significant contribution.[23] With regards to the causation issue, EPA states that the "threshold for significant contribution" from GHG emissions should be higher because there are "multiple intervening actors, uncertainties, and extrapolations necessary to draw a connection

[17] Coalition for Responsible Regulation v. EPA., 684 F.3d 102, 127 (D.C. Cir. 2012), aff'd in part, rev'd in part sub nom. Util. Air Regul. Grp. v. E.P.A., 573 U.S. 302 (2014), and amended, 606 F. App'x 6 (D.C. Cir. 2015).
[18] *Id.* at 128.
[19] *Id.*
[20] Proposed Rule, 90 Fed. Reg. at 25,767-25,768.
[21] *Id.* at 25,755.
[22] *Id.* at 25,768.
[23] *Id*. at 25,767.

between emissions by a source category and dangerous air pollution in the form of adverse effects in the U.S from anthropogenic climate change."[24]

The proposed rule contains no scientific evidence or analysis to substantiate these assumptions and suppositions. There is a vast body of scientific literature regarding the harms attributable to climate change that EPA has completely ignored in its analysis. EPA's failure to substantiate its position is particularly egregious given the fact that EPA has reversed course from all of its prior findings on GHG endangerment, including the Trump administration's 2021 endangerment finding.[25] Moreover, in past rulemakings, EPA has found that source categories "contribute significantly" to air pollution that endangers public health and welfare when the total emissions were much smaller than those attributable to U.S. fossil fuel-fired power plants and there was pervasive uncertainty about health and welfare impacts.[26] For example, EPA found that non-methane organic compound (NMOC) emissions from municipal solid waste landfills, which totaled approximately 283,000 tons per year (1.0 percent of stationary source NMOC emissions), were "significant" even though it could not reliably calculate the attributable health risks.[27]

As detailed below, there is overwhelming scientific consensus that climate change is causing pervasive and widespread harm to public health and welfare, including within the U.S., and the harms attributable to U.S. fossil fuel-fired power plants surpass any reasonable threshold of significance. EPA has an obligation to engage with the available scientific information and reach a rational determination on endangerment in light of that information. We summarize some of this scientific information below, and have included cited reports and studies as attachments to this comment letter.[28]

1. Scientific Consensus on Harms Attributable to Climate Change

EPA's assertion that the causal chain between emissions and harms is "too attenuated" to justify an endangerment finding is misleading and incorrect. There is widespread scientific consensus that GHG emissions cause climate change, and that climate change causes harm to

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[24] *Id.*

[25] Pollutant-Specific Significant Contribution Finding for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Generating Units, and Process for Determining Significance of Other New Source Performance Standards Source Categories, 86 Fed. Reg. 2542, 2556 (Jan. 13, 2021) (finding that power sector emissions were significant because they were more than 3% of U.S. GHG emissions).

[26] *See* Kate Welty & Dena Adler, *Significant by Any Measure: Reviewing Power Plant Emissions Under Section 111 of the Clean Air Act* (Institute for Policy Integrity May 2025).

[27] *See* Standards of Performance for New Stationary Sources and Guidelines for Control of Existing Sources: Municipal Solid Waste Landfills, 56 Fed. Reg. 24,468, 24,473 (proposed May 30, 1991); EPA, *Air Emissions from Municipal Solid Waste Landfills – Background Information for Proposed Standards and Guidelines,* EPA-450-3-90-011a (March 1991).

[28] We were unable to submit the full reports for IPCC AR6 and NCA5 as these exceeded the file limitations for attachments, but these are available at: https://www.ipcc.ch/assessment-report/ar6/ (IPCC AR6) and https://repository.library.noaa.gov/view/noaa/61592 (NCA5). We did attach the IPCC AR6 synthesis report, which summarizes all key findings.

human health and welfare. The evidentiary basis for these findings is robust, as there are many independent lines of evidence that all converge on the same conclusions about climate change and harm attribution. These include physical theory and understanding of the climate system and its interaction with other systems; observational datasets consisting of hundreds of different climate variables monitored by thousands of different instruments and different organizations; and a wide assortment of climate models and statistical techniques that are used to evaluate patterns, trends, causal relationships, variability, and uncertainty within the climate system.[29]

The Intergovernmental Panel on Climate Change (IPCC) recognized in its Sixth Assessment Report (AR6) that anthropogenic GHG emissions were "unequivocally" causing climate change, resulting in pervasive and harmful impacts across the world, many of which have been attributed to climate change with high or very high scientific confidence.[30] For example, AR6 found that it is an "established fact" that anthropogenic climate forcing is causing changes in the frequency and/or intensity of weather and climate extremes, particularly extreme heat events.[31] AR6 also found that climate-related hazards are increasingly contributing to adverse health impacts such as increases in food-, water-, and vector-borne diseases; increases in air quality problems and exacerbation of respiratory diseases; and disruption to natural and human systems that are essential to the provision of food, water, sanitation, healthcare, and other human needs.[32]

The U.S. Global Change Research Program (USGCRP) reached similar conclusions about the "unequivocal" evidence of anthropogenic climate change in the Fifth National Climate Assessment (NCA5).[33] With regards to U.S. impacts, NCA5 noted that that the "effects of human-caused climate change are already far-reaching and worsening across every region of the United States" and that "each additional increment of warming is expected to lead to more damage and greater economic losses" across the country.[34] For example, NCA5 concluded, with *very high confidence*, that the frequency and intensity of extreme heat events are increasing, consistent with expected

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[29] *See* IPCC, CLIMATE CHANGE 2021: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP I TO THE SIXTH ASSESSMENT REPORT OF THE IPCC (Valérie Masson-Delmotte et al. eds. 2021) [hereinafter IPCC AR6 WGI]; NATIONAL ACADEMY OF SCIENCES, CLIMATE CHANGE: EVIDENCE AND CAUSES: UPDATE 2020 (National Academies Press, 2020); U.S. GLOBAL CHANGE RESEARCH PROGRAM, FIFTH NATIONAL CLIMATE ASSESSMENT (A.R. Crimmins et al., eds., 2023) [hereinafter NCA5]; U.S. GLOBAL CHANGE RESEARCH PROGRAM, FOURTH NATIONAL CLIMATE ASSESSMENT, VOL. 1, CLIMATE SCIENCE SPECIAL REPORT (Donald J. Wuebbles et al. eds., 2017).

[30] *See* IPCC AR6 WGI at 4 ("it is unequivocal that human influence has warmed the atmosphere, ocean, and land" and "widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred"); *Id.* at 204 (finding that there are "multiple lines of evidence that unequivocally establish the dominant role in human activities in the growth of atmospheric CO_2"). *See also* IPCC, Climate Change 2022: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Sixth Assessment Report of the IPCC (2022) [hereinafter IPCC AR6 WGII].

[31] IPCC AR6 WGI at 42.

[32] IPCC AR6 WGII, Ch. 7. *See also* Jessica Wentz, *Climate Change and Human Health: A Synthesis of Scientific Research and State Obligations Under International Law* (Sabin Center for Climate Change Law May 2024) (summarizing key scientific findings regarding the effects of climate change on health).

[33] NCA5 at 2-4 ("[t]he evidence for warming across multiple aspects of the Earth system is incontrovertible, and the science is unequivocal that increase in atmospheric greenhouse gases are driving many observed trends and changes").

[34] *Id.* at 1-5.

physical responses to a warming climate.[35] NCA5 also found "robust evidence" that anthropogenic climate change has contributed to increases in the frequency and severity of the heaviest precipitation events across nearly 70 percent of the United States.[36] Other physical hazards identified in NCA5 as affecting U.S. interests included increases in wildfires, river floods, crop failures, tropical cyclones, drought, infectious and vector-borne diseases, and sea level rise. Based on these and other hazards, NCA5 concluded that climate change is already having significant adverse effects on mental, spiritual, and community health and other aspects of human well-being across the United States.[37]

2. Scientific and Legal Recognition that "Every Ton Matters"

IPCC AR6 and NCA5 both found that climate change is rapidly intensifying and that each additional increment of global warming will cause additional harm.[38] Moreover, every ton of carbon dioxide (CO_2) and other GHGs emitted into the atmosphere contributes to incremental warming. Thus, even a minor increase in GHG emissions will cause some degree of harm. In short, every ton counts.[39] EPA itself recognized that "[e]very additional increment of temperature comes with consequences" when promulgating standards of performance for GHG emissions from the oil and natural gas sector.[40]

Thus, EPA is incorrect in asserting that "only extraordinary emissions reductions on a global scale would have any impact on the potential endangerment of public health or welfare."[41] EPA made a similar argument in *Massachusetts v. EPA* – arguing that the regulation of GHG emissions from U.S. motor vehicles could not mitigate global climate change due to emissions growth in other countries – and the Supreme Court rejected that argument. The Court explained that agencies "do not generally resolve massive problems in one fell swoop, but instead whittle away over time" and, in the context of climate change, "[a] reduction in domestic emission would slow the pace of global emissions increase, no matter what happens elsewhere."[42] Thus, the Court held that regulatory action would help *reduce* the harmful effects on public health and welfare, even if it would not fully eliminate those harmful effects. The same is true for GHG emissions from U.S. power plants, which, as discussed below, have an enormous impact on public health and welfare.

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[35] *Id.* at 2-38; *See also* NCA4 Vol. I at 19; IPCC AR6 WGI at 8 (finding that it is "*virtually certain* that hot extremes (including heatwaves) have become more frequent and more intense across most land regions since the 1950s" and there is "*high confidence* that human-induced climate change is the main driver of these changes").
[36] See NCA5 at 2-18.
[37] *See* NCA5, Ch. 15 ("Human Health").
[38] *See, e.g.,* NCA5 at 1-5.
[39] For example, there is a near-linear relationship between cumulative CO_2 emissions and increase in global surface temperatures, and thus the IPCC has concluded that every ton of CO_2 that is released into the atmosphere will contribute to global warming and the harmful impacts of warming. *See* IPCC AR6 WGI at 28.
[40] Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review, 89 Fed. Reg. 16,820, 16,839 (March 8, 2024).
[41] Proposed Rule, 90 Fed. Reg. at 25,766.
[42] Massachusetts v. E.P.A., 549 U.S. 497, 499-500 (2007).

3. EPA's Prior GHG Endangerment Findings

The proposed rule is inconsistent with the technical assessments and findings issued by EPA in previous GHG endangerment findings, including the 2009 endangerment finding for GHG emissions from motor vehicle emissions, the 2015 and 2021 endangerment findings for GHG emissions from the power sector, and the 2024 endangerment finding for GHG emissions from the oil and natural gas sector.[43]

EPA amassed a substantial body of scientific evidence in support of its 2009 endangerment finding for motor vehicle emissions (which stands in stark contrast to the record underpinning the present proposal). For example, EPA published a technical support document in conjunction with the 2009 finding which contained several hundred pages of information about the relationship between GHG emissions and climate change and the ways in which climate change affects public health and welfare.[44] EPA concluded that body of scientific evidence provided "compelling" support for an endangerment finding.[45]

The 2009 endangerment finding was upheld by the D.C. Circuit Court of Appeals.[46] The court found that EPA had amassed a "substantial" body of evidence in support of its determination that motor vehicle GHG emissions could reasonably be anticipated to endanger public health and welfare. Specifically, the court found that EPA had supported its determination through three primary lines of evidence: (i) "basic physical understanding" of the greenhouse effect, (ii) observational evidence of past climate change, and (iii) models predicting how the climate will respond to GHG concentrations in the future.[47] The court also held that it was proper for EPA to refer to and incorporate findings from scientific assessments published by the IPCC, USGCRP, and National Research Council (NRC). The court expressly rejected the argument that the existence of some scientific uncertainty would warrant invalidation of the endangerment finding. To the contrary, the court held that the Clean Air Act language requiring EPA to determine whether emissions "may reasonably be anticipated to endanger public health or welfare" requires a "precautionary, forward-looking scientific judgment" about the risks of GHG emissions.[48]

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[43] Standards of Performance for the Oil and Natural Gas Sector, 89 Fed. Reg. at 16,852; Pollutant-Specific Significant Contribution Finding for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Generating Units, and Process for Determining Significance of Other New Source Performance Standards Source Categories, 86 Fed. Reg. 2542 (Jan. 13, 2021); Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,510 (Oct. 23, 2015); Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66496 (Dec. 15, 2009).

[44] U.S. Environmental Protection Agency, Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act (Dec. 7, 2009). The technical support document identified many harmful impacts that are attributable to climate change, including sea level rise, increases in the severity and frequency of extreme events, agricultural impacts, ecosystem impacts, and more.

[45] 74 Fed. Reg. at 66,497.

[46] Coalition for Responsible Regulation, 684 F.3d 102 (D.C. Cir. 2012).

[47] *Id.* at 120–21.

[48] Coalition for Responsible Regulation, 684 F.3d at 122.

Notably, the emissions at issue in the 2009 rulemaking (1,649 million tons of CO_2-equivalent) were comparable to the emissions at issue in the present rulemaking (1,554.6 million tons of CO_2-equivalent).[49] The findings from EPA and the D.C. Circuit in relation to the 2009 rulemaking are thus directly relevant to the present rulemaking. Also relevant is the fact that the Supreme Court acknowledged that motor vehicles generated an "enormous" quantity of GHG emissions with "enormous potential consequences" for public health and welfare in *Massachusetts v. EPA*.[50]

In 2015, EPA found that there was also a basis for concluding that GHG emissions from fossil-fuel fired power plants may reasonably be expected to endanger public health or welfare (although it maintained that such findings were not necessary to issue GHG performance standards for this sector, consistent with its long-standing interpretation of Section 111(b)(1)(A)).[51] In doing so, EPA incorporated findings from the 2009 motor vehicle endangerment finding, as well as more recent scientific assessments from the National Research Council (NRC), IPCC, and other organizations.[52] EPA found that the evidentiary basis for the GHG endangerment finding had "only grown stronger and the potential adverse consequences to public health and environment more dire" in the years since 2009, and that fossil fuel-fired power plants represented a significant contribution to that harm "under any reasonable threshold or definition."[53] In *American Lung Association v. EPA*, the D.C. Circuit held that EPA had "sensibly" concluded that that power sector emissions contribute significantly to dangerous air pollution "under any reasonable threshold or definition" and that, in this case, the question of endangerment was "not even close."[54]

In 2021, under the first-term Trump Administration, EPA again concluded that GHG emissions from fossil fuel-fired power plants clearly made a "significant contribution" to dangerous air pollution.[55] Specifically, EPA established a threshold of significance at 3% of U.S. emissions, and found that the power sector generated approximately 25% of U.S. emissions. EPA has not provided a reasoned explanation as to why it is changing its approach in this new proposal.

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[49] This figure includes CO_2 emissions (1,531.7 MMT CO_2e), methane (CH_4) emissions (1.3 MMT CO_2e), and N_2O emissions (21.9 MMT CO_2e). *See* EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2022,* EPA 430-R-24-004 (2024), Table 2-11, "Electric Power-Related Greenhouse Gas Emissions (MMT CO_2 Eq.).

[50] Massachusetts v. E.P.A., 549 U.S. at 500 (the Court was specifically commenting on the magnitude of 1.7 billion metric tons of CO2 attributable to U.S motor vehicles in 1999, which is slightly more than the emissions at issue in *Coalition for Responsible Regulation*, but still comparable to the ~ 1.6 billion metric tons of CO2-equivalent at issue in the present rulemaking).

[51] Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,510, 64,530 (Oct. 23, 2015).

[52] *Id.* at 64,530-31.

[53] *Id.* at 64,531.

[54] Am. Lung Ass'n v. Env't Prot. Agency, 985 F.3d 914, 976 (D.C. Cir. 2021), *rev'd and remanded sub nom. on other grounds,* W. Virginia v. Env't Prot. Agency, 597 U.S. 697 (2022). Because the D.C. Circuit held that EPA had made a sufficient significant contribution finding for GHG emission from the power sector, it concluded that it was unnecessary to reach the question of whether such a finding was required under Section 111(b)(1)(A).

[55] Pollutant-Specific Significant Contribution Finding for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Generating Units, and Process for Determining Significance of Other New Source Performance Standards Source Categories, 86 Fed. Reg. 2542 (Jan. 13, 2021).

In 2024, EPA found that methane emissions from the natural gas and oil sector, which comprised approximately 28 percent of U.S. methane emissions, were "significant under any reasonable standard or criterion" due to their potency and magnitude.[56] The global warming potential of those methane emissions (660 million metric tons CO_2-equivalent in 2019) was considerably smaller than the 1,554.6 million tons CO_2-equivalent at issue in the proposed rule.

4. Developments in Attribution Research

In recent years, the evidentiary basis for attributing harm to GHG emissions has become even more robust.[57] This is in part because climate change is rapidly intensifying and its harmful impacts have become more apparent, widespread, and severe.[58] There have also been scientific advances that make it possible to reach more specific conclusions about the nature and magnitude of harm attributable to specific emission sources. These include improvements in attribution methodologies as well as the development of specific tools that can be used in attribution analyses.

For example, researchers have developed techniques for quantifying the contribution of GHG emissions to physical phenomena such as sea level rise, ocean acidification, extreme heat, and increases in wildfire smoke,[59] as well as corresponding impacts on various aspects of public health and well-being.[60] These end-to-end attribution methodologies can be used to estimate damages and harmful impacts attributable to emissions from U.S. fossil fuel-fired power plants. Metrics developed for the social cost of GHGs can also be used for this purpose (see examples below).

There is also a growing body of research on impact attribution that can be used to assess impacts on human health. For example, a recent issue of *Nature Climate Change* featured multiple studies on the health effects of climate-driven changes in physical phenomena such as heat waves and wildfires.[61] These studies show that it is possible, in some instances, to quantify impacts such

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[56] Standards of Performance for the Oil and Natural Gas Sector, 89 Fed. Reg. at 16,852.
[57] *See* Philip B. Duffy, *Strengthened scientific support for the Endangerment Finding for atmospheric greenhouse gases,* 363 SCIENCE 597 (2019).
[58] *See* IPCC AR6 WGI; IPCC ARG WGII; NCA5.
[59] *See, e.g.*, David J. Frame et al., *Emissions and Emergence: A New Index Comparing Relative Contributions to Climate Change With Relative Climatic Consequences*, 14 ENVIRONMENTAL RESEARCH LETTERS 084009 (2019); Rachel Licker et al., *Attributing Ocean Acidification to Major Carbon Producers*, 14 ENVIRONMENTAL RESEARCH LETTERS 124060 (2019); Friederike E.L. Otto et al., *Assigning Historical Responsibilities for Extreme Weather Events*, 7 NATURE CLIMATE CHANGE 757 (2017); Brenda Ekwurzel et al., *The Rise in Global Atmospheric CO_2, Surface Temperature, and Sea Level from Emissions Traced to Major Carbon Producers*, 144 CLIMATIC CHANGE 579 (2017); Shaina Sadai et al., *Estimating the sea level rise responsibility of industrial carbon producers,* 20(4) ENVIRONMENTAL RESEARCH LETTERS 044012 (2025); Beverly E. Law et al., *Anthropogenic climate change contributes to wildfire particular matter and related mortality in the United States*, 6 COMMUNICATIONS EARTH & ENVIRONMENT 336 (2025).
[60] *See, e.g.,* Christopher W. Callahan & Justin S. Mankin, *Carbon majors and the scientific case for climate liability,* 640 NATURE 893 (2025); Sameed Ahmed M. Khatana et al., *Projections of Extreme Temperature-Related Deaths in the US,* 7(9) JAMA NETWORK OPEN: ENVIRONMENTAL HEALTH e2434942 (2024).
[61] *Advances in Attribution,* 14 NATURE CLIMATE CHANGE 1108 (2024).

as mortality from increased smoke and extreme heat.[62] These estimates can be tailored to the United States – e.g., Khatana et al. (2024) estimated that by mid-century (2036-2065), heat-related cardiovascular deaths in the U.S. could rise by up to 233 percent as climate change intensifies the frequency, duration, and severity of extreme heat.[63] Law et al. (2025) found that wildfire smoke attributable to climate change has caused approximately 15,000 deaths and a cumulative economic burden of $160 billion over 15 years.[64] Researchers have also published meta-assessments of health impacts attributable to climate change, including most notably the annual reports issued by the *Lancet Countdown on Climate Change and Human Health*.[65]

These are just some examples of available scientific resources that EPA could use to evaluate the effect of U.S. fossil fuel-fired power plants on public health and welfare. Notably, in the proposed rule, EPA has not utilized or acknowledged *any* of the available scientific resources on climate change harm attribution. EPA has a clear legal obligation to engage with these resources when making a "cause or contribute" finding for GHG emissions under Section 111(b)(1)(A).

5. Harm Attributable to U.S. Fossil Fuel-Fired Power Plants

The existing body of scientific evidence clearly demonstrates that the harms attributable to GHG emissions from U.S. fossil fuel-fired power plants surpass any reasonable threshold of "significance" under Section 111(b)(1)(A). EPA acknowledges that the U.S. power sector was responsible for approximately 3 percent of global total GHG emissions in 2022. This is an exceeding large share of global emissions. It is larger than the total GHG emissions attributable to most countries, with the exception of the top four emitters (U.S., China, India, and Russia).[66] It is equivalent to approximately half of the emissions attributable to the entire European Union, and it exceeds the emissions generated by the entire continent of Africa.[67] As another point of reference: the CO_2 emissions from U.S. fossil fuel-fired power plants were approximately 10.5% of total global CO_2 emissions from electricity and heat production.[68] Nonetheless, EPA asserts that this contribution is insignificant, in part due to the contribution of other nations to global GHG emissions.[69]

What EPA fails to acknowledge in this discussion is that this 3 percent contribution is enormous because the denominator (i.e., the total quantity of emissions and harms attributable to

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[62] See, e.g., Chae Yoen Park et al., *Attributing human mortality from fire $PM_{2.5}$ to climate change,* 14 NATURE CLIMATE CHANGE 1193 (2024).
[63] Khatana et al. (2024), *supra* note 60.
[64] Law et al. (2025), *supra* note 59.
[65] *See, e.g.,* Marina Romanello et al., *The 2024 report of the Lancet Countdown on health and climate change: facing record-breaking threats from delayed action*, 404 THE LANCET P1847 (2024); The Lancet Countdown on Health and Climate Change, *Policy brief for the United States* (2024).
[66] Emissions Database for Global Atmospheric Research, https://edgar.jrc.ec.europa.eu/report_2023.
[67] *Id.*
[68] In 2022, global electricity and heat production generated 14.6 Gt CO_2, and U.S. fossil fuel-fired power plants generated approximately 1.53 Gt CO_2. IEA, *CO_2 Global Emissions in 2022* (2023).
[69] Proposed Rule, 90 Fed. Reg. at 25,768.

those emissions) is also enormous. This becomes more evident when one considers the actual tonnage of GHG emissions attributable to the source category – according to EPA's latest GHG inventory, fossil fuel-fired power plants generated 1,554.6 million tons of CO_2-equivalent in 2022.[70] That's nearly 1.6 *billion* tons in a single year. It is impossible to capture the full scope of harms attributable to these emissions in quantitative metrics (because so many harms cannot be quantified), but there are a number of tools that can be used to generate damage estimates and provide insights on the magnitude of *some* of the attributable harms – and even then, the effect on health and welfare is clearly significant.

First, the metrics developed by EPA and other entities to measure the social cost of CO_2 and other GHGs could be used for this purpose.[71] These metrics were specifically developed to support regulatory decision-making by providing a monetary estimate of the net harm to society attributable to GHGs emitted in a given year. Here, we use EPA's 2023 social cost of CO_2 (SC-CO_2) to illustrate the potential magnitude of attributable harm.[72] Table 1 shows the social costs attributable to U.S. fossil fuel-fired generation, using EPA's 2023 SC-CO_2 (average 2% discount rate)[73] and EPA's most recent estimate of CO_2 emissions attributable to this source category (1,531.7 million metric tons in 2022). **The total estimated damages over a ten-year period from 2025-2034 are approximately $3.2 trillion (in 2020 dollars).**

Table 1: Social Cost of CO_2 (2% Discount rate), in 2020 $ (EPA 2023)

Year		Social Cost
2025	$	324,720,400,000
2026	$	322,858,333,333
2027	$	322,416,666,667
2028	$	321,868,191,721
2029	$	319,802,212,824
2030	$	319,080,812,726
2031	$	318,264,749,266
2032	$	316,024,575,063
2033	$	315,057,179,574
2034	$	314,006,219,981
10-year total	**$**	**3,194,099,341,155**

[70] Specifically, this sector generated 1,554.5 million tons of CO_2-equivalent in 2022. This figure includes CO2 emissions (1531.7 tons), nitrous oxide emissions (31.6 tons CO2-equivalent), and methane emissions (1.2 tons CO2-eqivalent) from the U.S. fossil fuel-fired power plants. [Cite EPA inventory]

[71] We recognize that the Trump administration has raised concerns about the technical validity of these estimates, and has issued guidance directing agencies to "limit their analysis and consideration of greenhouse gas emissions only to that plainly required in their governing statutes." OMB, Memorandum for Regulatory Policy Officers at Departments and Agencies and Managing and Executive Directors of Commissions and Boards (May 5, 2025). For the proposed rulemaking, EPA has a legal obligation to assess the magnitude of harm attributable to GHG emissions. EPA's 2023 social cost estimates continue to be a viable tool for quantifying such harms. These estimates incorporate dozens of peer-reviewed studies and reflect the best available science on GHG damage estimation. *See* Max Sarinsky & Kurt Weatherford, *The Social Cost of Greenhouse Gases: An Overview* (Institute for Policy Integrity May 2024).

[72] EPA, *Supplementary Material for the Regulatory Impact Analysis for the Final Rulemaking, "Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review"*, EPA-HQ-OAR-2021-0317 (Nov. 2023).

[73] EPA generated SC-CO_2 estimates at 2.5%, 2.0%, and 1.5% discount rates, and EPA used the 2.0% discount rates for its central estimates of social costs attributable to CO_2.

Notably, this cost estimate does not capture all climate related damages,[74] nor does it include the social costs of methane and nitrous oxide emissions attributable to this source category. Moreover, it does not reflect any potential increase in GHG emissions that may occur due to the administration's policy of supporting and subsidizing fossil fuels. But even a partial accounting of the attributable damages indicates that they are clearly significant.[75]

Scientists have developed other metrics that can also be used to evaluate the harms attributable to emissions on a per ton basis. For example, Burke et al. (2023) provide a framework for estimating both past and future damages attributable to GHG emissions on a per ton basis.[76] Other studies provide insights on physical impacts attributable to emissions on a per ton basis. Semken (2025) estimates the marginal impact of emission reductions on physical climate change outcomes, specifically finding that one ton reduction in CO_2 in 2025 would result in 4,000 liters less of glacier ice melt, a 6 hour increase in aggregate life expectancy,[77] and 5 m^2 decrease in vegetation undergoing ecosystem change.[78] Notz and Stroeve (2016) estimate that every additional ton of CO_2 will cause a sustained loss of approximately 3 square meters of September sea ice.[79]

There are also tools available to evaluate the magnitude of the contribution to climate change-related harms within the United States specifically. For example, the framework developed by Burke et al. (2023), above, can be used to estimate the contribution of a specific emitter to damages

[74] The EPA 2023 SC-CO_2 is a fairly comprehensive metric that captures damages attributable to changes in net agricultural productivity, human health effects, property damages from increased flood risk, changes in the frequency and severity of natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. However, EPA notes that it is not possible to include all physical, ecological, and economic impacts due to data and modeling limitations, and thus they do not capture the full scope of damages attributable to GHG pollution. EPA (2023), *supra* note 72 at 3, 5. For example, the EPA 2023 SC-CO_2 does not reflect "most of the consequences" attributable to changes in precipitation, damages from extreme weather events, the potential for nongradual damages from passing critical thresholds in natural and socioeconomic systems, non-climate mediated effects of GHG emissions, and feedback loops.

[75] These social cost estimates reflect the global harms attributable to U.S. power plant emissions. EPA should consider global costs in its harm analysis, as the Clean Air Act does not specifically restrict the harm analysis to domestic impacts, and EPA, along with the Office of Management and Budget (OMB) and the Interagency Working Group on the Social Cost of Carbon (IWG) have all previously acknowledged that a "focus on global [social cost] estimates in [regulatory impact analysis] is appropriate. *See id. at* FN 14, Section 1.3; OMB Circular A-4 (2003) (recognizing that when regulation is likely to have international effects, "these effects should be reported"); Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide – Interim Estimates under Executive Order 13990* (Feb. 2021) at 3 (finding that a "global perspective is essential for SC-GHG estimates because climate impacts occurring outside U.S. borders can directly and indirectly affect the welfare of U.S. citizens and residents," and in addition, "assessing the benefits of U.S. GHG mitigation activities requires consideration of how those actions may affect mitigation activities by other countries, as those international mitigation actions will provide a benefit to U.S. citizens and residents").

[76] Marshall Burke et al., *Quantifying Climate Change Loss and Damage Consistent with a Social Cost of Greenhouse Gases,* NBER Working Paper 31658 (September 2023).

[77] The "aggregate life expectancy" is defined as the life expectancy of everyone who lives until 2100 combined.

[78] Christoph Semken, *The Marginal Impact of Emission Reductions: Estimates, Beliefs, and Behaviors* (May 6, 2025).

[79] Dirk Notz & Julienne Stroeve, *Observed Arctic sea-ice loss directly follows anthropogenic CO_2 emission,* 354 SCIENCE 747 (2016).

within a specific country.[80] In addition, Hsiang et al. (2017) estimate that climate change causes overall economic damages in the United States equivalent to approximately 1.2% of GDP per 1°C on average, with larger damages at higher levels of warming.[81] Finally, Mankin et al. (2025) used climate models and an economic damage function to estimate U.S. economic damages attributable to the U.S. power sector, and in particular, its contribution to global mean surface temperature.[82] They determined that, from 1973-2023, GHG emissions from the U.S. power sector caused approximately $78 billion in damages. Notably, this is an estimate of historical damages from past emissions; it does not capture future damages from past emissions (which tend to be a larger share of overall attributable damages, particularly when looking at more recent emissions).

As with the SC-CO_2, these damage estimates only capture a portion of the harms attributable to GHG emissions, and thus these are conservative estimates that inevitably underestimate the total attributable damages. There may be significant variation in cost estimates due to differences in methodology and the scope of impacts included in the estimates. Nonetheless, all of the different damage and impact estimates support the overarching conclusion that emissions from this source category are "significant by any measure."[83]

Importantly: our goal in this discussion is to highlight the fact that tools are available to quantify impacts and damages attributable to the GHG emissions at issue in this rulemaking. However, we are not suggesting that it is *necessary* to use these tools in order to arrive at the conclusion that these emissions surpass any reasonable threshold of significance. As noted above, a 3% contribution to climate change-related harms is enormous, even when focusing only on damages that will occur within the United States. As detailed in NCA5, climate change is already causing pervasive adverse effects across the country, there are multiple climate impacts "of significant concern" in every U.S. region, climate-related damages "pose significant risks to the US economy", and every incremental increase in GHG emissions and fraction of a degree of additional warming will lead to increasing risks across essentially all U.S. regions and sectors.[84]

III. Conclusion

There is a vast body of scientific literature documenting the ways in which GHG emissions contribute to climate change and associated harms to public health and welfare. The available

[80] For example, the authors estimate that US CO_2 emissions from 1990-2020 resulted in $293 billion in damages to India and $167 billion in damages to Brazil. This analysis could be further downscaled to evaluate the contribution of U.S. power sector emissions to damages. Burke et al. (2023), *supra* note 76, at 15.
[81] Solomon Hsiang et al., *Estimating Economic Damage from Climate Change in the United States,* 356 SCIENCE 1262 (2017).
[82] Justin Mankin, Alexander R. Gottlieb, and Christopher W. Callahan, *Climate damages to the U.S. economy from U.S. power sector emissions* (June 2025).
[83] *See* Kate Welty & Dena Adler, *Significant by Any Measure: Reviewing Power Plant Emissions Under Section 111 of the Clean Air Act* (Institute for Policy Integrity May 2025).
[84] *See* NCA5 at Table 1.2 ("Climate Change is Already Affecting All US Regions and Will Continue To Have Impacts in the Near Term"); 1-32.

scientific data provides overwhelming support for the conclusion that GHG emissions from U.S. fossil fuel-fired power plants contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. Due to EPA's misinterpretation of its obligations under Section 111(b)(1)(A), EPA has not consulted any of the available scientific information on this topic, nor has it made any attempt to analyze the effect of these GHG emissions on public health and welfare. In sum: there is no legal or scientific support for EPA's "no significant contribution" determination.

Sincerely,

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