Joint Comments of Environmental and Public Health Organizations on Climate Science and Climate Change As They Pertain to EPA's Proposed Review of Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units

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I. INTRODUCTION

The Center for Biological Diversity, Clean Air Council, Clean Air Task Force, Clean Wisconsin, Conservation Law Foundation, Environmental Defense Fund, Minnesota Center for Environmental Advocacy, Natural Resources Defense Council, Sierra Club, and Union of Concerned Scientists (collectively, the "Organizations") submit the following comments concerning climate change and climate science on EPA's proposed rule entitled "Review of Standards of Performance for Greenhouse Gas Emissions from new, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units," 83 Fed. Reg. 65,424 (Dec. 20, 2018) ("Proposal").

In these comments, we summarize and attach comments on climate change and its consequences that we previously submitted to EPA's dockets for proposed rulemakings relating to greenhouse gas emissions from existing power plants. We then discuss and submit major new scientific findings[1,2] published since the date of those earlier comments. That evidence demonstrates that climate change damages are even more drastic and will become overwhelming even more rapidly than previously understood. The newly published work shows that truly calamitous outcomes cannot be avoided unless emissions are *steeply reduced within the next decade.*

In light of the vast body of scientific evidence of current and impending harm, the Proposal wholly fails to fulfill EPA's statutory mandate to protect the public from greenhouse

[1] IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, Maycock, M. Tignor, and T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp. ("IPCC Special Report").

[2] USGCRP [U.S. Global Change Research Program], Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II (Reidmiller, D.R. et al. eds.), U.S. Global Change Research Program, Washington, DC, USA (2018).

gas pollutants from new, modified, and reconstructed power plants. As fully discussed in other comments being filed in this docket by the Organizations and others, the Proposal would *increase* emission limits for new, modified or reconstructed coal-fired power plants from the current limit of 1,400 lbs. CO_2/MWhg[3] to between 1,900 and 2,200 lbs. CO_2/MWh-g.[4] This means that even at the low-end (1,900 CO_2/MWh-g), the Proposal would permit each new 600 MW power plant unit to emit 1.1 million additional tons of CO_2 per year.[5] Put another way, over the course of an average 48-year useful life, one such new unit would emit at least 52.8 million additional tons of CO_2.[6] For context, we note that EPA claims its proposal covering *all existing* fossil fuel-fired power plants would reduce CO_2 emissions by just 7 million tons by 2035[7] – in other words, even a single new coal-fired unit built according to the proposed standards would undo, many times over, the entirety of the purported CO_2 emission reductions EPA proposes for hundreds of existing power plants.

EPA also proposes to retain the current, inadequate standards for new and reconstructed gas-fired units, and seeks comment on whether they should be even further relaxed for certain simple-cycle gas units that sometimes operate in baseload capacity.[8] EPA makes this proposal even though numerous ways to strengthen standards for gas-fired power plants significantly are currently available, in use and cost effective.[9] For power plant modifications and reconstructions, EPA also increases emission limitations, thereby allowing old and inefficient units to undertake life extension projects while evading effective emission controls.[10] In short, although the Proposal purports to regulate power plant greenhouse gas pollution, it in fact enables emission *increases* by writing a blank check that greenlights the construction of even the dirtiest new power plant and useful life extensions for the dirtiest existing ones.

Notably, the agency's deeply irresponsible Proposal comes at a time when power plants not only continue to constitute the U.S.'s highest-emitting category of stationary source emitting

[3] Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (EGUs)," 80 Fed. Reg. 64,510 (Oct. 23, 2015) ("Current Standards"), at 64,513.
[4] Proposal, 83 Fed. Reg. at 64,513.
[5] EPA, Economic Impact Analysis for the Review of Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (Dec. 2018) ["2018 EIA"], at 2-4 – 2-6 tbls. 2-1, 2-6, & 2-7.
[6] *Id*.
[7] EPA, Regulatory Impact Analysis for the Proposed Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program, at ES-10, tbl. ES-8 (Aug. 2018). Even that low number is considerably overstated.
[8] Proposal, 83 Fed. Reg. at 65,460-461.
[9] *See* separate comments submitted by some of the Organizations to this docket. *See also* Joint Comments of Sierra Club, Clean Air Task Force, Environmental Defense Fund, Natural Resources Defense Council, Earthjustice, Environmental Law and Policy Center, Southern Environmental Law Center, and the National Wildlife Federation on EPA's proposed Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 1430 (Jan. 8, 2014), Docket No. EPA-HQ-OAR-2013-0495 (May 9, 2014) at 83-106.
[10] Proposal, 83 Fed. Reg. at 65,460-46.

greenhouse gases, but their emissions are again on the rise. Although the agency claims power plant emissions have decreased, that is no longer the case: not only have annual rates of emission declines been shrinking since 2016, but for 2018, a study estimates that they *increased* by 34 million metric tons.[11] This dangerous development was driven by a 166 million MWh increase in natural gas-fired generation in the first ten months of 2018, an amount more than triple that of the decreases in coal-fired generation over the same period of time.[12]

Lastly, our comments discuss some of the ways in which the Proposal violates EPA's duties under the Clean Air Act and falls far short of reasoned decision-making. EPA's Proposal blithely encourages increased carbon emissions while it almost entirely overlooks climate change or the damage it causes. The Proposal does not provide any analysis of how the Proposal affects the dire climate crisis already upon us, or explain the reversal of its findings in the rulemaking it seeks to replace. As a result of this flagrant omission, EPA has completely disconnected the Proposal from the Clean Air Act's objective: the protection of the environment and human health from dangerous pollution. Standing alone, this subversion of Congressional intent renders the Proposal unlawful, arbitrary and capricious. When seen in the context of EPA's other attempts to roll back current regulations reducing carbon emissions from the nation's vehicle fleet and other sources, it constitutes an utter abdication of the agency's duty to safeguard public health and the environment.

In sum, EPA's Proposal outlines deliberate steps to facilitate increasing power plant carbon emissions at precisely the time when the best available science discussed below – including science published by EPA itself along with twelve other U.S. government agencies – conclusively demonstrates that those emissions must be steeply reduced within the next decade. Instead, EPA throws gas on the five-alarm fire that climate change has become. The Proposal must be withdrawn.

II. THE EVIDENCE OF DEVASTATING CURRENT AND FUTURE HARM FROM CLIMATE CHANGE IS OVERWHELMING

A. Scientific Studies Overwhelmingly Demonstrate that Anthropogenic Climate Change Is Already Causing Immediate, Devastating Impacts to Communities Across the Country and These Harms Will Worsen Dramatically as Greenhouse Gas Pollution Continues to Rise.

In 2018, the Organizations and others submitted detailed comments to EPA in connection with the agency's efforts to roll back greenhouse gas emission guidelines for existing power plants. Those comments cited and summarized numerous scientific studies that conclusively

[11] Rhodium Group, Energy & Climate Staff, Preliminary US Emissions Estimates for 2018 (Jan. 8, 2019), https://rhg.com/research/preliminary-us-emissions-estimates-for-2018/ at 4.
[12] *Id.* at 4 and Figure 2.

prove the vast and escalating harms wrought by climate change. We here submit those earlier comments to this docket, attaching, incorporating them by reference and summarizing them, and then update that voluminous body of scientific work with studies published after the date of our earlier comments. They demonstrate that the damages and threats are even more dire and urgent than previously understood.

April 26, 2018 Comments. On April 26, 2018, we submitted comments specific to climate change in connection with EPA's proposed repeal of carbon pollution emission guidelines for existing power plants under Clean Air Act Section 111(d), 42 U.S.C. § 7411(d), attached hereto as Attachment A ("April 2018 Comments").[13] In summary, those comments discussed the overwhelming body of scientific work demonstrating that anthropogenic climate change is already causing immediate, devastating impacts to communities across the country, and that these harms will worsen as greenhouse gas pollution continues to rise. As detailed in the April 2018 Comments, scientific research has established that greenhouse gas emissions are making the Earth's climate hotter and more extreme; climate change and ocean acidification are harming biodiversity, ecosystems services, and public lands; and climate change is now affecting human health and morbidity, the U.S. economy and national security. We pointed out the many ways in which climate change already causes heat-related deaths and exacerbates respiratory and other diseases.[14] In 2017 alone, 16 separate weather and climate disaster events in the U.S. caused damages totaling $306 billion – a new U.S. record.[15]

Since we filed the April 2018 Comments, the U.S. federal government under the Trump Administration issued the second volume of the authoritative Fourth National Climate Assessment, a scientific synthesis prepared by hundreds of scientific experts and reviewed by the National Academy of Sciences, NOAA, NASA and many other federal agencies.[16] The Fourth National Climate Assessment, comprised of the 2017 *Climate Science Special Report* (Volume I)[17] and the 2018 *Impacts, Risks, and Adaptation in the United States* (Volume II),[18] once again

[13] Joint Comments of Environmental and Public Health Organizations Regarding the Proposed Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, Docket ID No. EPA-HQ-OAR-2017-0355 (Apr. 26, 2018), Attachment A.
[14] Attachment A at 10-12.
[15] Attachment A at 15.
[16] Avery, C.W., D.R. Reidmiller, T.S. Carter, K.L.M. Lewis, and K. Reeves, 2018: Report Development Process. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 1387–1409. doi: 10.7930/NCA4.2018.AP1 https://nca2018.globalchange.gov/chapter/appendix-1.
[17] USGCRP [U.S. Global Change Research Program], Climate Science Special Report: Fourth National Climate Assessment, Vol. I (Wuebbles, D.J. et al. eds.), U.S. Global Change Research Program, Washington, DC, USA (2017), https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf. This volume of the report is discussed in the April 2018 Comments.
[18] USGCRP [U.S. Global Change Research Program], Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II (Reidmiller, D.R. et al. eds.), U.S. Global Change Research Program, Washington, DC, USA (2018), https://nca2018.globalchange.gov/

established that human-caused climate change is inflicting widespread and intensifying harms across the country. It concludes that "there is no convincing alternative explanation" for the observed warming of the climate over the last century other than human activities.[19] It finds that "evidence of human-caused climate change is overwhelming and continues to strengthen, that the impacts of climate change are intensifying across the country, and that climate-related threats to Americans' physical, social, and economic well-being are rising."[20]

The Fourth National Climate Assessment decisively recognizes the dominant role of fossil fuels in driving climate change. It reports that "fossil fuel combustion accounts for approximately 85% of total U.S. greenhouse gas emissions,"[21] which is "driving an increase in global surface temperatures and other widespread changes in Earth's climate that are unprecedented in the history of modern civilization."[22]

Importantly, the Assessment makes clear that the harms of climate change are long-lived, and the choices we make now on reducing greenhouse gas pollution will affect the severity of the climate change damages in the coming decades and centuries: "[t]he impacts of global climate change are already being felt in the United States and are projected to intensify in the future—but the severity of future impacts will depend largely on actions taken to reduce greenhouse gas emissions and to adapt to the changes that will occur."[23] As the report explains: "[m]any climate change impacts and associated economic damages in the United States can be substantially reduced over the course of the 21st century through global-scale reductions in greenhouse gas emissions, though the magnitude and timing of avoided risks vary by sector and region. The effect of near-term emissions mitigation on reducing risks is expected to become apparent by mid-century and grow substantially thereafter."[24]

Among its findings, Volume II of the Fourth National Climate Assessment emphasized that climate change is already leading to substantial economic losses in the U.S., and that these losses will be much more severe under higher emissions scenarios, impeding economic growth:

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[19] USGCRP [U.S. Global Change Research Program], Climate Science Special Report: Fourth National Climate Assessment, Vol. I (Wuebbles, D.J. et al. eds.), U.S. Global Change Research Program, Washington, DC, USA (2017), https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf at 10.

[20] Jay, A., D.R. Reidmiller, C.W. Avery, D. Barrie, B.J. DeAngelo, A. Dave, M. Dzaugis, M. Kolian, K.L.M. Lewis, K. Reeves, and D. Winner, 2018: Overview. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 33–71. doi: 10.7930/NCA4.2018.CH1 at 36.

[21] *Id.* at 60.

[22] *Id.* at 39.

[23] *Id.* at 34.

[24] Martinich, J., B.J. DeAngelo, D. Diaz, B. Ekwurzel, G. Franco, C. Frisch, J. McFarland, and B. O'Neill, 2018: Reducing Risks Through Emissions Mitigation. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 1346–1386. doi: 10.7930/NCA4.2018.CH29 at 1347.

> Without substantial and sustained global mitigation and regional adaptation efforts, climate change is expected to cause growing losses to American infrastructure and property and impede the rate of economic growth over this century.[25]
>
> In the absence of more significant global mitigation efforts, climate change is projected to impose substantial damages on the U.S. economy, human health, and the environment. Under scenarios with high emissions and limited or no adaptation, annual losses in some sectors are estimated to grow to hundreds of billions of dollars by the end of the century. It is very likely that some physical and ecological impacts will be irreversible for thousands of years, while others will be permanent.[26]

For example, according to the Assessment, the number of extreme weather events per year costing more than one billion dollars per event has increased significantly since 1980, with the total costs of these events exceeding $1.1 trillion.[27] Between 2015 and April 2018 alone, 44 billion-dollar weather and climate disasters struck the United States, causing nearly $400 billion in damages.[28] It estimated the 2017 Atlantic Hurricane season to have caused more than $250 billion in damages and hundreds of deaths throughout the U.S. Caribbean, Southeast, and Southern Great Plains.[29]

By the end of the century, the Assessment estimated that warming on our current high emissions trajectory would cost the U.S. economy hundreds of billions of dollars each year and up to 10 percent of U.S. gross domestic product due to damages including lost crop yields, lost labor, increased disease incidence, property loss from sea level rise, and extreme weather

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[25] USGCRP [U.S. Global Change Research Program], Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II (Reidmiller, D.R. et al. eds.), U.S. Global Change Research Program, Washington, DC, USA (2018), https://nca2018.globalchange.gov/, at Summary Findings, p. 25.

[26] Martinich, J., B.J. DeAngelo, D. Diaz, B. Ekwurzel, G. Franco, C. Frisch, J. McFarland, and B. O'Neill, 2018: Reducing Risks Through Emissions Mitigation. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 1346–1386. doi: 10.7930/NCA4.2018.CH29 at 1347.

[27] Hayhoe, K., D.J. Wuebbles, D.R. Easterling, D.W. Fahey, S. Doherty, J. Kossin, W. Sweet, R. Vose, and M. Wehner, 2018: Our Changing Climate. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 72–144. doi: 10.7930/NCA4.2018.CH2 at 81.

[28] Jay, A., D.R. Reidmiller, C.W. Avery, D. Barrie, B.J. DeAngelo, A. Dave, M. Dzaugis, M. Kolian, K.L.M. Lewis, K. Reeves, and D. Winner, 2018: Overview. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 33–71. doi: 10.7930/NCA4.2018.CH1 at 66

[29] *Id.* at 66

damage.[30] To put that worst case estimate into context, we note that 10 percent of the U.S.' gross domestic product for 2017 amounts to over 1.9 trillion dollars.[31]

B. The IPCC Special Report Demonstrates that Steep Reductions in Greenhouse Gas Emissions Must be Made in the Coming Decade to Avoid the Most Devastating Consequences of Climate Change.

In 2018, the Intergovernmental Panel on Climate Change (IPCC), the international scientific body for the assessment of climate change, issued a *Special Report on Global Warming of 1.5°C*.[32] The IPCC Special Report provides overwhelming and compelling evidence that climate hazards are more urgent and more severe than previously thought, and that aggressive reductions in emissions *within the next decade* are essential to avoiding the most devastating climate harms. With others, the Organizations submitted comments discussing the IPCC Special Report to the docket for EPA's proposed emission guidelines for existing power plants, and we are attaching and incorporating them by reference here.[33] As we pointed out there, "The longer we wait to reduce emissions, the greater the risks will be, and the greater the cost of reducing those risks in the future. Action too long delayed may put a sustainable climate out of reach altogether."[34]

The IPCC Special Report quantifies the harms that would occur at 2°C warming compared with 1.5°C, and the differences are stark. According to the IPCC's analysis, the damages that would occur at 2°C warming compared with 1.5°C include significantly more deadly heatwaves, drought and flooding; 10 centimeters of additional sea level rise within this century, exposing 10 million more people to flooding; a greater risk of triggering the massive ice loss from the Greenland and Antarctic ice sheets with resulting multi-meter sea level rise over hundreds to thousands of years; dramatically increased species extinction risk, including a doubling of the percentage of vertebrate and plant species losing more than half their habitable range, and the virtual elimination of coral reefs; 1.5 to 2.5 million more square kilometers of

[30] Martinich, J., B.J. DeAngelo, D. Diaz, B. Ekwurzel, G. Franco, C. Frisch, J. McFarland, and B. O'Neill, 2018: Reducing Risks Through Emissions Mitigation. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 1346–1386. doi: 10.7930/NCA4.2018.CH29 at 1357 to 1361.

[31] Countryeconomy.com, United States (USA) GDP – Gross Domestic Product, *available at* https://countryeconomy.com/gdp/usa?year=2017.

[32] IPCC [Intergovernmental Panel on Climate Change], Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (Oct. 6, 2018), http://www.ipcc.ch/report/sr15/.

[33] Comments of Environmental and Public Health Organizations on EPA's Proposed Emission Guidelines for Greenhouse Gas Emissions From Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program, 83 Fed. Reg. 44,746 (Aug. 31, 2018), Comments Concerning Climate Science and Climate Change, submitted to Docket No. EPA-HQ-OAR-2017-0333 (Oct. 31, 2018), Attachment B.

[34] Health and Environmental Organizations' April 2018 Climate Change Comment at 19.

thawing permafrost area with the associated release of carbon dioxide and methane, a potent greenhouse gas; a tenfold increase in the probability of ice-free Arctic summers; a higher risk of heat-related and ozone-related deaths and the increased spread of mosquito-borne diseases such as malaria and dengue fever; reduced yields and lower nutritional value of staple crops like maize, rice, and wheat; a doubling of the number of people exposed to climate-change induced increases in water stress; and up to several hundred million more people both exposed to climate-related risks and susceptible to poverty by 2050.[35]

The IPCC report concludes that pathways to limit warming to 1.5°C with little or no overshoot require "a rapid phase out of CO_2 emissions and deep emissions reductions in other GHGs and climate forcers."[36] In pathways consistent with a 1.5°C temperature increase, global net anthropogenic CO_2 emissions must decline *by about 45% from 2010 levels by 2030*, reaching net zero around 2050 (*high confidence).*[37] For a two-thirds chance for limiting warming to 1.5°C, CO_2 emissions must reach carbon neutrality in 25 years (*high confidence).*[38] The IPCC Special Report lays out in stark terms that a mere one-half of a degree Celsius of additional warming makes a vast difference in avoiding immense damage in food and water security, loss of coastal properties, extreme heat waves, droughts and flooding, migration, poverty, devastating health outcomes and lives lost. And it leaves no doubt that emission reductions within *just the next decade* will make that difference.

C. New Scientific Studies Confirm that Climate Change Harms are Escalating and that the U.S. Must Take Immediate Action to Rapidly Reduce Greenhouse Gas Pollution to Avoid Catastrophic Damages

Evidence accumulating since we submitted our comments in 2018 demonstrates that climate change continues its alarming escalation. 2018 was the fourth warmest year in the last five years, with only 2017, 2016 and 2015 surpassing 2018; nine of the last 10 years are the hottest years in recorded human history.[39] The overheating of our planet is speeding up.

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[35] IPCC Special Report at Summary for Policymakers, 8 to 14.
[36] IPCC Special Report at Chapter 2, 2-28.
[37] IPCC Special Report at Summary for Policymakers, 6 and 14 "Each finding is grounded in an evaluation of underlying evidence and agreement. A level of confidence is expressed using five qualifiers: very low, low, medium, high and very high, and typeset in italics, for example, medium confidence. The following terms have been used to indicate the assessed likelihood of an outcome or a result: virtually certain 99–100% probability, very likely 90–100%, likely 66–100%, about as likely as not 33–66%, unlikely 0–33%, very unlikely 0–10%, exceptionally unlikely 0–1%. Additional terms (extremely likely 95–100%, more likely than not >50–100%, more unlikely than likely 0–<50%, extremely unlikely 0–5%) may also be used when appropriate."
[38] *Id.* at Summary for Policymakers, at 14-15.
[39] National Aeronautics and Space Administration, *2018 Fourth Warmest Year in Continued Warming Trend, According to NSA, NOAA* (Feb. 6, 2019), *available at* https://www nasa.gov/press-release/2018-fourth-warmest-year-in-continued-warming-trend-according-to-nasa-noaa; Washington Post, *Undeniable Warming: The Planet's Hottest Five Years on Record in Five Images* (Feb. 6, 2019) *available at* https://www.washingtonpost.com/weather/2019/02/06/undeniable-warming-planets-hottest-five-years-record-five-images/?utm_term=.a3ae26c3172e.

In addition to Volume II of the Fourth National Climate Assessment and the *IPCC Special Report*, new scientific research published since April 2018 confirms that the U.S. must take immediate action to rapidly reduce greenhouse gas pollution to avoid catastrophic damages from climate change. That additional research is summarized below.

1. Added scientific support for the 2009 EPA Endangerment Finding

In 2009 EPA found that the then-current and projected concentrations of greenhouse gas pollution endanger the public health and welfare of current and future generations, based on robust scientific evidence of the harms from climate change.[40] A 2018 study reviewed the scientific evidence that has emerged since 2009 and concluded that this evidence "lends increased support" for EPA's endangerment finding.[41] The study by 16 prominent scientists examined the topics covered by the endangerment finding and concluded that "[f]or each of the areas addressed in the [endangerment finding], the amount, diversity, and sophistication of the evidence has increased dramatically, clearly strengthening the case for endangerment."[42] The study also found that the risks of some impacts are even more severe or widespread than anticipated in 2009:

> Newly available evidence about a wide range of observed and projected impacts strengthens the association between risk of some of these impacts and anthropogenic climate change; indicates that some impacts or combinations of impacts have the potential to be more severe than previously understood; and identifies substantial risk of additional impacts through processes and pathways not considered in the endangerment finding.[43]

There is no doubt that the overwhelming evidence of endangerment from greenhouse gas emissions EPA documented in 2009 has become even more conclusive in the intervening years.

2. Global and U.S. greenhouse gas emissions continue to rise, exacerbating climate change harms

While temperatures are increasing relentlessly, global and U.S. greenhouse gas emissions have risen sharply in 2018—even though climate science demonstrates that emissions must be cut aggressively and immediately to avoid climate change's most devastating effects. After three years of little or no emissions growth, global fossil CO_2 emissions increased 1.6 percent in 2017,

[40] U.S. EPA [U.S. Environmental Protection Agency], Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Final Rule, 74 Federal Register 66496 (2009).
[41] Duffy, Philip B. et al., Strengthened Scientific Support for the Endangerment Finding for Atmospheric Greenhouse Gases, Science doi: 10.1126/science.aat5982 (2018) at 1.
[42] *Id.* at 1.
[43] *Id.* at 1.

reaching 36.2 billion metric tons (Gt) CO_2 pollution—a level 63 percent higher than in 1990.[44] In 2018, global fossil CO_2 emissions rose even more steeply, estimated at 2.7 percent higher than 2017, reaching a record of *37.1 billion metric tons CO_2 pollution* in just one year.[45]

U.S. carbon dioxide emissions also rose sharply in 2018, following three years of decline and an overall downward trend since 2007. Analysis by the Global Carbon Project estimated that U.S. fossil CO_2 emissions increased by around 2.5 percent in 2018, reaching 5.4 billion metric tons of CO_2 pollution.[46] According to the analysis, the U.S. emissions increase largely came from a rise in natural gas use. Although emissions from U.S. coal use declined by 3.1 percent, emissions from natural gas use increased by 9.2 percent and emissions from oil use increased by 1.6 percent in 2018.[47]

An analysis by the Rhodium Group similarly estimated that U.S. energy-related CO_2 emissions increased by 3.4 percent in 2018, marking the second largest annual gain since 1996, surpassed only by the 3.6 percent increase in 2010 when the economy rebounded from the recession.[48] U.S. emissions in 2018 rose across all analyzed sectors—power, transport, industry and buildings.

In the U.S. power sector, emissions rose by 34 million metric tons in 2018, compared to a decline of 78 million metric tons in 2017 and an average annual decline of 61 million metric tons between 2005 and 2016.[49] The 1.9 percent increase in emissions from electric power generation was primarily driven by the increased use of natural gas, used to meet a rising demand for electricity.[50] According to the analysis, between January and October 2018, U.S. power companies added a greater share of gas capacity than the share of retired coal capacity, and twice as much gas went online as combined wind and solar capacity additions during that period.[51] The Rhodium report warned that "the U.S. was already off track in meeting its Paris Agreement targets"; the steep emissions increase in 2018 has made the gap even wider.[52]

3. New studies document that climate harms are rapidly escalating and that the climate system is approaching or has surpassed dangerous tipping points

[44] LeQuéré, Corinne et al., Global carbon budget 2018, 10 Earth System Science Data 2141 (2018); Jackson, Robert B. et al., Global energy growth is outpacing decarbonization, 13 Environmental Research Letters 120401 (2018).
[45] Jackson et al. at 5.
[46] *Id.* at 3.
[47] Global Carbon Project, Global Carbon Budget 2018 *(*published on Dec. 5, 2018) https://www.globalcarbonproject.org/carbonbudget/18/files/GCP_CarbonBudget_2018.pdf, at 35 (Fossil CO_2 Emissions in USA).
[48] Rhodium Group, Preliminary US Emissions Estimates for 2018, Energy and Climate Staff (Jan. 8, 2019), https://rhg.com/research/preliminary-us-emissions-estimates-for-2018/
[49] *Id.*
[50] *Id.*
[51] *Id.*
[52] *Id.*

New research documents that the massive Greenland and Antarctic ice sheets are losing ice at an accelerating rate through increasing glacier calving and surface melting, and are approaching or already may have passed tipping points of irreversible ice loss. A 2019 study found that Greenland's southwest ice sheet is losing ice at nearly four times the rate it did in 2003, and concluded that "Greenland's air–sea–ice system crossed one or more thresholds or tipping points near the beginning of this millennium, triggering more rapid deglaciation."[53] Another study found that, over the past two decades, Greenland's ice sheets have been melting at a rate 50% higher than pre-industrial levels and 33% above 20th-century levels, meaning that more meltwater is released from Greenland's ice sheet now than at any time in the last 350 years and likely going back 6,000 to 7,000 years.[54] A separate study estimated that the rate of ice loss from melting Arctic glaciers and from the Greenland ice sheet tripled during the past decade compared with the previous two decades, now adding over a millimeter to the global sea level each year.[55] At the southern pole, the rate of ice loss from the massive Antarctic ice sheet has increased by more than six-fold since the late 1970s, leading to 250 billion tons of ice or meltwater pouring into the ocean each year, and research suggests that the East Antarctic ice sheet, once thought to be stable, is losing substantial amounts of ice.[56] Permafrost is thawing worldwide as temperatures rise, and the carbon dioxide and methane released from thawing permafrost has the potential to amplify human-induced warming, possibly significantly.[57]

A 2019 study estimated that the oceans are warming 40 percent faster than scientists projected, and that the rate of ocean warming is accelerating.[58] The study warned that rapid warming of the oceans has widespread impacts and have contributed to increases in rainfall intensity, rising sea levels, the destruction of coral reefs, declining ocean oxygen levels, and ice loss from glaciers, ice sheets and Arctic sea ice.

Another 2019 study found that climate change is weakening the ability of the terrestrial biosphere (vegetation and soil) to uptake carbon, a significant development because the

[53] Bevis, Michael et al., Accelerating changes in ice mass within Greenland and the ice sheet's sensitivity to atmospheric forcing, PNAS doi/10.1073/pnas.1806562116 (2019).
[54] Trusel, Luke D. et al., Nonlinear rise in Greenland runoff in response to post-industrial Arctic warming, 564 Nature 104 (2018).
[55] Box, Jason E. et al., Global sea-level contribution from Arctic land ice: 1971-2017, 13 Environmental Research Letters 125012 (2018).
[56] Rignot, Eric et al., Four decades of Antarctic ice sheet mass balance from 1979-2017, PNAS doi/10.1073/pnas.1812883116 (2019); Slater, Thomas and Andrew Shepherd, Antarctic ice losses tracking high, 8 Nature Climate Change 1025 (2018); IMBIE, Mass balance of the Antarctic ice sheet from 1992 to 2017, 558 Nature 219 (2018).
[57] USGCRP [U.S. Global Change Research Program], Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II (Reidmiller, D.R. et al. eds.), U.S. Global Change Research Program, Washington, DC, USA (2018), https://nca2018.globalchange.gov/ at 74; Biskaborn, Boris K. et al., Permafrost is warming at a global scale, Nature Communications doi.org/10.1038/s41467-018-08240-4 (2019).
[58] Cheng, Lijing et al., How fast are the oceans warming?, 363 Science 128 (2019).

terrestrial biosphere absorbs about 25 percent of anthropogenic carbon dioxide emissions.[59] The research showed that droughts, heat waves and other extreme climate-related events reduce soil moisture, lowering carbon uptake now and projected into the future.

According to new research, climate change has also played a significant role in spurring the migration of refugees seeking asylum during 2011 to 2015 by affecting drought severity and the likelihood of armed conflict.[60] The study found a strong connection between climate change stress and human migration, particularly in the violent and destabilizing conflicts that erupted in western Asia and in sub-Saharan Africa.

In sum, the incontrovertible evidence of climate change's increasingly dire effects on our environment, health and lives spans decades, and the newest scientific studies, including those issued by numerous U.S. government agencies and the IPCC, make clear that emissions must be steeply reduced within the next decade across all sectors to avoid runaway calamities.

III. THE PROPOSAL'S FAILURE TO MEANINGFULLY DISCUSS, LET ALONE ARTICULATE A RATIONAL BASIS FOR IGNORING ITS IMPACTS OR A REASONED EXPLANATION FOR EPA'S CHANGE IN POSITION, IS UNLAWFUL, ARBITRARY AND CAPRICIOUS

The Proposal purports to implement regulations under Section 111 of the Clean Air Act, 42 U.S.C. § 7411, the Clean Air Act provision that "'speaks directly'"[61] to climate change-causing greenhouse gas emissions from power plants, their largest stationary sources. Yet, absurdly, the preamble to the Proposal does not once mention climate change or the damage it wreaks – and the accompanying Economic Impact Analysis contains only a cursory reference to climate change.[62] The Proposal also lacks any discussion of climate science, the gravity of climate harm, the urgent need to take action, the amount of damage at stake, or the centrality of the power sector's role in reducing overall emissions. Further, EPA makes no attempt to explain *why* it no longer concerns itself with these issues, in direct contradiction to the repeated and strong warnings in the preamble to the Current Standards that supplied EPA's rationale for its

[59] Green, Julia K. et al., Large influence of soil moisture on long-term terrestrial carbon uptake, 564 Nature 476 (2019).
[60] Abel, Guy J. et al., Climate, conflict and forced migration, 54 Global Environmental Change 239 (2019).
[61] *American Electric Power Co. v. Connecticut*, 564 U.S. 410, 424 (2011).
[62] While the Proposal is entirely silent, the Economic Impact Analysis for the Proposal does devote a single short paragraph to the subject. The paragraph concedes that it is the "adverse impacts" from climate change that "necessitate EPA regulation of GHGs from EGU sources", and admits that a coal-fired plant constructed under the proposed standards "would have higher CO_2 emissions" than one adhering to the Current Standards, but then declares, without explanation, that "[w]e do not attempt to quantify the impacts of these increased emissions or the economic value of these impacts." Economic Impact Analysis for the Review of Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (Dec. 2018) at 2-6.

2015 final rule.[63] Here, EPA fails to connect the Proposal to the reason why EPA must promulgate greenhouse gas regulations of power plants in the first place – that is, to reduce damage from climate change through the best system available to curb these emissions – despite EPA's admission that coal-fired power plants built under the proposed standards will cause far greater emissions than plants built under the Current Standards.[64] This vast analytical gap renders the exercise arbitrary and capricious.

The Proposal does not fulfill basic requirements of reasoned decisionmaking.[65] Under this standard, an agency undertaking a rulemaking must examine "all relevant factors" and record evidence, and articulate a reasoned explanation for its decision that demonstrates a "rational connection between the facts found and the choice made."[66] In addition, "[a]n agency changing its course must supply a reasoned analysis indicating that prior policies and standards are being deliberately changed, not casually ignored."[67] Where an agency's "new policy rests upon factual findings that contradict those which underlay its prior policy," the agency must "provide a more detailed justification than what would suffice for a new policy created on a blank slate."[68]

The Proposal does not meet any of these requirements. EPA's complete silence on climate change stands in stark contrast to its many previous, explicit findings on the subject in numerous other rulemakings, where it unequivocally determined that climate change is a dire and urgent hazard to the environment and the public.[69] EPA's silence is also incompatible with its findings

[63] Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric utility Generating Units; Final Rule (Oct. 23, 2015), 80 Fed. Reg. 64,510, 64,517–522.
[64] 2018 EIA, at 2-4 – 2-6 tbls. 2-1, 2-6, & 2-7.
[65] Clean Air Act, 42 U.S.C. § 7607(d)(9)(A); Administrative Procedure Act, 5 U.S.C. § 706(2)(A), respectively.
[66] *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.,* 464 U.S. 29, 43 (1983).
[67] *Lone Mountain Processing, Inc. v. Sec'y of Labor,* 709 Fed. 1161, 1164 (D.C. Cir. 2013) (internal quotation marks and citations omitted); *Am. Wild Horse Res. Campaign v. Perdue*, 873 F.3d 914, 927 (D.C. Cir. 2017) (agency reversing direction is not permitted "to whistle past [the] factual graveyard" and disregard previous policy and underlying record).
[68] *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009); see also *Encino Motorcars, LLC v. Navarro*, 136 S. Ct. 2117, 2125-26 (2016); *Nat'l Lifeline Ass'n v. FCC*, 2019 WL 405020, *5–*6 (D.C. Cir. Feb. 1, 2019).
[69] EPA has repeatedly and in strong terms affirmed both the gravity of the hazards climate change causes and the urgency of reducing emissions to mitigate those hazards. *See, e.g.*, Standards of Performance for Municipal Solid Waste Landfills, 81 Fed. Reg. 59,332, 59,337-39 (Aug. 29, 2016) (canvassing wide variety of serious harms from climate change and discussing recent assessments of the state of the science); *Id.* at 59,339 ("These assessments and observed changes raise concerns that reducing emissions of GHGs across the globe is necessary in order to avoid the worst impacts of climate change, and underscore the urgency of reducing emissions now."); Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles— Phase 2, 80 Fed. Reg. 40,138, 40,138 (July 13, 2015) (new scientific "assessments highlight the urgency of the situation as the concentration of CO2 in the atmosphere continues to rise. Absent a reduction in emissions, a recent National Research Council of the National Academies assessment projected that concentrations by the end of the century would increase to levels that the Earth has not experienced for millions of years."); 2016 Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills, 81 Fed. Reg. 59,276, 59,283 (Aug. 29, 2016); 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, 77 Fed. Reg. 62,624, 62,894-95 (Oct. 15, 2012); 80 Fed. Reg. 64,673-75 (discussing "urgent" need for emission reductions).

in its own 2015 final rule setting standards for greenhouse gas emissions from new, modified or reconstructed power plants – the very rule it here purports to replace. In that rule, EPA carefully described the numerous, comprehensive, and peer-reviewed national and international reports on climate change's harmful consequences issued since 2009, finding that they

> confirm and strengthen the conclusion that GHGs endanger public welfare, and emphasize the urgency or reducing GHG emissions due to their projections that show GHG concentrations climbing to ever-increasing levels in the absence of mitigation. The [National Research Council] . . . stated that 'the magnitude and rate of the present greenhouse gas increase place the climate system in what could be one of the most severe increases in radiative forcing of the global climate system in Earth history.'[70]

Indeed, EPA designated the urgent need to set standards to reduce greenhouse gas emissions from new power plants as the rationale for its work. Among other things, EPA observed that

- "reducing emissions of GHGs across the globe is necessary in order to avoid the worst impacts of climate change, and [recent assessments] underscore the urgency of reducing emissions now."[71]
- "Waiting for unacceptable impacts to occur before taking action is imprudent because the effects of greenhouse gas emissions do not fully manifest themselves for decades and, once manifest, many of these changes will persist for hundreds or even thousands of years."[72]
- "Future temperature changes will depend on what emission path the world follows."[73]
- "Fossil fuel-fired EGUs are by far the largest emitters of GHGs among stationary sources in the U.S. . . . Among fossil fuel-fired EGUs, coal-fired units are by far the largest emitters."[74]

But EPA ignores the prior record, gives no reasons for its about-face, and supplies no new or different rationale for regulating power plant greenhouse gas emissions. If EPA intends to reverse its vociferous prior findings about climate change and its consequences, it cannot do so *sub silentio* but must fully explain and justify its about-face. As it is, EPA has violated basic requirements of administrative law, rendering the Proposal unlawful, arbitrary and irrational.

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[70] EPA, Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,510, 64,518 (Oct. 23, 2015) ("2015 Power Plant NSR Rule").
[71] 2015 Power Plant NSR Rule at 64,520.
[72] *Id.*
[73] *Id.* at 64,518 (internal quotations omitted).
[74] *Id.* at 64,522.

And yet, merely by issuing the Proposal, EPA appears to be engaged in "regulating" emissions from new, modified and reconstructed power plants, even though no actual reductions would be accomplished. To the contrary, the Proposal gives carte blanch to even the dirtiest of new power plant designs. This subterfuge creates the perception that action is being taken under Section 111 of the Clean Air Act and that therefore, federal common law remedies for climate change damages are preempted. *Cf. American Electric Power Co. v Connecticut*.[75] But because the Proposal, if finalized, would exacerbate the problem it supposedly solves, it is unlawful, arbitrary and capricious, and cannot fulfill the Clean Air Act's mandate to protect the public health and welfare.

EPA's action must also be seen in the context of its other regulatory endeavors. While proposing to weaken standards for new power plants, it is also attempting to replace standards for existing power plants with new guidelines that would do next to nothing to curb their emissions, and likely will even increase them.[76] This means that EPA would leave the U.S.'s largest stationary source of this deadly pollution largely untouched.

At the same time, EPA is proposing to roll back greenhouse gas emission standards from light-duty motor vehicles, now the nation's largest source of greenhouse gases. In that proposed rollback, EPA seeks to portray the vast amount of additional emissions a rollback would cause as "minimal" because, by themselves, they purportedly account for only a relatively small amount of incremental increase in global atmospheric CO_2 concentrations, warming and sea level rise by 2100.[77] Standing alone, this reasoning is plainly arbitrary and capricious as it disregards the purpose and structure of the Clean Air Act, which is designed and intended to regulate numerous individual stationary and mobile source categories to achieve effective overall pollution reductions, precisely because by themselves, individual sources may contribute only a fraction of the harmful emissions. But when taken in conjunction with EPA's efforts to issue blank emission checks to the power sector (as well as other major emission sources),[78] EPA's scheme to obliterate as many greenhouse gas regulations as possible amounts to an outright assault on public health, the environment, and a livable planet.

[75] *American Electric Power Co. v. Connecticut*, 564 U.S. 410, 424 (2011).
[76] Joint Comments of Environmental and Public Health Organizations on the Best System of Emission Reduction and Other Issues in EPA's Proposed Emission Guidelines for Greenhouse Gas Emissions From Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program (Octo. 31, 2018), submitted to Docket No. EPA-HQ-OAR-2017-0355, at 1.
[77] Proposed Rule, The Safer Affordable Fuel-Efficient Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks, 83 Fed. Reg. 42985, 42,996 (Aug. 24, 2018) (stating that additional emissions attributable to less stringent standards would cause less than one part per million to global atmospheric CO2 concentrations by 2100 and would contribute less than three thousandths of a degree Celsius to global average temperatures, which the agencies predict will have increased by a whopping 3.4 degrees Celsius).
[78] *E.g.*, Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration, Oil and Gas proposal, EPA-HQ-OAR-2017-0483.

That assault is particularly pernicious here because the reduction and eventual elimination of greenhouse gases as a byproduct of power generation is an essential prerequisite to enable other emission sources to reduce their own emissions. Chief among sources dependent on clean power to meet their reduction goals is transportation, and its largest component, the light duty vehicle fleet. The most effective – and eventually the only sustainable – pathway to eliminating emissions from that fleet and from medium- and heavy-duty vehicles is their electrification.[79] But any rule that greenlights unconstrained or even expanded use of fossil fuels to generate the power necessary to run an electrified vehicle fleet sabotages those efforts. EPA, however, pays no heed to any of these consequences of its Proposal.

IV. CONCLUSION

The Proposal's failure to comply with basic rulemaking requirements is flagrant. EPA does not just fail to consider all "relevant factors" – it says nothing at all about climate change and its horrendous effects, the very reason why power plant carbon emissions must be reduced. But EPA cannot weigh competing factors and select a solution to a problem it does not acknowledge exists. By failing to consider climate change and its horrendous damages, the Proposal does not merely impermissibly "put a thumb on the scales" of the costs and benefits of its proposed action,[80] but eliminates the scale itself. The Proposal is arbitrary, capricious and unlawful.

In sum, for the numerous reasons set forth in other joint and separate comments submitted to this docket by the Organizations and others, EPA must withdraw the Proposal.

[79] Attachment A at 24-26 further explains the correlation between the generation of clean power and the success of efforts to decarbonize nation's vehicle fleet. For example, there we pointed out that, according to a recent study by the Union of Concerned Scientists, by transitioning to an 80 percent zero-carbon electric grid by 2050 the U.S. can reduce average lifecycle EV emissions by 60 percent. Union of Concerned Scientists, Cleaner Cars from Cradle to Grave: How Electric Cars Beat Gasoline Cars on Lifetime Global Warming Emissions at 2 (Nov. 2015), www.ucsusa.org/clean-vehicles/electric-vehicles/life-cycle-ev-emissions#.Wh8HVYanHcs. No such reductions are achievable absent a clean power source.

[80] *Center for Biological Diversity v. NHTSA*, 538 F.3d 1172, 1198 (2008).

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