ARTICLES

Returning to Clean Air Act Fundamentals: A Renewed Call to Regulate Greenhouse Gases Under the National Ambient Air Quality Standards (NAAQS) Program

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INTRODUCTION

In the more than a decade since the Supreme Court resolved that greenhouse gases are "air pollutants" under the Clean Air Act ("Act"),[1] the Environmental Protection Agency ("EPA") has grappled with how to bring the Act to bear on the existential threat these pollutants pose to the earth and all its inhabitants. Under

1. Massachusetts v. EPA, 549 U.S. 497 (2007).

President Obama, the EPA addressed greenhouse gases by regulating several of the most important sources.[2] Those efforts, although salutary, were limited and subject to protracted litigation.[3] At the same time, President Obama left office without invoking the Act's most far-reaching and important tool: the National Ambient Air Quality Standards ("NAAQS") program, or even responding to a 2009 rulemaking petition urging such regulations.[4]

The NAAQS program is the heart of the Clean Air Act, providing an overarching, comprehensive program for the reduction of those air pollutants, emitted from numerous and diverse sources, that endanger public health or welfare. Critically, the NAAQS program allows states to use their broad regulatory powers over sectors not subject to federal legislation to optimally attain the NAAQS through State Implementation Plans ("SIPs").[5] While there have certainly been challenges in implementing the NAAQS program over the years, it has made significant strides in reducing levels of the existing listed criteria air pollutants—lead, ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and particulate matter.

The Trump Administration does not plan to promulgate a greenhouse gas NAAQS.[6] To the contrary, the current EPA is curtailing and rolling back not only the Obama Administration's greenhouse gas regulations, but the larger Clean Air Act framework that has been a bedrock of the Agency's approach to protecting public health and the environment for generations.[7]

However, the premise of this Article is that, under a new administration, the EPA will resume its congressional mandate to make science-driven decisions to protect human health and the environment. At that time, the EPA should inaugurate its return to that mission by finally promulgating NAAQS for greenhouse

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2. The EPA's greenhouse gas regulation began with its "endangerment finding" for greenhouse gases from mobile sources, *see* Coal. for Responsible Regulation, Inc. v. EPA, 684 F.3d 102 (D.C. Cir. 2012) (upholding endangerment finding), *aff'd in part, rev'd on other grounds sub nom.* Util. Air Regulatory Group v. EPA, 134 S. Ct. 2427 (2014), and had spread to other areas before the Trump Administration began rolling back even that progress. *See infra* pp. 245–54.

3. *Id.*

4. *See* Ctr. for Biological Diversity & 350.org, *Petition to Establish National Pollutant Limits for Greenhouse Gases Pursuant to the Clean Air Act* (Dec. 2, 2009), https://www.biologicaldiversity.org/programs/climate_law_institute/global_warming_litigation/clean_air_act/pdfs/Petition_GHG_pollution_cap_12-2-2009.pdf.

5. *E.g.*, 42 U.S.C. § 7410(a).

6. Although numerous federal agencies recently issued the fourth National Climate Assessment volume, with detailed scientific findings as to the causes of climate change and impacts in the United States, President Trump has made it absolutely clear he rejects those findings, and does not believe action is necessary to address the climate crisis. *Compare* U.S. GLOBAL CHANGE RESEARCH PROGRAM, IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT VOLUME II (D.R. Reidmiller et al. eds., 2018), https://nca2018.globalchange.gov/downloads/NCA4_Report-in-Brief.pdf *with* Aaron Blake, *President Trump's Full Washington Post Interview* Transcript Annotated, WASH. POST, Nov. 28, 2018 (regarding climate change, quoting President Trump saying, "As to whether or not it's man-made and whether or not the effects that you're talking about are there, I don't see it.").

7. *See infra* 252–55 (detailing recent EPA initiatives).

gases. Indeed, promulgating such a NAAQS would be the perfect vehicle for the EPA to reclaim its mantle as a leader in science-based decision-making for the protection of the environment.

After the Supreme Court resolved that greenhouse gases are subject to the Clean Air Act in 2007,[8] the question of a greenhouse gas NAAQS received lengthy treatment by both academics and practitioners.[9] In one article, practitioners argued that setting a NAAQS for greenhouse gases would fit naturally within the language and purpose of this program and explained why regulating in this manner would be the most expeditious and effective means to employ the full force of the Act to address the climate change crisis.[10] The article also responded to several arguments that questioned the viability of a greenhouse gas NAAQS, including how such a standard would be structured given that greenhouse gas emissions are not localized like other criteria air pollutants and the legal risks implementation of such a NAAQS may pose to the EPA's regulatory authority under other Clean Air Act sections—particularly Section 111, under which the Obama Administration promulgated the Clean Power Plan.[11]

This Article reiterates and expands on these arguments in favor of a greenhouse gas NAAQS, calling for the EPA to launch a more comprehensive

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8. Massachusetts v. EPA, 549 U.S. 497 (2007).

9. Kassie Siegel et al., *Strong Law, Timid Implementation. How the EPA Can Apply the Full Force of the Clean Air Act to Address the Climate Crisis*, 30 UCLA J. ENVTL. L. & POLICY 185 (2012) [hereinafter *Strong Law, Timid Implementation*]; Kassie Siegel et al., *No Reason to Wait: Reducing Greenhouse Gas Emissions Through the Clean Air Act* (Ctr. for Biological Diversity Climate Law Inst., Working Paper June 2009); Ari R. Lieberman, *Turning Lemons into Lemonade: Utilizing the NAAQS Provisions of the Clean Air Act to Comprehensively Address Climate Change*, 21 BUFF. ENVTL. L.J. 1 (2013); Inimai M. Chettiar & Jason A. Schwartz, Inst. for Policy Integrity, *The Road Ahead: EPA's Options and Obligations For Regulating Greenhouse Gases* (2009); Holly Doremus & W. Michael Hanemann, *Of Babies and Bathwater: Why the Clean Air Act's Cooperative Federalism Framework Is Useful for Addressing Global Warming*, 50 ARIZ. L. REV. 799 (2008); Robert B. McKinstry Jr. et al, *The New Climate World: Achieving Economic Efficiency in a Federal System for Greenhouse Gas Control Through State Planning Combined with Federal Programs*, 34 N.C. J. INT'L L. & COM. REG. 768 (2009); Patricia Ross McCubbin, *EPA's Endangerment Finding for Greenhouse Gases and the Potential Duty to Adopt National Ambient Quality Standards to Address Global Climate Change*, 33 S. ILL. U. L. J. 437 (2009); Timothy J. Mullins & M. Rhead Enion, *(If) Things Fall Apart: Searching for Optimal Regulatory Solutions to Combating Climate Change under Title I of the Existing CAA if Congressional Action Fails*, 40 ENVTL. L. REP. 10864 (2010); Rich Raiders, *How EPA Could Implement a Greenhouse Gas NAAQS*, 22 FORDHAM ENVTL. L. REV. 233 (2010); Nathan Richardson, *Greenhouse Gas Regulation Under the Clean Air Act: Does* Chevron *Set the EPA Free?*, 29 STAN. ENVTL. L.J. 283 (2010); Nathan Richardson et al., *Greenhouse Gas Regulation under the Clean Air Act: Structure, Effects, and Implications of a Knowable Pathway*, 41 ENVTL. L. REV. 10098 (2011); Christopher T. Giovinazzo, *Defending Overstatement: The Symbolic Clean Air Act and Carbon Dioxide*, 30 HARV. ENVTL. L. REV. 99 (2006); Craig N. Oren, *Is the Clean Air Act at a Crossroads?*, 40 ENVTL. L. 1231, 1249–54 (2010) [hereninafter *Is the Clean Air Act at a Crossroads?*]; Craig N. Oren, *When Must EPA Set Ambient Air Quality Standards? Looking Back at* NRDC v. Train, 30 UCLA J. ENVTL. L. & POL'Y 157 (2012) [hereinafter *When Must EPA Set Ambient Air Quality Standards? Looking Back at* NRDC v. Train].

10. Siegel, *Strong Law, Timid Implementation*, *supra* note 9, at 206–12. Those authors were, as the authors here are, all practicing attorneys with the Center for Biological Diversity.

11. *Id.* at 213–24.

approach to regulating greenhouse gases under the Clean Air Act than the Agency has followed to date. Moreover, the Article will detail how *eight* developments in the past several years lend additional support to the case for a greenhouse gas NAAQS.

First, the climate crisis has only grown more urgent, and thus the need for the far-reaching protections of a greenhouse gas NAAQS more vital. While the global atmospheric concentration of carbon dioxide remained below approximately 300 parts per million (ppm) for more than 800,000 years, and reached 350 ppm less than thirty years ago, it has continued to rise from 395 ppm in December 2012 to 408 ppm in December 2017.[12] Climate change and its devastating impacts are no longer a future concern; the effects are being experienced now and are only going to get much worse without dramatic action to curb greenhouse gas emissions.

Second, in 2015 the EPA issued its Clean Power Plan ("CPP"), which regulates greenhouse gas emissions from electric power plants.[13] Although the Supreme Court has stayed its implementation,[14] and the Trump Administration has proposed repealing it,[15] the CPP as promulgated would regulate these emissions with a nation-wide program containing elements that could be incorporated into a greenhouse gas NAAQS. For example, the EPA established an emission reduction target approach for each state, which could be expanded to form the basis for NAAQS SIPs and encompass greenhouse gas reduction measures across sectors.[16]

Third, the ongoing and protracted litigation over the CPP and other greenhouse gas initiatives demonstrates that the sector-by-sector approach the EPA has relied on to date will not address the climate crisis more quickly than a greenhouse gas NAAQS. In particular, although promulgating a greenhouse gas NAAQS will almost certainly engender litigation, success with such a program would bring about much more far-reaching results than the current regulatory approach. That

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12. *See Climate Change Indicators: Atmospheric Concentrations of Greenhouse Gases*, EPA (Apr. 2016), https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases; *Global Climate Change, Vital Signs of the Planet, Carbon Dioxide Measurement*, NASA, (Nov. 2018), https://climate.nasa.gov/vital-signs/carbon-dioxide/.

13. 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).

14. *See* Lisa Heinzerling, *The Supreme Court's Clean-Power Power Grab*, 28 GEO. ENVTL. L. REV. 425 (2016) (discussing the unprecedented and inappropriate nature of the Supreme Court stay).

15. Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 82 Fed. Reg. 48,035 (Oct. 16, 2017); *see also* 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) (proposed replacement rule).

16. Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,510.

is because only the NAAQS program forces the EPA to achieve the critical goal of protecting human health and welfare, as distinguished from focusing solely on improving technologies within each separate sector.

Fourth, in 2014 the Supreme Court, in *Homer*, upheld a NAAQS implementation rule which—like a potential greenhouse gas NAAQS—addressed pollution that crosses state lines. The Court recognized the EPA's broad latitude to address the "thorny causation problem" caused when multiple states contribute to the failure to attain NAAQS, and concluded that the EPA's "efficient and equitable solution to the allocation problem" was well within the Agency's discretion.[17] This decision further supports the EPA's authority to appropriately allocate greenhouse gas emission reductions among states under a greenhouse gas NAAQS.

Fifth, although the Supreme Court issued another ruling in *UARG* limiting the EPA's authority to regulate greenhouse gas emissions from certain sources,[18] in that decision the Court further concluded that the EPA could continue to regulate those sources under certain conditions, which has important implications for the EPA's authority to regulate these pollutants under the NAAQS program. Thus, although the Court found that the term "air pollutant" in the statutory definition of "major sources" does not include greenhouse gases—because, the Court concluded, including them would lead to absurd results Congress could not have intended—the Court limited its holding to that definition alone. The Court concluded there is no similar constraint on including greenhouse gas emissions where the EPA is regulating those sources anyway, called "anyway sources," for other pollutant emissions.[19]

One of the arguments against a greenhouse gas NAAQS concerns the statutory requirement that the EPA establish a deadline for the "attainment" of a primary NAAQS in no longer than ten years.[20] A ten-year deadline is currently impossible for greenhouse gases because they are long-lived in the atmosphere, and thus will take much longer than ten years to reduce to safe concentration levels. But the NAAQS program also has a separate provision for imposing *secondary* standards as necessary to protect "public welfare."[21] This provision not only contains no strict deadline, it expressly calls on the EPA to take into account effects on "climate."[22] The Court's treatment of "anyway sources" in *UARG* thus suggests a path by which the EPA could impose a *secondary* NAAQS, even if it were determined that the Agency does not have the authority to impose a primary standard.

Sixth, in 2015 the United States and the international community, under the auspices of the United Nations Framework Convention on Climate Change, entered into the Paris Agreement, which commits participating nations to taking

17. EPA v. EME Homer City Generation, L.P., 134 S. Ct. 1584, 1607 (2014).
18. Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427 (2014).
19. *Id.* at 2448–50.
20. 42 U.S.C. § 7502(a)(2)(A).
21. *Id.* § 7502(a)(2)(B).
22. *Id.* § 7602(h) (defining public welfare to include climate impacts).

the steps necessary to hold "the global average temperature to well below 2° Celsius above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5° Celsius above pre-industrial levels."[23] This international framework serves to reinforce the EPA's authority, under Clean Air Act Section 179B,[24] to take global greenhouse gas emissions into account in setting domestic emission limits under the NAAQS program.[25]

Seventh, in recent years, scientists have developed reasonable carbon budgets that allocate appropriate carbon emission reductions among the nations of the world, including the United States. For example, the United States carbon budget to limit temperature rise to well below 2°C (per the Paris Agreement) has been estimated at 25 $GtCO_2eq$ to 57 $GtCO_2eq$ on average.[26] Taken together, this carbon budgets work and the Paris Agreement provide the EPA with multiple options for establishing the United States' emission reduction levels that would be incorporated into a greenhouse gas NAAQS.

Finally, the current regulatory uncertainty concerning the regulation of greenhouse gases under the NAAQS program, which will remain so long as the EPA does not invoke this authority, is arguably itself an obstacle to addressing the climate crisis in other ways. For example, in response to recent tort lawsuits against fossil fuel companies and others potentially liable for the sea level rise and other damages caused by climate change, defendants have been arguing, with some initial success, that because the EPA has such plenary authority to address greenhouse gases under the Clean Air Act, the Act displaces any claims that touch on climate change.[27]

If, in fact, the courts were to determine that the EPA has no power to regulate greenhouse gases under the NAAQS program, defendants' displacement arguments would certainly have less force. On the other hand, the current *status quo*, under which the scope of the EPA's authority to act remains unresolved, has allowed defendants to more successfully invoke the Act to avoid liability.

Accordingly, even if in response to an EPA NAAQS for greenhouse gases, the courts—or Congress—were to preclude the EPA from regulating these pollutants

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23. UNFCCC Paris Agreement, art. 2, ¶ 1(a).

24. 42 U.S.C. § 7509(a).

25. Although the Trump Administration has announced its withdrawal from the Paris Agreement, that result—which will not be finalized until 2020, Paris Agreement, art. 28—would not undermine the utility of the Agreement to a greenhouse gas NAAQS.

26. *See, e.g.*, Robiou du Pont et al., *Equitable mitigation to achieve the Paris Agreement goals* 3 (Paris Equity Check, 2017). Quantities measured in $GtCO_2eq$ include the mass emissions from carbon dioxide ("CO_2") as well as the other well-mixed greenhouse gases (CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and SF6) converted into CO_2-equivalent values. *See* Glen P. Peters *et al.*, *Measuring a Fair and Ambitious Climate Agreement Using Cumulative Emissions*, (Environmental Research Letters, No. 105004, 2015); Renaud Gignac and H. Damon Matthews, *Allocating a 2C Cumulative Carbon Budget to Countries*, (Environmental Research Letters, No. 075004, 2015); Yann Robiou du Pont et al., *Equitable Mitigation to Achieve the Paris Agreement Goals*, Supplemental Tables 1 and 2, (Nature Climate Change, No. NCLIMATE3186, 2017).

27. *See infra* pp. 282–84.

under the NAAQS program, that result could arguably be preferable to the *status quo*. In short, while today there is no such program, the uncertain prospect of comprehensively regulating greenhouse gases by means of a NAAQS poses an obstacle to addressing the climate crisis in other ways. Under a new administration, the EPA should not let this untenable *status quo* remain.

Part I of this Article summarizes the state of the climate crisis and addresses the Obama Administration's efforts to harness the Act to address that crisis, before summarizing the Trump Administration's initiatives to dismantle these efforts.

Part II, in turn, details the unique suitability of the NAAQS program to comprehensively address greenhouse gas pollution in the United States. In particular, this Part will explain why, especially in light of the Paris Agreement and more recent work on carbon budgets, the dispersal of greenhouse gases throughout the atmosphere is no impediment to a greenhouse gas NAAQS. It will also suggest several approaches that the EPA could take to ensure that a greenhouse gas NAAQS is consistent with the statute's requirements for prompt action towards attainment of air quality standards, particularly in light of the Supreme Court's rulings in *Homer* and *UARG*, as well as the significant progress the EPA made with the SIPs components of the CPP.

Finally, Part III will explain why neither (a) the relationship between the NAAQS program and the EPA's power to regulate pollutants under Clean Air Act Section 111 (under which the CPP was promulgated) nor (b) any concern with Congressional backlash, should stand in the way of the EPA finally moving forward with a greenhouse gas NAAQS. As for the CPP, it would not be impacted until a greenhouse gas NAAQS is in effect, at which point its relevant elements can be incorporated into the NAAQS. And although Congress always will have the power to completely remove the EPA's authority to promulgate a greenhouse gas NAAQS, the Agency's refusal to resolve the scope of this authority is a double blow, hindering both the full use of the Clean Air Act to address the climate crisis and separate efforts to address that crisis with other regulatory tools, both within and beyond the Act. Accordingly, a new EPA should finally move forward with a greenhouse gas NAAQS.

Whether The EPA Can Be Compelled To Promulgate a Greenhouse Gas NAAQS

This Article urges that, under a new administration, the EPA return to its science-based mission by voluntarily promulgating a greenhouse gas NAAQS. Nonetheless, it bears noting that Clean Air Act Section 108 *mandates* that the EPA promulgate a NAAQS for any air pollutant endangering public health and welfare and present from numerous and diverse sources.[1] Greenhouse gases indisputably fit this test, particularly given that the EPA has already made—and successfully defended—an "endangerment" finding

for emissions of these pollutants from mobile sources under Section 202 of the Act.[2]

Some commentators have suggested that the EPA retains discretion to decline to impose a NAAQS regardless of endangerment, in light of the final phrase in Section 108(a), which provides that the mandate to impose a NAAQS applies to pollutants "for which [EPA] *plans* to issue air quality criteria under this section."[3] However, this argument has been rejected by every court that has considered it.[4]

Moreover, relying on whether the EPA "plans" to issue a NAAQS would arguably give the Agency absolute, unreviewable discretion whether to issue a NAAQS for a pollutant despite finding endangerment. Such a reading would run counter to the "very narrow" circumstances in which courts find that Congress intends to afford agencies such broad discretion.[5] Particularly in the context of a provision that begins by setting forth what the EPA "shall" do to address some of the most far-reaching and important public health threats that the statute is designed to address, it would not be reasonable for the EPA to conclude that Congress intended to afford the Agency that kind of unbridled discretion.[6]

1. 42 U.S.C. § 7408(a)(1).

2. Coalition for Responsible Reg., Inc. v. EPA, 684 F.3d 102 (D.C. Cir 2012). There is no reason the EPA could reasonably reach a different endangerment finding under Section 108 than it has already successfully made and defended under Section 202. Indeed, in making its 2016 endangerment finding for aircraft greenhouse gas emissions, the EPA relied on how the standard is the same as under Section 202—that is, whether the pollutant "may reasonably be anticipated to endanger public health or welfare." *See* 81 Fed. Reg. 54,434 (Aug. 15, 2016) (comparing 42 U.S.C. § 7521(a) with § 7571(a)(2)(A)). The same, of course, is true in the Act's provision governing when a NAAQS is required. 42 U.S.C. § 7408(a)(1)(A).

3. *See, e.g.*, Craig Oren, *Is The Clean Air Act At A Crossroads*, *supra* note 9, at 1249–55 (arguing that the text and legislative history of Section 108 indicate that EPA retains discretion whether to impose a NAAQS, even for a pollutant which both endangers public health and welfare and is emitted from numerous and diverse sources).

4. *See* NRDC v. Train, 411 F. Supp. 864 (S.D.N.Y. 1976), *aff'd* 545 F.2d 320 (2d Cir. 1976) (finding the EPA's argument "is contrary to the structure of the Act as a whole" and would render the "shall" language in Section 108 "mere surplusage"); Indiana & Michigan Elec. Co. v. EPA, 509 F.2d 839, 841 (7th Cir. 1975); Kennecott Copper Corp. v. EPA, 462 F.2d 846, 847 (D.C. Cir. 1972); Center for Biological Diversity v. EPA, 749 F.3d 1079, 1083 (D.C. Cir. 2014) ("EPA is required to regulate any airborne pollutant which, in the Administrator's judgment, 'may reasonably be anticipated to endanger public health or welfare,'" and "[f]or pollutants within that category—so-called 'criteria air pollutants'—the EPA must promulgate national ambient air quality standards"); Zook v. McCarthy, 52 F. Supp. 3d 69, (D.D.C. 2014) (Section 108 "makes clear that EPA's listing duty is a nondiscretionary duty to list any pollutant that the EPA has determined meets the criteria in Section 108(a)(1)(A) and (B)"); Ethyl Corp. v. EPA, 541 F.2d 1, 20 note 37 (D.C. Cir. 1976) ("Sections 108 and 202 are *mandatory* in their terms; under both sections the Administrator 'shall' regulate if 'in his judgment' the pollutants warrant regulation") (emphasis added); *see also*, Richardson, *Greenhouse Gas Regulation under the Clean Air Act*, at 21–26.

5. Hi-Tech Furnace Sys. v. FCC, 224 F.3d 781, 788 (D.C. Cir. 2000) (explaining that the exception making agency action entirely unreviewable is a "very narrow" one, reserved for "those rare instances where statutes are drawn in such broad terms that in a given case there is no law to apply")

(*citing* Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402, 410 (1971)). All the EPA would have to do under Section 108(a)(1)(C) is refuse to issue a NAAQS on the grounds that the agency has "no plans" to act, without any need to reasonably explain *why* there were no such plans, and there would arguably be no recourse —and thus no effective judicial review. *See also, e.g.*, Weyerhaeuser v. Fish and Wildlife Svc., 139 S. Ct. 361, 370–72 (2018) (finding that even a statutory provision providing simply that the agency *may* act under certain circumstances does not preclude judicial review).

6. The decision in *Train* was issued before *Chevron v. NRDC*, where the Supreme Court established that an agency is entitled to deference for a reasonable interpretation of an ambiguous statutory provision. Chevron v. NRDC, 467 U.S. 837 (1984). In light of *Chevron*, the EPA itself has intimated the Agency might be entitled to deference were it to formally interpret Section 108 as providing the Agency with broad discretion whether to regulate a pollutant even if it falls under Section 108. *See* Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44,354, 44,477 note 229 (July 30, 2008). The EPA could only prevail in such an argument, however, if it were offering a reasonable interpretation of Section 108—and, as the foregoing discussion demonstrates, reading that provision to provide the EPA with unfettered discretion in deciding whether or when issuing a NAAQS for a pollutant it has found endangers public health and welfare and is emitted from many sources would not be reasonable.

I. THE CLIMATE CRISIS AND THE EPA'S RESPONSES TO DATE

A. THE CLIMATE CRISIS

After the Supreme Court ruled in *Massachusetts v. EPA*[28] that greenhouse gases are "air pollutants" under the Clean Air Act, the EPA comprehensively assessed whether these gases endanger public health and welfare. In 2009, the EPA made its endangerment finding, establishing that, for the purposes of the Act, motor-vehicle emissions of greenhouse gases "contribute to the total greenhouse gas air pollution, and thus to the climate change problem, which is reasonably anticipated to endanger public health and welfare."[29] Industry-supported groups and various states vigorously challenged that finding.[30] Rejecting those challenges in 2012, the D.C. Circuit unanimously found that the EPA had relied on the best scientific data; had reasonably concluded, based on that data, that climate change is caused by anthropogenic greenhouse gas emissions; and had also reasonably found that climate change "threatens both public health and public welfare."[31] The Supreme Court declined to review the EPA's findings, and since

28. Massachusetts v. EPA, 549 U.S. 497 (2007).

29. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, EPA, https://www.epa.gov/ghgemissions/endangerment-and-cause-or-contribute-findings-greenhouse-gases-under-section-202a-clean (last visited Jan. 17, 2019); Final Rule, 74 Fed. Reg. 66,499 (2009) (codified at 40 C.F.R. ch. 1) (EPA made the endangerment finding for "the mix of six long-lived and directly-emitted greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6)").

30. Coal. for Responsible Regulation, Inc. v. EPA, 684 F.3d 102 (D.C. Cir. 2012).

31. As the Court summarized:

> [EPA] found that extreme weather events, changes in air quality, increases in food- and water-borne pathogens, and increases in temperatures are likely to have adverse health effects [and] [t]he

that time, the EPA has consistently reiterated that greenhouse gases endanger public health and welfare.[32]

Since that decision, the urgency of the climate crisis has only grown. In October 2018, the Intergovernmental Panel on Climate Change ("IPCC") issued a Special Report on the state of the crisis and what needs to be done.[33] Most importantly, the Special Report concludes that it is absolutely critical for greenhouse gas emissions to be drastically reduced in the next decade to avoid the worst impacts of climate change.[34] Key findings of the special report also include:

First, "human-induced warming reached approximately 1°C (likely between 0.8°C and 1.2°C) above pre-industrial levels in 2017, increasing at 0.2°C (likely between 0.1°C and 0.3°C) per decade."[35]

Second, "[m]ean sea level is increasing . . . with substantial impacts already being felt by coastal ecosystems and communities . . . . These changes are interacting with other factors such as strengthening storms, which together are driving greater storm surge, infrastructure damage, erosion and habitat loss."[36]

Third, "[t]he ocean has absorbed about 30% of the anthropogenic carbon dioxide, resulting in ocean acidification and changes to carbonate chemistry that are unprecedented in 65 million years."[37]

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record also supports the EPA's conclusion that climate change endangers human welfare by creating risk to food production and agriculture, forestry, energy, infrastructure, ecosystems, and wildlife.

Id. at 121.

32. *See, e.g*., 81 Fed. Reg. 54,422 (Aug. 15, 2016) (to be codified at 40 C.F.R. pts. 87 and 1068); *see also* Philip B. Duffy et al., *Strengthened scientific support for the Endangerment Finding for atmospheric greenhouse gases*, SCIENCE, Dec. 13, 2018 (summarizing the latest evidence concerning the ways in which greenhouse gases are endangering public health and welfare).

33. *See generally*, IPCC, GLOBAL WARMING OF 1.5°C: SUMMARY FOR POLICYMAKERS (2018), https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers/.

34. *Id*. at 51; IPCC, HEADLINE STATEMENTS FROM THE SUMMARY FOR POLICYMAKERS: GLOBAL WARMING OF 1.5°C 2 (2018), https://www.ipcc.ch/site/assets/uploads/sites/2/2018/07/sr15_headline_statements.pdf.

35. *Id*.; MYLES ALLEN ET AL., IPCC, Chapter 1: Framing and Context, at 51 (2018) [hereinafter "IPCC 2018 Report"], https://www.ipcc.ch/sr15/chapter/chapter-1-pdf/.

Indeed, in late 2017, United States government scientists issued Volume I of the Fourth National Climate Assessment ("NCA") pursuant to the Global Change Research Act ("GCRA"), 15 U.S.C. § 2921—confirming that the earth "is now the warmest in the history of modern civilization," and that "the last three years have been the warmest years on record for the globe." U.S. GLOBAL CHANGE RESEARCH PROGRAM, CLIMATE SCIENCE SPECIAL REPORT, FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME I (2017), https://science2017.globalchange.gov. The 2017 NCA also reiterates that, "*[t]housands of studies* conducted by researchers around the world have documented changes in surface, atmospheric, and oceanic temperatures; melting glaciers; diminishing snow cover; shrinking sea ice; rising sea levels; ocean acidification; and increasing atmospheric water vapor." *Id* at 10. (emphasis added).

36. IPCC 2018 Report, Chapter 3, at 225, https://www.ipcc.ch/sr15/chapter/chapter-3/.

The Fourth NCA, Volume I finds that "global average sea level has risen by about 7–8 inches since 1900," and that they "are expected to continue to rise—by at least several inches in the next 15 years and by 1–4 feet by 2100," while a "rise of as much as 8 feet by 2100 cannot be ruled out." FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME I, *supra* note 35, at 10.

37. IPCC 2018 Report, Chapter 3, at 178, https://www.ipcc.ch/sr15/chapter/chapter-3/.

Fourth, greenhouse gas emissions are principally responsible for global warming and climate change.[38]

And *finally*, "[t]he rise in global CO_2 concentration since 2000 is about 20 ppm/decade, which is up to 10 times faster than any sustained rise in CO_2 during the past 800,000 years."[39]

In November 2018, Volume II of the congressionally-mandated Fourth National Climate Assessment was released, further detailing the stark realities of climate change impacts on Americans, including increased hurricanes and extended wildfire seasons.[40] The Assessment also details how lower-income and marginalized communities are expected to experience even greater impacts to their health, safety and quality of life than others.[41] It further concludes that, without substantial and sustained reductions in emissions, the impact to the United States economy will likely reach hundreds of billions of dollars by the end of the century.[42]

Reports aside, the on-the-ground evidence of the climate crisis is now all around us. Ever more severe hurricanes, rain storms and extreme weather, wildfires, intense heat waves, melting ice, and other impacts are dominating headlines and devastating lives and the environment.[43] The climate crisis is no longer something to be concerned about in the distant future.[44] And, as detailed in the IPCC's most recent report, absent necessary action within the next decade, it will become exponentially more difficult to keep global temperatures from rising more than 1.5° Celsius—above which the earth will experience devastating climate change impacts.[45]

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38. IPCC 2018 Report, Chapter 1, at 54, https://www.ipcc.ch/site/assets/uploads/sites/2/2018/11/SR15_Chapter1_Low_Res.pdf. FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME I, *supra* note 35, at 1. As the Fourth NCA, Volume I concludes, "[i]t is extremely likely that human activities, especially emissions of greenhouse gases, are the dominant cause of the observed warming since the mid-20th century." *Id*. at 10.

39. IPCC 2018 Report, Chapter 1, at 54, https://www.ipcc.ch/site/assets/uploads/sites/2/2018/11/SR15_Chapter1_Low_Res.pdf. *See also* NATIONAL RESEARCH COUNCIL, CLIMATE STABILIZATION TARGETS: EMISSIONS, CONCENTRATIONS, AND IMPACTS OVER DECADES TO MILLENNIA (The National Academies Press, 2011), http://www.nap.edu/catalog/12877.html.

40. U.S. GLOBAL CHANGE RESEARCH PROGRAM, CLIMATE SCIENCE SPECIAL REPORT, FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME II 24 (2018), https://nca2018.globalchange.gov.

41. *Id*. at ch. 14.

42. *Id*. at ch. 1, at 46. As noted, President Trump rejects the conclusions of the latest Climate Assessment. *See supra* note 6.

43. *See, e.g*., Joel Achenbach & Angela Fritz, *Hot summers, wildfires: Scientists say it's climate change, and they told you so*, CHICAGO TRIBUNE (July 27, 2018), https://www.chicagotribune.com/news/nationworld/ct-summer-climate-change-20180727-story.html.

44. *See* Duffy et al., *supra* note 32 (summarizing latest evidence on greenhouse gas impacts on human health and the environment).

45. IPCC, GLOBAL WARMING OF 1.5°C: SUMMARY FOR POLICYMAKERS, *supra* note 33.

B. THE EPA'S EFFORTS TO ADDRESS THE CLIMATE CRISIS TO DATE: SOME STEPS FORWARD, AND NOW BACKWARD

Although the NAAQS program allows the EPA to comprehensively regulate emissions of an air pollutant that is both dangerous and widespread, the Act also provides the EPA with tools to combat those pollutants more narrowly, by targeting individual pollutant sectors and sources. This section reviews those programs, and the progress the Obama Administration made in regulating greenhouse gases under them, and then addresses the Trump Administration's efforts to roll back these initiatives.

As depicted in the chart on the following page, taken together, the EPA estimated that the emissions reductions from the Obama Administration's programs —between 2020 and 2050—would amount to approximately 16 gigatons of CO_2eq. Thus, although any or all of these emission reduction efforts might be strengthened, as developed to date they would not collectively bring about greenhouse gas reduction levels even remotely approaching those necessary for the United States to stay within its carbon budget of at least 25–57 gigatons of CO_2eq.[46]

1. The Obama EPA's Greenhouse Gas Regulations

a. The Clean Power Plan

For stationary sources, Clean Air Act Section 111(b) provides for the EPA to establish a list of the different "categories" of stationary sources that "cause[], or contribute[] significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare," and then to issue "standards of performance" for pollution from those sources.[47] Those standards must reflect the "best system of emission reductions" ("BSER") that stationary sources can achieve while taking into account both the costs involved and "any nonair quality health and environmental impact and energy requirements."[48]

In addition to mandating such regulations for new sources, the Act provides for the development of standards of performance for existing stationary sources of pollution.[49] Under the existing source program in Section 111(d), the Act provides for the EPA to require that states develop plans—similar to the SIPs promulgated for national air quality standards—that impose requirements on existing sources in sectors where new source standards are issued. It was under that authority that the EPA issued the CPP.

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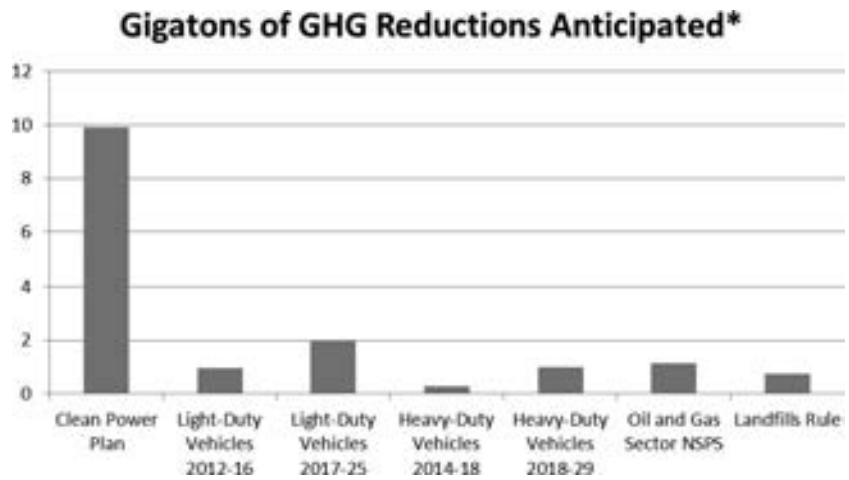
46. *See* Robiou du Pont et al., *supra* note 26. Annual United States emissions in 2017 alone approached 6.5 gigatons. Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990–2017, at 2-1 (2019).

47. 42 U.S.C. § 7411(b)(1).

48. *Id.* § 7411(a)(1).

49. *Id.* § 7411(b)(1), (d).

FIGURE 1.



*Data details: (1) Clean Power Plan between 2020-2050 = 9,967 MMT CO_2 based on an average of rate-based and mass-based approaches, applying the estimated annual emissions reduction at full implementation in 2030 to the years 2030-2050 (*see* EPA, Carbon Polluting Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units: Final Rule, 80 Federal Register 64,661, 64,924 (Oct. 23, 2015), Tables 15 and 16); (2) Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards over the lifetime of vehicles sold during Model Years 2012-2016 = 960 MMT CO2eq (*see* EPA and NHTSA, Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards: Final Rule, 75 Federal Register 25,324, 25,328 (May 7, 2010)); (3) Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards over the lifetime of vehicles sold during Model Years 2017-2025 = 1,960 MMT CO2eq (*see* EPA and NHTSA, 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards; Final Rule, 77 Federal Register 62,623, 62,890 (Oct. 15, 2012)); (4) Heavy-Duty Vehicle Greenhouse Gas Emissions Standards and Fuel Efficiency Standards over the lifetime of vehicles sold during Model Years 2014-2018 = 270 MMT CO2eq (*see* EPA and NHTSA,Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles: Final Rule, 76 Federal Register 57,106, 57,106 (Sept. 15, 2011)); (5) Heavy-Duty Vehicle Greenhouse Gas Emissions Standards and Fuel Efficiency Standards over the lifetime of vehicles sold during Model Years 2018-2029 = 1,000 MMT CO2eq (959 to 1098 MMT CO2eq) (*see* EPA and NHTSA, Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles—Phase 2: Final Rule, 81 Federal Register 73,478, 73,482 (Oct. 25, 2016)); (6) NSPS for New Fossil-Fuel Fired Power Plants = negligible (*see* EPA, Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units: Final Rule, 80 Federal Register 64,510, 64,515 (Oct. 23, 2015)("the EPA projects that this final rule will result in negligible CO2 emission changes, quantified benefits, and costs by 2022 as a result of the performance standards for newly constructed EGUs"); (7) 2016 NSPS for Oil and Gas Sector between 2020-2050 = 1,165 MMT CO2eq based on 20-year GWP for methane of 87 and applying the estimated annual emissions reductions in 2025 to the years 2025-2050 (*see* EPA, Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources: Final Rule, 81 Federal Register 35,824, 35,827, 35,886 (June 3, 2016)); (8) 2016 Standards for New and Existing Municipal Landfills between 2025-2050 = 744 MMT CO2eq based on 20-year GWP for methane of 86 and applying the estimated annual emissions reductions in 2025 to the years 2025-2050 (*see* EPA, Standards of Performance for Municipal Solid Waste Landfills: Final Rule, 81 Federal Register 59,332, 59,363 (Aug. 29, 2016)); and (9) EPA, Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills: Final Rule, 81 Federal Register 59,276, 59,306 (Aug. 29, 2016).

The CPP was the Obama Administration's marquee greenhouse gas reduction program, intended to establish the BSERs for greenhouse gases from existing power plants. Pursuant to Clean Air Act Section 111(b),[50] in 2015 the EPA issued New Source Performance Standards ("NSPS") for greenhouse gas emissions from new, modified, and reconstructed fossil fuel-fired steam generating units and natural gas-fired stationary combustion turbines—collectively Electric Generating Units, or "EGUs."[51] At the same time, pursuant to its authority under Section 111(d),[52] the EPA issued the CPP for greenhouse gas emissions from *existing* power plants.[53] In its most general form, the CPP established state-by-state goals for carbon emissions reductions from existing power plants and offered a flexible framework under which states could meet those targets.

More specifically, the EPA examined various approaches to the BSER from existing power plants. Based on that analysis the EPA established state carbon emission reduction targets. The CPP then provided emission guidelines to guide states in achieving these targets over time.[54] Under the CPP, the EPA defined the BSER for existing power plants by reference to several "building blocks." Block One concerned economically achievable measures source owners could take to improve the heat rates—the efficiency with which plants convert fuel to electricity—at coal-fired steam plants.[55] Blocks Two and Three, in turn, focused on economically achievable approaches to shifting energy generation from coal-fired, and other steam-to-electric, power plants to other forms of generation, including more efficient existing natural gas combined-cycle plants ("gas plants") and renewable-energy sources such as wind and solar.[56]

The CPP provided for states to adopt plans to satisfy the emission guidelines and allowed multiple avenues for the states to structure their plans and emission limits. For example, the CPP allowed for a relatively straightforward approach, whereby states would implement the two national emission performance rates for coal and gas plants. Each source would be allowed to reduce its emissions through a combination of actions, including heat-rate improvements, shifting generation from dirtier to cleaner power generation methods, or acquiring emission rate credits.[57]

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50. *Id.* § 7411(b).

51. Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,510, 64,661 (Oct. 23, 2015) (to be codified at 40 C.F.R. pt. 60).

52. 42 U.S.C. § 7411(d).

53. 80 Fed. Reg. 64, 661 (Oct. 23, 2015).

54. *Id.* at 64,666.

55. *Id.* at 64,717. Although natural gas plants—also large emitters of greenhouse gases—will be a considerably larger portion of the power plant fleet in coming years, the CPP provided no heat rate improvements for those plants.

56. *Id.* at 64,723–58, 64,787–811. The EPA quantified the degree of emission reduction achievable with these technologies for two subcategories of sources: steam units and gas-fired units.

57. *Id.*

Alternatively, the CPP allowed states to adopt state-based emission limits that would blend the separate limits for coal and gas plants, and which would apply uniformly to both kinds of plants. It also allowed for "mass-based" approaches used under other programs—such as those addressing acid rain and cross-state smog—whereby the state would impose limits on the number of tons of pollution a plant may emit, rather than calculating limits based on pollution emitted per unit of electricity generated.[58]

Finally, the CPP anticipated that source owners could choose to obtain alternative sources of generation to meet emission reduction goals. Thus, states were permitted to adopt a mass-based plan that could include measures such as renewable portfolio standards that provide for source owners to obtain renewable energy resources. Under any of these approaches, states could also allow sources to engage in cross-state trading for emission reduction credits.[59]

b. Challenges to the Clean Power Plan

Litigation over the CPP has been fierce and unceasing. Opponents unsuccessfully tried to challenge the CPP before it was even finalized,[60] and filed new challenges as soon as the final CPP was issued.[61] After the D.C. Circuit refused to immediately stay the CPP, the petitioners obtained an unprecedented decision from the Supreme Court staying the CPP until litigation over its legality is resolved.[62]

One of the many arguments against the CPP is that the EPA may not rely on its authority to regulate power plant emissions under Section 111(d) in a manner that leads to widespread emission reductions through the development of renewable energy sources. The CPP's critical elements that may lead to "generation-shifting" to other sources of energy, opponents argue, go beyond the EPA's authority to regulate "sources" under Section 111(d).[63] In advancing this argument, opponents have expressly contrasted the EPA's *broader authority under the NAAQS program*, claiming that only under that kind of broader authority could the EPA ensure reductions in greenhouse gas

58. *Id.*

59. *Id.* The CPP required that state plans include enforceable emissions standards that begin in 2022 and ramp up to full strength by 2030. In the event a state did not adopt any such plan, the EPA provides a federal plan instead. *See also, e.g.*, Daniel Selmi, *Federal Implementation Plans and the Path to Clean Power*, 28 GEO. ENVTL. L. REV. 637 (2016).

60. *See, e.g.*, Murray Energy Corp. v. EPA, 788 F.3d 330 (D.C. Cir. 2015).

61. *See, e.g.*, Petition for Review, West Virginia v. EPA, (D.C. Cir. Oct. 23, 2015) (No. 15-1363).

62. *See* Heinzerling, *supra* note 14 (discussing the unprecedented and inappropriate nature of the Supreme Court stay).

63. Brief for the Petitioner, State of West Virginia v. EPA, No. 15-1363, 54–56 (D.C. Cir. Apr. 22, 2016).

emissions across the economy.[64]

The D.C. Circuit considered the merits of CPP challenges initially *en banc*, but more than two years after hearing oral arguments the court has not issued a decision on the CPP's legality. In the meantime, the CPP and the litigation over it both remain[65] while the Trump Administration pursues its replacement rule.[66]

c. The EPA's Limited Progress Regulating Greenhouse Gas Emissions from Other Stationary Source Sectors

In addition to power plants, the EPA regulates pollutants from dozens of other categories of stationary industrial sources,[67] many of which could potentially be regulated for greenhouse gas emissions. However, despite numerous lawsuits to prompt action during the Obama Administration, the only progress made thus far has been on methane emissions, further supporting the conclusion that a comprehensive approach to greenhouse gas regulation under the NAAQS program is preferable to continuing to pursue emission limitations on a sector-by-sector basis. For example:

- Although the EPA has recognized that "[p]ortland cement is one of the largest stationary source categories of GHG emissions,"[68] the Agency has declined to set a greenhouse gas NSPS.[69]
- The EPA has made no progress regulating greenhouse gas emissions from refineries.[70]

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64. *Id*. For its part, in defending the CPP, the EPA expressly relied on Section 111's *cross- reference* to its Section 110 authority to impose SIPs, explaining:

> The references in Sections 111(d)(1) and (d)(2) to Section [110] and to the flexibility states have under the NAAQS program (see 42 U.S.C. § 7410(d)(2)(A)) further indicate that Congress intended that states be able to incorporate a broad range of emission-reduction mechanisms into their Section 111(d) "standards of performance," including having the ability to craft standards that authorize, incentivize, or compel generation-shifting.

State of West Virginia v. EPA, No. 15-1363, Brief of EPA at 47 (D.C. Cir. Apr. 22, 2016). The EPA also argued that, unlike the Section 111(d) program, "state plans implementing ambient air quality standards may include, in addition to 'emission limitations' for individual sources, 'other control measures,' 'means,' or 'techniques,' like 'marketable permits' to ensure attainment and maintenance of ambient air quality standards." *See id*. at 55.

65. *See, e.g*., State of West Virginia v. EPA, No. 15-1363 Order of Dec. 21, 2018 (D.C. Cir. 2018).

66. 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).

67. *See* 40 C.F.R. § 60.

68. 75 Fed. Reg. 54,970, 54,997 (Sept. 9, 2010) (to be codified at 40 C.F.R. pts. 60 and 63).

69. *Id*.; *see also* Portland Cement Ass'n v. EPA, 665 F.3d 177 (D.C. Cir. 2011) (rejecting challenge to EPA's failure to act on the grounds that the agency has taken no reviewable final agency action on the matter).

70. 73 Fed. Reg. 35,838 (June 24, 2008) (to be codified in 40 C.F.R. pt. 60).

- The EPA has not issued greenhouse gas emission limits for industrial commercial-institutional boilers.[71]
- The EPA has similarly declined to regulate greenhouse gas emissions from coal mines, citing budgetary and resource constraints.[72]
- Finally, as regards reductions in emissions of methane—a particularly potent greenhouse gas[73]—the EPA issued regulations that would have begun to address methane emissions from landfills and the oil and gas sector, but it did not do so comprehensively. The regulations also only addressed new, and not existing, sources.[74]

The EPA also regulates emissions from stationary sources under the Clean Air Act's Prevention of Significant Deterioration ("PSD") and Title V permitting programs.[75] However, this authority also has not produced significant greenhouse gas reductions because the Agency does not require permittees to consider alternatives such as renewable energy, and courts have allowed the EPA to adopt approaches to Best Available Control Technology ("BACT") requirements that limit improvements to relatively minor efficiency adjustments rather than substantial changes.[76]

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71. 71 Fed. Reg. 9,866 (Feb. 27, 2006) (to be codified in 40 C.F.R. pt. 60).

72. *See* Wildearth Guardians v. EPA, 751 F.3d 649 (D.C. Cir. 2014) (upholding EPA's reliance on resource constraints as a reasonable basis for inaction on coal mine emissions).

73. Scot M. Miller et al., *Anthropogenic Emissions of Methane in the United States*, 50 Proc. Nat'l Acad. Sci. 20,018, 20,018 (Dec. 10, 2013), http://www.pnas.org/content/pnas/110/50/20018.full.pdf.

74. 81 Fed. Reg. 59,332 (Aug. 29, 2016) (to be codified in 40 C.F.R. pt. 60) (landfill regulation); 81 Fed. Reg. 35,824 (June 3, 2016) (oil and gas regulations); *see also* David Woodsmall, *Targeting Fugitive Emissions: Regulating Methane Emissions from the Oil and Natural Gas Industry under Section 111 of the Clean Air Act*, GEO. ENVTL. L. REV. 531 (Spring 2016). For *existing* sources of methane in this sector, the Obama Administration issued an Information Collection Request ("ICR") under Clean Air Act Section 114 in order to collect data the Agency determined would be necessary to proceed with Section 111(d) regulations, 81 Fed. Reg. 66,962 (Sept. 29, 2016), but took no further action.

75. 42 U.S.C. §§ 7470–7492, 7661; *see also* Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427 (2014).

76. Thus, for example, the Ninth Circuit found that the EPA had acted within its discretion when it refused to consider a solar power alternative to a biomass facility, finding that alternative would "redefine the source" and thus was not mandated by BACT requirements. Helping Hand Tools v. EPA, 836 F.3d 999 (9th Cir. 2016); Sierra Club v EPA, 499 F.3d 653 (7th Cir. 2007) (upholding EPA's narrow view of BACT requirements); *Utility Air Regulatory Group*, 134 S. Ct. at 2448 ("it has long been held that BACT cannot be used to order a fundamental redesign of the facility"); *see also, e.g.*, Gregory B. Foote, *Considering Alternatives: The Case for Limiting CO2 Emissions From New Power Plants Through New Source Review*, 34 ELR 10642 (July 2004) (explaining that BACT often "focuses on end-of-stack controls, providing little or no attention to important categories of emission reduction strategies—beginning with the threshold decision whether to build any new source at all. As a result, states and permit applicants often fail to consider the full range of alternatives, precluding even the possibility of adopting an alternative that might result in dramatically less pollution.").

d. The EPA's Progress Regulating Greenhouse Gases from Mobile Sources

Mobile sources—cars, trucks, airplanes, and other moving vehicles—also are an important source of air pollution. For those sources, the Act requires that the EPA also establish standards governing emissions of air pollutants that "may reasonably be anticipated to endanger public health or welfare."[77] After such an endangerment finding for mobile sources, the EPA must set standards "which reflect the greatest degree of emission reduction achievable through the application of [available technology], giving appropriate consideration to cost, energy, and safety factors associated with the application of such technology."[78] The Act also authorizes differing standards among classes of vehicles—such as passenger cars versus trucks, and aircraft, for which the EPA must also set standards for pollutants that "endanger public health or welfare."[79]

The regulation of new motor vehicles under Section 202 was the focus of *Massachusetts v. EPA*,[80] and, in concert with California's efforts to also move forward with curbing these emissions, the Obama Administration's EPA made more concrete progress here than in any other sector.[81] In 2010, the EPA, along with the National Highway Traffic Safety Administration ("NHTSA")[82] and California, adopted the first parallel passenger car—otherwise called "light duty vehicle"—greenhouse gas emission and fuel economy standards, for model years 2012-2016.[83] Two years later, the agencies adopted standards for vehicles beginning in model year 2017, and running through 2025.[84]

The rulemaking also provided for the EPA to conduct a "mid-term review" of the standards for model years 2022-25.[85] In January 2017, the EPA completed that mid-term review and issued its "Final Determination" that the original standards for 2022-25 should remain in place.[86] California reached the same result.[87]

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77. 42 U.S.C. § 7521.

78. *Id.* § 7521(a)(3).

79. *Id.* §§ 7521(a)(3)(ii), 7571–72.

80. Massachusetts v. EPA, 549 U.S. 497 (2007).

81. Under Clean Air Act Section 209, California is entitled to a "waiver" allowing the state to impose stricter motor vehicle emission standards than the EPA, in recognition that the state's mobile source program predates the federal regulatory scheme. 42 U.S.C. § 7543. Other states may also adopt California's standards. 42 U.S.C. § 7507 (1990).

82. NHTSA sets Corporate Average Fuel Economy ("CAFE") standards pursuant to the Energy Policy Conservation Act. 49 U.S.C. § 32901.

83. *See* 75 Fed. Reg. 25,324 (May 7, 2010) (to be codified at 49 C.F.R. pts. 531, 533, 536, 537, 538).

84. *See* 77 Fed. Reg. 62,624 (Oct. 15, 2012) (to be codified at 49 C.F.R. pts. 523, 531, 533, 536, 537).

85. *Id.*

86. *See* EPA, Final Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation, EPA-420-R-17-001 (January 2017).

87. California Environmental Protection Agency, California's Advanced Clean Cars Midterm Review (Jan. 18, 2017), https://www.arb.ca.gov/msprog/acc/mtr/acc_mtr_finalreport_full.pdf.

Finally, although aircraft emissions account for 12 percent of all United States transportation greenhouse gas emissions and 3 percent of total United States GHG emissions,[88] the Obama Administration's EPA never imposed any greenhouse gas regulations for this sector. Thus, despite the EPA's endangerment finding for aircraft greenhouse gas emissions in 2016,[89] the Agency did not propose implementing emission standards.

2. De-regulating Greenhouse Gases under the Trump Administration: (Roll) Back to the Future

Fulfilling campaign promises to roll-back environmental regulations,[90] and consistent with his denial of climate change,[91] in March 2018, President Trump signed Executive Order 13783, directing the EPA to re-evaluate the CPP and the Obama Administration's other greenhouse gas regulation efforts.[92] Since that time, the EPA has moved aggressively to delay and roll back the Obama Administration's progress.

a. Affordable Clean Energy Rule and Oil and Gas Regulation Roll-backs

In October 2017, the EPA proposed to repeal the CPP, without offering a replacement.[93] Several months later the EPA solicited comment on a potential replacement rule,[94] and finally, in August 2018, proposed the Affordable Clean

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While these standards were an important step forward, it bears emphasizing that they are considerably less ambitious than could actually be achieved with existing technology, and lower than the standards required in other jurisdictions, such as the European Union and South Korea. *See* International Council on Clean Transportation, Light-Duty Vehicle Greenhouse Gas And Fuel Economy Standards (2017), https://www.theicct.org/sites/default/files/publications/2017-Global-LDV-Standards-Update_ICCT-Report_23062017_vF.pdf. In 2016, the EPA also established model year 2021-27 greenhouse gas emission standards for heavy duty trucks. 81 Fed. Reg. 73,478 (Oct. 25, 2016) (to be codified at 49 C.F.R. pts. 523, 534, 535, 538); *see also* 76 Fed. Reg. 57,106 (Sept. 15, 2011) (model year 2014-18 heavy duty truck standards).

88. *See Regulations for Greenhouse Gas Emissions from Aircraft*, EPA, https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-greenhouse-gas-emissions-aircraft.

89. 81 Fed. Reg. 54,422 (Aug. 15, 2016) (to be codified at 40 C.F.R. pts. 87 and 1068).

90. *See, e.g.*, Justin Worland, *Donald Trump Promises to Cut Regulation on 'Phony' Environmental Issues*, TIME, (May 26, 2016), http://time.com/4349309/donald-trump-bismarck-energy-speech/).

91. *See, e.g.*, Edward Wong, *Trump Has Called Climate Change a Chinese Hoax. Beijing Says It Is Anything But*, N.Y. TIMES (Nov. 18, 2016, https://www.nytimes.com/2016/11/19/world/asia/china-trump-climate-change.html).

92. *See* Exec. Order No. 13783, § 4 (Mar. 28, 2017)(requiring the EPA to review the CPP and other decisions and "if appropriate [to] suspend, revise, or rescind the guidance, or publish for notice and comment proposed rules suspending, revising, or rescinding those rules").

93. Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 82 Fed. Reg. 48,035 (Oct. 16, 2017).

94. 82 Fed. Reg. 61,507 (Dec. 28, 2017).

Energy ("ACE") Rule to replace the CPP.[95] Unlike the CPP's sector-wide approach to emissions reduction, the ACE Rule considers only the "best system of emission reduction" that can be applied at a particular source. Consequently, it requires only limited heat rate improvements at coal-fired power plants.[96]

With regard to the EPA's separate 2016 rule establishing new source performance standards for fugitive emissions of methane and other air pollutants from oil and gas sources,[97] the Agency initially sought to temporarily stay implementation of the rule "pending reconsideration," under the Clean Air Act Section 307(d).[98] However, the D.C. Circuit vacated that stay, blocking the EPA's immediate roll-back efforts.[99] Although the EPA also proposed a two-year stay while it reconsiders the 2016 rule,[100] it never finalized that proposal, but instead has proposed a marked weakening of the rule.[101]

Finally, regarding *existing* sources of oil and gas methane, in March 2017, the EPA withdrew the ICR for information on equipment and emissions at oil and gas operation sites,[102] and several states have sued the EPA for failing to move forward with regulations to curb methane emissions from these sources.[103]

b. Roll-backs of Mobile Source Regulations

The Trump Administration has also been working on roll-backs to greenhouse gas emission reductions from mobile sources. As regards passenger cars, in April 2018, the EPA withdrew its January 2017 Final Determination, and announced it would reconsider the 2022-25 mobile emission standards.[104] Several months later, the EPA issued a new Proposed Rule, the "Safer and Affordable Fuel-Efficient Vehicles Rule," proposing to freeze fuel economy standards and

95. 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).

96. *Id.* The EPA has also proposed to significantly weaken the Obama Administration's NSPS for greenhouse gas emissions from EGUs. 83 Fed. Reg. 65,424 (Dec. 20, 2018).

97. 81 Fed. Reg. 35,824 (June 3, 2016) (to be codified in 40 C.F.R. pt. 60).

98. 42 U.S.C. § 7607(d)(7)(B).

99. Clean Air Council v. EPA, 862 F.3d 1 (D.C. Cir. 2017).

100. *See, e.g.*, 82 Fed. Reg. 27646 (June 16, 2017) (proposed delay rule).

101. 83 Fed. Reg. 52,056 (Oct. 15, 2018).

102. 82 Fed. Reg. 12,817 (Mar. 7, 2017).

103. Sierra Club v. Wheeler, 330 F. Supp. 3d 407, 411 (D.D.C. 2018). As regards landfills, while the Trump Administration has not moved to repeal the methane emissions rule, there have been serious concerns whether it is being carried out, leading California and other states to file suit. *See* California v. EPA, No. 18-CV-03237-HSG, 2018 WL 6728009 (N.D. Cal. Dec. 21, 2018).

104. *See* 83 Fed. Reg. 16,077 (Apr. 13, 2018); *see also* 82 Fed. Reg. 14,672 (Mar. 22, 2017) (initial notice on re-opening the mid-term evaluation process); 82 Fed. Reg. 39,551 (Aug. 21, 2017) (request for comment on re-considering mid-term evaluation). Litigation over the withdrawal of the Final Determination is now pending in the D.C. Circuit, California v. EPA, No. 18-1114, (D.C. Cir. filed July, 10, 2018), which rejected the EPA's initial bid to have the case dismissed. *Id.* Order of Nov. 21, 2018.

greenhouse gas emission standards for passenger cars and light trucks at 2020 levels for model years 2021-2026.[105] For its part, California has announced it will not be undertaking such a re-evaluation, but the EPA is seeking to use this process to revoke California's Clean Air Act waiver—and thereby remove California's independent authority to regulate greenhouse gases from mobile sources under the Clean Air Act.[106]

As for heavy-duty trucks, although the EPA's 2016 truck standards included "glider vehicles,"[107] the EPA has proposed to exempt these vehicles from the standards, which will leave old, less efficient and more polluting engines on the road for many years.[108] The 2016 standards also provided important requirements for the trailer component of trucks that improve fuel efficiency and reduce greenhouse gas emission, but the EPA is revisiting that aspect of the standards for trailers.[109]

Finally, as regards aircraft emissions, in pending litigation challenging the biogenic carbon dioxide component of the aircraft endangerment finding, the EPA has obtained several abeyance orders on the grounds that the parties are discussing a potential resolution, which likely signals that the EPA has no intention of moving forward with implementing regulations.[110]

c. The EPA's Broader Roll-back of Science-Based Decision-Making

The Trump Administration's EPA has also launched initiatives that pose enormous threats to the Agency's regulation of pollutants under the entire NAAQS program. These include: (a) a Memorandum suggesting a new and more restrictive view of the NAAQS program;[111] (b) a Proposed Rule, which, if finalized, would prohibit the EPA from considering vital public health studies in NAAQS decision-making;[112] and (c) an Advanced Notice of Proposed Rule-making concerning the manner in which the EPA undertakes cost-benefit analysis, suggesting the EPA might issue uniform regulations elevating compliance costs, and undermining the consideration of the environmental benefits of NAAQS and other

105. 83 Fed. Reg. 42,986 (Aug. 24, 2018).

106. *Id*. at 42,999.

107. Gliders are trucks comprised of a previously owned powertrain (including the engine, transmission, and usually the rear axle) combined with new body parts (generally including the tractor chassis with frame, front axle, brakes, and cab).

108. 82 Fed Reg. 53,442 (Nov. 16, 2017). The EPA had announced it simply would not enforce the standards, but in response to litigation, withdrew that approach. *See* Juliet Eilperin and Brady Dennis, *EPA reverses course, says it will enforce stricter pollution limits for glider trucks*, WASH. POST, (July 27, 2018) https://www.washingtonpost.com/national/health-science/epa-reverses-course-says-it-will-enforce-stricter-pollution-limits-for-glider-trucks/2018/07/26/705ff4ee-9144-11e8-8322-b5482bf5e0f5_story.html?noredirect=on&utm_erm=.d2bdc87d0c0d.

109. *See* Truck Trailer Man. Ass'n. v. EPA, No. 16-1430, (D.C. Cir. Oct. 27, 2017).

110. *See* EPA Status Report, Biogenic CO2 Coalition v. EPA, No. 16-1358, (D.C. Cir. Nov. 1, 2018).

111. *See* EPA, Back To Basics Process For Reviewing National Ambient Air Quality Standards (May 9, 2019).

112. *See* 83 Fed. Reg. 18,768 (Apr. 30, 2018).

regulations.[113] Taken together, these EPA initiatives reflect a fundamental assault on the Agency's decades-long legacy of protecting the American people from the harmful effects of air pollution.

II. THE UPDATED CASE FOR A GREENHOUSE GAS NAAQS

It remains to be seen how far the Trump Administration will get in fulfilling its deregulatory agenda. Decided cases thus far suggest that there may be judicially imposed limits on its efforts to elide its statutory mandates and elevate industry interests above public health and the environment.[114] However, once the Trump Administration leaves, and the EPA is empowered to once again carry out its statutory mandates, it will be faced with both unraveling the damage wrought, while at the same time determining anew how to bring the Act to bear on the climate crisis.

At that time, the EPA should not simply return to the Obama Administration's approach to greenhouse gas regulations. As the preceding discussion demonstrates, that sector-by-sector approach simply will not bring about the emission reductions necessary within the timeframe they are needed. Only through the NAAQS program can the EPA work toward the overarching objective of protecting human health and welfare from the threats posed by greenhouse gas emissions. Moreover, any notion that proceeding with an incremental approach would allow faster progress with fewer litigation and other delays than pursuing a greenhouse gas NAAQS has been shattered by the ferocious litigation assault that the fossil fuel and power industry and its state allies have waged against the CPP and other regulatory initiatives to date.

Rather, when the EPA returns to faithfully implementing the Act, it should restore the central role of science in the Agency's decision-making by finally implementing a greenhouse gas NAAQS. As the following sections explain, such a NAAQS is the Act's best tool for regulating greenhouse gases.

At the same time, developments in recent years have made implementing a greenhouse gas NAAQS more straightforward, helping to resolve concerns raised as to whether the global nature of greenhouse gas emissions and climate change make a greenhouse gas NAAQS feasible. This Part briefly outlines the NAAQS program, and then explains how, and why, a new EPA should move forward with a greenhouse gas NAAQS as rapidly as practicable.

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113. *See* 83 Fed. Reg. 27,524 (June 13, 2018). The Agency also issued a policy statement providing that in future regulatory actions it will treat biomass from managed forests as carbon neutral when burned at power plants. EPA, EPA'S TREATMENT OF BIOGENIC CARBON DIOXIDE EMISSIONS FROM STATIONARY SOURCES THAT USE FOREST BIOMASS FOR ENERGY PRODUCTION (Apr. 23, 2018).

114. *See, e.g.*, Lisa Heinzerling, *Unreasonable Delays: The Legal Problems (So Far) of Trump's Deregulatory Binge*, 12 HARV. L. & POL'Y REV. 13 (Winter 2018); *see also, e.g.*, NRDC v. Nat'l Hwy Traffic Safety Admin., 894 F.3d 95 (D.C. Cir. 2018) (rejecting agency's effort to delay implementation of Obama era regulation imposing penalties for violating fuel economy standards).

A. THE NAAQS PROGRAM

Although the Clean Air Act has multiple and overlapping programs to address pollution at the individual plant, vehicle class, and industry sector level, only the NAAQS program requires the EPA to achieve the overarching objective of protecting public health and welfare from the most pervasive forms of air pollution emitted from "numerous or diverse" sources.

The NAAQS comes into play once the EPA makes a threshold finding that a pollutant, which is present in the ambient air due to "numerous or diverse mobile or stationary sources," "cause[s] or contribute[s] to air pollution which may reasonably be anticipated to endanger public health or welfare."[115] For greenhouse gases, the EPA made that finding for certain mobile sources in 2009,[116] and since that time has consistently reiterated that greenhouse gases endanger public health and welfare.[117]

Once an air pollutant is listed as a NAAQS pollutant, the EPA has one year to issue "air quality criteria" that reflect "the latest scientific knowledge useful in indicating the kind and extent of all identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air, in varying quantities."[118] Pollutants for which criteria have been identified are known as "criteria" air pollutants, and the current six "criteria" pollutants are lead, ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and particulate matter.[119]

At the time these criteria are established, the EPA must also propose primary and secondary air quality standards; these are the National Ambient Air Quality Standards, or NAAQS.[120] Primary standards are target concentrations of the pollutant in the air, "the attainment and maintenance of which . . . are requisite to protect the public health."[121] Secondary standards are "the level of air quality"

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115. 42 U.S.C. § 7408(a)(1)(A) and (B) (1998).

116. *See* Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202 (a) of the Clean Air Act, *supra* note 29.

117. Among other rulemakings, the EPA has reiterated that finding in (a) promulgating new and existing source regulations for power plants, 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); (b) regulating the oil and gas sector, 81 Fed. Reg. 35,824 (June 3, 2016) (to be codified in 40 C.F.R. pt. 60); and (c) connection with greenhouse gas emissions from aircraft. 81 Fed. Reg. 54,422, 54,424 (Aug. 15, 2016) (explaining that "[n]o information or assessments published since late 2009 suggest that it would be reasonable for the EPA to now reach a different or contrary conclusion for purposes of CAA Section 231(a)(2)(A) than the Agency reached for purposes of Section 202(a)").

118. *Id.* 42 U.S.C. § 7408(a)(2) (1998). This includes: (a) variable factors (including atmospheric conditions) which of themselves or in combination with other factors may alter the effects on public health or welfare of such air pollutant; (b) the types of air pollutants which, when present in the atmosphere, may interact with such pollutant to produce an adverse effect on public health or welfare; and (c) any known or anticipated adverse effects on welfare. *Id.* § 7408(a)(2)(A)-(C).

119. *See* 40 C.F.R. § 50.

120. 42 U.S.C. § 7409(a)(2).

121. *Id.* § 7409(b)(1).

necessary to "protect the public welfare"[122]—expressly defined to include, *inter alia*, "effects on soil, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, *and climate*"[123]—from the adverse effects of "such air pollutants in the ambient air."[124] The EPA is not permitted to consider cost in determining the standards necessary to protect public health or welfare.[125]

Once the primary and secondary NAAQS have been established, the EPA, with input from the states, must designate geographic areas of the nation as being in "attainment"—that is, areas that meet the "national primary or secondary ambient air quality standard for the pollutant"—or "nonattainment"—that is, areas that do *not* meet one or both of those standards.[126] This process may take up to three years to complete.[127]

For areas designated as nonattainment, the EPA is required to determine the dates by which attainment can be achieved.[128] With respect to a primary air quality standard, the Act provides that ten years is the longest period that may be provided for reaching attainment.[129] Where an area's nonattainment designation is with respect to a secondary standard, by contrast, the EPA must choose the date "by which attainment can be achieved as expeditiously as practicable."[130] Under the NAAQS program, the states, and their air quality regions, then play the leading role in bringing about compliance with the NAAQS. Once the EPA has made its designations, each state must prepare—within three years—a SIP to obtain "implementation, maintenance and enforcement" of the standards.[131] For nonattainment areas, these plans must include, *inter alia*, "the implementation of all reasonably available control measures as expeditiously as practicable . . . ."[132]

As a practical matter, these broad mandates call for states to take action to reduce emissions on many fronts—from not only power plants, but also commercial and residential buildings, the transportation sector, the agricultural sector and elsewhere. Although the myriad of programs and approaches states may take to

122. *Id.* § 7409(b)(2).

123. *Id.* § 7602(h) (emphasis added).

124. *Id.* § 7409(b)(2).

125. *See, e.g.*, Whitman v. American Trucking Ass'ns, Inc., 531 U.S. 457, 471 (2001). In a recent memorandum, the EPA Administrator sought to weaken this feature of the NAAQS program, characterizing *Whitman* as authorizing the EPA to consider "adverse social, economic, or energy effects" in establishing NAAQS, *see* EPA, Back To Basics Process For Reviewing National Ambient Air Quality Standards, *supra* note 111, an interpretation flatly contrary to the Supreme Court's ruling in *Whitman*.

126. 42 U.S.C. § 7407(d)(1) (2012).

127. *Id.* § 7407(d)(1)(B)(i).

128. *Id.* § 7502(a)(1)(A).

129. *Id.* § 7502(a)(2)(A). Congress has amended the statute to extend these deadlines for all existing NAAQS pollutants, *id.* §§ 7511 (ozone), 7512 (carbon monoxide), 7513 (particulate matter), 7514 (sulfur oxides, nitrogen dioxide, and lead). The Act also provides specific remedies when the statutory deadlines are missed. *Id.* § 7509(c), (d).

130. *Id.* § 7502(a)(2)(B).

131. *Id.* § 7410(a).

132. *Id.* § 7502(c)(1).

reduce emissions of listed pollutants are beyond the scope of this Article, the salient point is that the NAAQS program activates the widest possible approach to tackling these emissions with maximum flexibility to choose those measures, across multiple sectors, which will allow each state to achieve SIP emission reduction requirements.[133]

Importantly for purposes of envisioning a greenhouse gas NAAQS, the Clean Air Act also requires that each SIP address pollution that crosses state lines. Thus, under Section 110(a)(2)(D), each SIP must prohibit sources from emissions "which will contribute significantly to nonattainment in, or interfere with maintenance by, *any other State* with respect to any such national primary or secondary ambient air quality standard . . . ."[134]

The existing NAAQS have brought about enormous reductions in NAAQS pollutants, while also providing large economic benefits.[135] Because one of the main objections to any NAAQS—and especially over greenhouse gases—concerns the overall economic impact on regulated businesses, it also bears emphasizing that these benefits have been achieved during periods of rapid economic growth: the EPA currently states on its website, "[f]rom 1970 to 2015, aggregate national emissions of the six common pollutants alone dropped an average of 70 percent while gross domestic product grew by 246 percent."[136]

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133. *See id*. § 7410(a). In many states, NAAQS implementation is carried out by multiple Air Quality Management Districts, which manage a specific area. For example, California alone has more than twenty-five such districts. *See, e.g*., CALIFORNIA SOUTH COAST AIR MANAGEMENT DISTRICT, FINAL SIP (2016), http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp. Through the "transportation conformity" program, the EPA also works with states to incorporate changing mobile source emission standards into state SIPs. 40 C.F.R. § 93.100-60 (2018).

134. 42 U.S.C. § 7410(a)(2)(D)(i)(I) (emphasis added).

135. Between 1990 and 2010, the Clean Air Act produced an almost 50% reduction in volatile organic compounds and nitrogen oxides, and more than a 60% reduction in sulfur oxides, while producing economic benefits that dwarfed the costs. *See* EPA, THE BENEFITS AND COSTS OF THE CLEAN AIR ACT FROM 1990 TO 2020 (2011).

136. *See Clean Air Act Results*, EPA, https://www.epa.gov/clean-air-act-overview/progress-cleaning-air-and-improving-peoples-health. (last visited Feb. 19, 2019); *see also* OFFICE OF MGMT. & BUDGET, 2017 DRAFT REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND AGENCY COMPLIANCE WITH THE UNFUNDED MANDATES REFORM ACT (Feb. 23, 2018) (available at https://www.whitehouse.gov/wp-content/uploads/2017/12/draft_2017_cost_benefit_report.pdf) (estimating that the regulations imposed from 2006 to 2016 provided benefits worth as much as $911 billion in exchange for costs as low as $78 billion, measured in 2015 dollars).

To be sure, the NAAQS are no panacea, and for some—especially ozone—air quality districts have struggled to meet NAAQS attainment deadlines. *See, e.g*., Max Baumhefner, *The Ozone Saga*, 35 ECOLOGY L.Q. 557 (2008) (discussing failure to comply with ozone standards); Arnold W. Reitze, Jr., *The National Ambient Air Quality Standards For Ozone*, 6 ARIZ. J. ENVTL. L. & POL'Y 421, 431–33 (2015) (same). However, the fact that the EPA, and implementing state and local agencies, have grappled with how to most effectively implement NAAQS for other criteria air pollutants only serves to further highlight that the complexities in implementing a greenhouse gas NAAQS is in no manner an impediment to the EPA's authority, and responsibility, to act.

B. GREENHOUSE GASES ARE WELL-SUITED FOR REGULATION UNDER THE NAAQS PROGRAM

Greenhouse gases have several distinguishing characteristics from the existing criteria air pollutants. While some criteria pollutants travel across state—and even international—borders, existing NAAQS pollutants' impacts are all closely tied with where the pollutants are ultimately located, and thus the EPA has been able to set localized pollution concentrations as attainment objectives.

Greenhouse gases are different. They are broadly dispersed in the atmosphere, not staying within one state, or even the United States, and their impacts are not tied to pollutant concentrations in any one area. This means that, unlike other NAAQS pollutants, attainment cannot be measured based on local pollution conditions alone. Moreover, while it has proven difficult to reach attainment for some of the existing NAAQS pollutants, it is apparent that it will take multiple decades, and require significant changes to many aspects of the economy as well as those of countries around the world, to reduce greenhouse gas concentrations to safe levels—regardless of how quickly emissions are reduced.

Relying on these distinguishing characteristics, some have argued that greenhouse gases are not suited for regulation under the NAAQS program.[137] The issues can be framed in many ways but come down to the same fundamental question: given the unique nature of greenhouse gases, can the EPA craft a greenhouse gas NAAQS which fits sufficiently within the NAAQS framework? Or, put another way, would a reviewing court conclude that a greenhouse gas NAAQS is so different from other NAAQS regulations—and so far-reaching—that Congress could not have intended the EPA to impose it under the existing statutory scheme?[138]

One way to approach that question would be to focus on the economic implications of a greenhouse gas NAAQS. Some recent Supreme Court precedents suggest that where an agency initiative will have major economic impacts, the Court will be skeptical that Congress authorized the agency to act unless the statutory language is unambiguous.[139] For example, in *FDA v. Brown & Williamson Tobacco Corp.*, the Court concluded that the Food and Drug Administration's power to regulate drugs did not encompass the power to regulate tobacco products, because the underlying statute did not make clear that Congress intended to give the Agency such sweeping authority.[140]

Similarly, in *UARG* the Court rejected the EPA's effort to regulate greenhouse gases from certain sources under the Clean Air Act's Title V and PSD programs in

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137. *E.g.*, Oren, *Is The Clean Air Act At A Crossroads*, *supra* note 9, at 1246–50.

138. As the Supreme Court has characterized this question in the course of considering the scope of various statutes, Congress "does not, one might say, hide elephants in mouseholes." Bilski v. Kappos, 561 U.S. 593, 645 (2010) (quoting Whitman v. American Trucking Assns., Inc., 531 U.S. 457, 468 (2001)).

139. *See* Lisa Heinzerling, *The Power Canons*, 58 WM. & MARY L. REV. 1933 (2017) (discussing, *e.g.*, King v. Burwell, 135 S. Ct. 2480, 2488–89 (2015)).

140. FDA v. Brown & Williamson Tobacco Corp., 529 U.S. 120, 147 (2000).

part on the grounds that "it would bring about an enormous and transformative expansion in the EPA's regulatory authority without clear congressional authorization."[141] The same charge is likely to be levied against a greenhouse gas NAAQS.

This line of attack should not be an impediment to a greenhouse gas NAAQS, for two reasons. First, unlike the programs at issue in *UARG*, the NAAQS program is designed precisely to address pollutants, like greenhouse gases and the other NAAQS listed pollutants, emitted from "numerous or diverse mobile or stationary sources."[142] Congress thus plainly anticipated that through such regulation the EPA would, in fact, impact many activities. Moreover, by directing the EPA to take into account the "latest scientific knowledge" relevant to the "kind and extent of all identifiable effects of public health or welfare which may be expected from the presence of such pollutant in the ambient air," 42 U.S.C. § 7408(a)(2), Congress also contemplated that there might be new economic effects where the science reveals a new air pollution threat. Accordingly, a greenhouse gas NAAQS would not expand the EPA's role in the unanticipated manner the Court was concerned about in *UARG*.[143]

Second, the EPA's regulation of the existing NAAQS already has far-reaching economic impacts. Indeed, the Supreme Court, in *Whitman v. American Trucking Assns., Inc*., has rejected a claim that the EPA exceeded its power in setting NAAQS without taking cost considerations into account.[144]

Whitman concerned the EPA's revised NAAQS for particulate matter and ozone. Petitioners claimed the EPA was required to consider economic implications when revising NAAQS, and that in any event the NAAQS program constituted an unconstitutional delegation of legislative authority to the EPA.[145] Rejecting both arguments, the Supreme Court unanimously found that the EPA may not consider costs in setting NAAQS, and that the Agency's power to make NAAQS determinations raises no serious constitutional concerns.[146]

This outcome should resolve any similar attack on a greenhouse gas NAAQS. Thus, while establishing and implementing a NAAQS may have far-reaching economic implications, the Court's ruling in *Whitman* makes clear that Congress gave the EPA precisely that power in the NAAQS program.[147]

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141. Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427, 2444 (2014).

142. 42 U.S.C. § 7408(a)(1)(B) (1998).

143. It also bears emphasizing that EPA's *failure* to impose a greenhouse gas NAAQS also has important economic implications, allowing ongoing emissions that inevitably contribute to the devastating economic harms caused by climate change. *See supra* at 243–45.

144. Whitman v. American Trucking Ass'ns Inc., 531 U.S. 457, 471 (2001).

145. *Id.* As the Court explained, where a statute lacks any "intelligible principle" to guide agency action, the statute may be deemed to violate the non-delegation doctrine. *Id.* at 474.

146. *Id.*

147. Importantly, the Court noted that while economic factors are irrelevant to *establishing* NAAQS, the Act provides for "economic costs to be taken into account in *implementing* the air quality standards." *Id.* at 467 (emphasis added); *see, e.g.*, 42 U.S.C. § 7502(a)(1)(A) (2017) (mandating that, in setting an attainment date, the EPA must consider "the availability and feasibility of the pollution control measures that the Administrator believes may be necessary to provide for attainment"). Thus, for example, while

Moreover, it bears emphasizing that the EPA has been able to implement the existing NAAQS without adverse economic effects, and there is no reason to assume a greenhouse gas NAAQS would be different. To be sure, there will necessarily be large-scale economic adjustments as the nation moves away from a fossil fuel economy to one driven by renewables. However, the engines of economic growth in the energy industry—a significant source of greenhouse gas emissions—are the same renewable energy sources that will be central to a greenhouse gas NAAQS program. Solar jobs are growing faster than any other job sector, and wind and solar energy continue to account for the largest areas of new energy growth across the economy.[148] Moreover, existing technologies are available to make this transition rapidly, and once the development of new technologies—which the Act is expressly designed to foster[149]—are considered, as several studies have concluded, there is no reason that the transition to a 100% renewable energy economy cannot be achieved within several decades.[150]

At bottom, as the nation's experience with existing NAAQS has shown, the economy can and will adjust to the regulatory structure necessary to achieve a greenhouse gas NAAQS. The Act contains the necessary flexibility to ensure that the nation can move toward a NAAQS as expeditiously as possible, without

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SIPs must include, *inter alia*, "all reasonably available control measures as expeditiously as practicable," including by imposing "reasonably available control technology" ("RACT"), *id.* § 7502(c), the EPA interprets RACT to allow states to reject measures that "would be economically or technologically infeasible," 66 Fed. Reg. 58,607 (Jan. 3, 2001) (codified at 42 C.F.R. pt.52)—which means that economic factors would inevitably come into play in determining how far states must go in their SIPs to move toward attainment of a greenhouse gas NAAQS.

By contrast, in *Michigan v. EPA*, the Court found that a different Clean Air Act provision, providing for the EPA to regulate certain sources where "appropriate and necessary," required consideration of cost factors in determining whether to regulate *at all*, regardless of the role such factors may play in implementing the standards, because, the Court found, unlike the terms that govern standard-setting under the NAAQS program, the phrase "'appropriate and necessary' requires at least some attention to cost." 135 S. Ct. 2699, 2707 (2015).

148. *See* BUREAU OF LABOR STATISTICS, OCCUPATIONAL OUTLOOK HANDBOOK (April 23, 2018), available at https://www.bls.gov/ooh/fastest-growing.htm (finding that "solar photovoltaic installers" and "wind turbine service technicians" will be the two fastest growing occupations through 2026); Erin Winick, *Five Jobs that are Set to Grow in 2018*, MIT TECH. REV. (Jan. 8, 2018), https://www.technologyreview.com/s/609644/five-jobs-that-are-set-to-grow-in-2018/ (explaining that renewables "will be the fastest-growing professions by percentage over the next 10 years").

149. *See* Ethyl Corp. v. EPA, 541 F.2d 1, 14 (D.C. Cir. 1976) (*en banc*) (explaining that the NAAQS program is designed to be "technology forcing").

150. *See*, e.g., Jacobson et al., *100% Clean and Renewable Wind, Water, and Sunlight All-Sector Energy Roadmaps for 139 Countries of the World*, JOULE (2017) (setting out roadmaps that "envision 80% conversion by 2030 and 100% by 2050"); Richard J. Millar, *et al.*, *Emission budgets and pathways consistent with limiting warming to 1.5 ℃*, NATURE GEOSCIENCE (Sept. 18, 2017); Jacobson et al., *100% Clean and Renewable Wind, Water, and Sunlight (WWS) All-Sector Energy Roadmaps for the 50 United States*, 8 ENERGY ENV'T SCI. 2093, 2093 (2015); S. Pacala & R. Socolow, *Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies*, 305 SCI. 968, 968 (2004).

hampering the nation's ability to continue to thrive as it has under all the existing NAAQS.

Nonetheless, it remains inevitable that the unique nature of greenhouse gases will raise issues that have not been addressed in prior NAAQS or the cases considering them. The first set of issues concerns how the EPA will formulate the NAAQS, and how to comply with the statutory requirement for attainment of a primary standard within ten years. As section 1 below explains, the fact that it will require multiple decades to stabilize the climate to the point where greenhouse gases no longer endanger public health and welfare is not an obstacle to a greenhouse gas NAAQS.

The second set of issues concerns how the EPA will address compliance with a greenhouse gas NAAQS, given the global nature of the climate change problem caused by greenhouse gas emissions. As detailed in section 2 below, particularly in light of the Paris Agreement, the work that has been done on climate budgets, and the Supreme Court's decision in *Homer*, the EPA can rely on existing Clean Air Act provisions that consider pollution that crosses state and national boundaries in designing a program whereby each state makes allocated reductions in emissions to contribute to greenhouse gas emission attainment goals.

1. The Time Period Necessary to Achieve Attainment is No Impediment to a Greenhouse Gas NAAQS

a. What a Greenhouse Gas NAAQS Could Look Like

In order to address the various objections to a greenhouse gas NAAQS, one must begin by considering what such a NAAQS might look like. A NAAQS does not consist solely of a "level"—that is, a concentration of pollutants in the ambient air—but also an averaging time, and a "form." The "averaging time" specifies the span of time across which the amount of a pollutant in the air will be averaged.[151] For example, some NAAQS require a certain average annual level, while others require a certain average daily level.

The "form" of a NAAQS, in turn, describes how compliance with the level will be determined within the averaging time. The form often includes an element allowing for exceedance of the standard, for a certain number of times over the averaging period.[152]

Under existing NAAQS these elements are used in combination to address the specific health and welfare effects of different pollutants. For instance, different levels

151. *E.g.*, Am. Farm Bureau Fed'n v. EPA, 559 F.3d 512, 516 (2009).

152. For example, the hourly nitrogen dioxide NAAQS allows exceedances as long as the 98th percentile of measured levels at each monitoring site in each year, averaged over three years, does not exceed the standard. 40 C.F.R. §§ 50.11, pt. 50 app. S(c)(2).

can be set in relation to different averaging times to capture the health and welfare effects associated with shorter- and longer-term exposures to specific pollutants.[153]

In contemplating a greenhouse gas NAAQS, a particularly useful model to consider would be the most recent NAAQS the EPA promulgated for lead. For that standard, based on the close relationship between lead levels in children and effects on IQ, the EPA determined that "an allowable airborne lead-related loss of two IQ points should be used to set the NAAQS standard."[154] To achieve that objective, the EPA established a lead air exposure level, and then found that "the appropriate averaging time for the air lead level standard is a rolling three-month period with a maximum (not-to-be-exceeded) form evaluated over a period of three years."[155]

For a greenhouse gas NAAQS, the endangerment finding, and the 2015 Paris Agreement, provide the EPA with the basis for determining the first part of the NAAQS. Thus, the EPA has already determined that greenhouse gases endanger public health and welfare, and in the Paris Agreement, the United States and the rest of the world's nations agreed that to protect the planet from these dangers, humanity must hold "the global average temperature to well below 2° Celsius above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5° Celsius above pre-industrial levels . . . ."[156] Thus, just as the lead NAAQS sought to determine the necessary limitations on airborne lead exposure to avoid a loss of two IQ points, a greenhouse gas NAAQS would be set based on the limitations on greenhouse gases necessary to achieve no more than a 1.5° Celsius increase in temperatures.

b. How a Greenhouse Gas NAAQS can be Formulated

In order to translate a greenhouse gas NAAQS temperature objective into a greenhouse gas standard, the EPA will have to determine the target concentrations of greenhouse gases necessary to keep global temperatures below the target level—just as, with lead, the Agency had to find the level of airborne lead exposure that would keep IQ levels from dropping more than two IQ points. As a threshold matter, because current greenhouse gas concentration levels are far above what is necessary to stabilize the climate, it is inevitable that these standards must be set far *below* current levels, which will mean that the entire country will immediately be in "nonattainment"—that is, out of compliance with the standard.[157]

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153. *See, e.g.*, National Ambient Air Quality Standards for Particulate Matter, 71 Fed. Reg. 61144, 6144 (Oct. 17, 2006) (setting different standards for fine particulate matter exposures over 24-hour and annual time periods).

154. *See* 73 Fed. Reg. 66964, 67005 (Nov. 12, 2008) (final lead NAAQS); Coalition of Battery Recyclers Ass'n v. EPA, 604 F.3d 613, 616 (D.C. Cir. 2010) (rejecting challenges to the standard).

155. 604 F.3d at 617.

156. UNFCCC Paris Agreement, art. 2, ¶ 1(a)

157. 42 U.S.C. § 7407(d)(1)(A) (emphasis added).

This status, in turn, would trigger the Act's Section 172 provisions for nonattainment areas, under which the EPA must establish an attainment date for the primary standard that may be "*no greater than 10 years from the date of designation as nonattainment, considering the severity of nonattainment and the availability and feasibility of pollution control measures*."[158] The statute contains no similar deadline for the secondary standard.

In light of current greenhouse gas concentration levels, and the long-lived nature of greenhouse gases in the atmosphere, there are currently no measures the EPA could require that would achieve attainment for greenhouse gases on this ten-year primary standard timetable. This is because even if *emissions* of carbon dioxide and other long-lived pollutants were cut rapidly to zero, it would still take longer than ten years for *atmospheric concentrations* to fall to below the primary standard. Consequently, this statutory deadline for attainment has been the basis for one of the arguments against the suitability of greenhouse gases for NAAQS designation. In short, the argument goes, because the NAAQS program requires attainment in no more than ten years, and that cannot be achieved for greenhouse gases, the statute must not permit a greenhouse gas NAAQS.[159]

To the contrary, as the following subsections explain, this deadline is no impediment at all.[160]

i. The EPA Could Design a Greenhouse Gas NAAQS that Meets the Deadline for a Primary Standard

Although it will take longer than a decade to reach attainment for greenhouse gases, the EPA could design a greenhouse gas NAAQS that satisfies the requirements for a primary standard. Specifically, one option is for the EPA to rely on the "averaging" feature of a NAAQS, as the EPA has done for other pollutants.[161] Under this approach, while the EPA would set binding benchmarks to maximize reductions and insure "reasonable further progress" on a strict timetable toward attainment,[162] the final attainment level requisite to protect the public health might not be achieved for several decades or even longer.

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158. 42 U.S.C. § 7502(a)(2)(A) (emphasis added).

159. *E.g.*, Oren, *Is The Clean Air Act At A Crossroads*, *supra* note 9, at 1247.

160. In discussing the feasibility of a NAAQS in 2011, Rich Raiders questioned whether the public health effects of greenhouse gas concentrations at then-current levels were sufficient to allow the EPA to set attainment below those levels. Raiders, *supra* note 9, at 277–78. Whatever the import of that argument then, seven years later the EPA would have little difficulty finding current greenhouse gas concentration have concrete adverse public health impacts, given the mega-hurricanes, droughts, wildfires and heat waves that have become so common in the past few years. *See* U.S. GLOBAL CHANGE RESEARCH PROGRAM, CLIMATE SCIENCE SPECIAL REPORT, FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME II*), supra* note 40.

161. *See supra* pp. 263–64 (discussing averaging for nitrogen oxides and lead).

162. *See* 42 U.S.C. §§ 7501(1); 7502(c)(2) (defining and applying reasonable further progress requirements).

For several existing NAAQS, the unique nature of the pollutants has led the EPA to measure attainment by considering average pollutant levels for as long as three years.[163] As has been done for other NAAQS, the three elements of a NAAQS —level, form and averaging time—could be used to structure a NAAQS reflecting the specific harm caused by climate pollutants.[164]

The averaging time for a greenhouse gas NAAQS today could reasonably span decades. Although this is a far longer averaging time than for other NAAQS pollutants, the approach may be appropriate given both the long-lived nature and effects of carbon dioxide and other climate pollutants, and the long-term strategies necessary to protect public health and welfare. Because the EPA has long tailored averaging times to the effects of particular pollutants, it would be within its authority to follow the same course with greenhouse gases, relying on a longer averaging time to reflect the necessarily slow atmospheric response of even aggressive steps to curb emissions of carbon dioxide and other long-lived pollutants.

Moreover, such an averaging time could be combined with a form that would comply with the Act's standard for attainment within ten years. In particular, the form could allow a certain number of decades of non-attainment over the long averaging period. If the resulting standard, for example, allowed for seventy years of non-attainment over an averaging time of one-hundred years, then so long as attainment has been achieved in year seventy and maintained for the following thirty years, states will have been in attainment over the entire period.

Assuming, for purposes of discussion, that the EPA determined that the appropriate attainment level is 350 parts-per-million (ppm) of $GtCO_{2eq}$,[165]the Figure below shows what this might look like.

The challenge of such an approach, of course, would be that there would be no way to determine, in year ten, whether states had reached "attainment," because that would only be quantifiable at the end of the averaging period. However, by establishing binding benchmarks over the averaging period, reflecting the greenhouse gas concentration targets that would need to be reached at, for example, each ten-year interval in order to achieve the ultimate standard, the EPA could

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163. *See, e.g.*, National Ambient Air Quality Standards for Lead, 73 Fed. Reg. 66,964 (Nov. 12, 2008).

164. Because the existing endangerment finding concerns the six principal climate-changing pollutants, *see* 81 Fed. Reg. 54,434, 54,422(Aug. 15, 2016), the simplest approach may be for the EPA to craft its NAAQS for the same group of pollutants. Alternatively, the EPA has also relied on an indicator pollutant as a surrogate for multiple pollutants, and might do so with CO_2 here. *See* Primary National Ambient Air Quality Standard for Sulfur Dioxide,75 Fed. Reg. 35,520, 35,537 (June 22, 2010) (retaining SOx as indicator for all species of gaseous sulfur oxides).

165. This Article does not propose to resolve the appropriate level of the standard, which would be determined by the best available science. However, leading scientists have suggested that an appropriate level may be 350 ppm. *See, e.g.*, James Hansen et al., *Ice Melt, Sea Level Rise and Superstorms: Evidence from Paleoclimate Data, Climate Modeling, and Modern Observations that 2 C Global Warming Could be Dangerous*, 16 ATMOS. CHEM. PHYS. 3761, 3801 (2016).

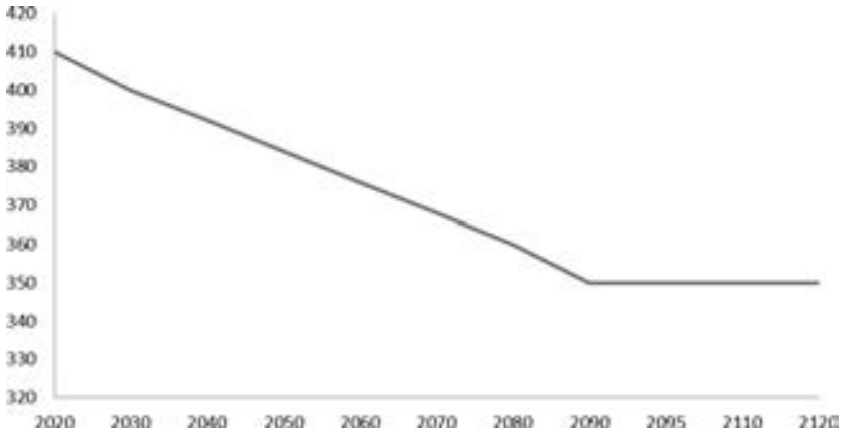

FIGURE 2 Potential Greenhouse Gas PPM Under a NAAQS Over The Next Century

ensure "reasonable further progress,"[166] "as expeditiously as practicable,"[167] towards the attainment goal. Thus, the EPA would model and establish shorter-term concentration targets, reflecting the emissions reductions necessary to ensure that the country remains on track toward the long-term concentration goal over the full averaging period.[168]

In sum, given that the EPA has some flexibility in setting a NAAQS, including the averaging and form elements, there is no reason that the requirement for attainment within ten years should stand in the way of a greenhouse gas NAAQS primary standard.

ii. The EPA has Discretion to Establish a Secondary NAAQS for Greenhouse Gases that Will Not Be Fully Attained for Decades

To be sure, the long-term averaging approach would be novel. However, even if a reviewing court were to find that the statute does not permit such a long averaging period for a primary standard, there would still be the secondary NAAQS. Once the EPA establishes air quality criteria, the Agency must establish not just primary standards necessary to protect public health, but also the *secondary* standards necessary to protect public welfare,[169] which is defined to expressly include effects on "weather, visibility, *and climate*."[170]

166. *See* 42 U.S.C. §§ 7501(1); 7502(c)(2).

167. 42 U.S.C. § 7502(a)(2).

168. Of course, success on this path will require emission reductions not just in the United States, but around the world. The next section addresses that issue.

169. 42 U.S.C. § 7502(a)(2)(B).

170. 42 U.S.C. § 7602(h) (emphasis added).

Because the secondary standard does not contain a specific attainment deadline, such a standard for greenhouse gas emissions would be—relatively speaking—more straightforward. The EPA would issue standards that will satisfy the ultimate attainment goal and would determine a pathway toward that goal "as expeditiously as practicable,"[171] considering the emission reductions necessary for the United States to make an appropriate contribution to reducing worldwide emissions over time.

That leaves the question as to whether the EPA would have the authority to impose a secondary standard even if there were no method to appropriately craft a primary standard. Given how the Supreme Court addressed an analogous statutory interpretation question in *UARG v. EPA*,[172] the answer is yes. Thus, if the EPA establishes primary and secondary standards for greenhouse gases, even if a reviewing court were to determine that the primary standard is not allowable, that should still leave the secondary standard intact.[173]

UARG concerned the regulations the EPA crafted to address greenhouse gas emissions under the Act's Title V and PSD permitting programs.[174] The Clean Air Act Section 302(j) defines "major" sources of air pollution to include any stationary source emitting more than 100 tons per year of "any air pollutant."[175] The EPA had concluded that since the term "air pollutant" includes greenhouse gases, the Act requires the Agency to regulate these emissions from major sources.[176]

However, compared to other regulated pollutants, a far greater number of pollution sources emit greenhouse gases above the statutory threshold for regulation, and thus, according to the EPA, a literal application of the "major source" standard for greenhouse gas emissions would have encompassed *millions* of sources.[177] To address that regulatory burden, the EPA created much higher thresholds for greenhouse gases—the "tailoring rule"—on the grounds that applying the statute to greenhouse gases would have been otherwise unworkable.[178]

In *UARG*, the Supreme Court rejected this approach as an impermissible "rewriting of the statutory thresholds," which must be done by Congress, not by

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171. Both the primary and secondary standards require EPA action "as expeditiously as practicable," but it is the secondary standard that contains no firm deadline. 42 U.S.C. § 7502(a)(2).

172. Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427 (2014).

173. The only legislative history that appears to exist concerning secondary standards suggests Congress contemplated that they would be "generally more restrictive" than primary standards, which is consistent with Congress not providing a strict timetable for achieving them. *See* ENVIRONMENTAL PROTECTION AGENCY, *Legal Compilation: Air, Volume Three*, 1680 (1973).

174. *Utility Air Regulatory Group*, 134 S. Ct. 2427.

175. 42 U.S.C.§ 7602(j) (2017). Similarly, for purposes of the PSD program, Section 169 defines the term to encompass any stationary source emitting more than 250 tons of "any air pollutant." *Id.* § 7479 (1).

176. *Utility Air Regulatory Group*, 134 S. Ct. at 2437; *see generally* Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31,514 (2010) (tailoring rule).

177. *Id.*

178. *Id.*

the EPA.[179] In the majority's view, the fact that the term "air pollutant" encompassed greenhouse gases under the "Act-wide definition" does not dictate whether the same term includes greenhouse gases under these programs.[180] And because the parties agreed that it would be an absurd result to read the statute as requiring permits for the millions of sources that would arguably be covered at the statutory thresholds, the Court found, Congress must not have intended the term "air pollutant" in the definition of "major sources" to encompass greenhouse gases.[181]

The question then remained as to whether the Court's reading of these specific provisions excluded the EPA from engaging in the regulation of greenhouse gases under these permit programs *at all*. In particular, Section 165(a)(4) of the PSD program requires that covered facilities must impose the "best available control technology [BACT] for each pollutant subject to regulation."[182] Petitioners argued that if the term "air pollutant" in the definition of "major source" did not include greenhouse gas emissions, the term "pollutant" in the BACT provision necessarily also excluded greenhouse gas emissions – a result which would mean that even if a plant were a "major source" due to emissions of *other* pollutants, it would not be subject to greenhouse gas PSD BACT requirements.[183]

However, just as the Court had rejected the EPA's effort to interpret the term "air pollutant" consistently throughout the Act, the Court also rejected the view that its conclusion about the proper reading of covered pollutants under the definition of a "major source" dictates the scope of the term throughout the PSD program.[184] Rather, the Court looked at *the specific provision at issue*, and concluded that, under the BACT provision, the EPA *could* reasonably interpret the requirement to impose BACT for "each pollutant subject to regulation under [the] Act"[185] to include greenhouse gas emissions, without any absurd result. Thus, with regard to sources that the EPA regulates as major sources due to their emissions of other pollutants, the Court found that the EPA can require those sources to be subject to BACT for the control of greenhouse gas emissions.[186]

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179. *Id*. at 2445–47.

180. *Id*. at 2439-41 ("*Massachusetts* does not strip EPA of authority to exclude greenhouse gases from the class of regulable air pollutants under other parts of the Act where their inclusion would be inconsistent with the statutory scheme").

181. *Id*.

182. 42 U.S.C. § 7475(a)(4) (2017).

183. *Utility Air Regulatory Group*, 134 S. Ct. at 2447; *see also* Brief for Petitioner, at 26, Utility Air Regulatory Group v. EPA, 573 U.S. 302, (No. 12-1146). ("Regulation of carbon dioxide as an 'air pollutant' under the PSD program, therefore, is contrary to congressional intent and thus unlawful"); *id*. at 28 (specifically arguing that the term "pollutant" in the definition of BACT does not include greenhouse gases); *see also* Utility Air Regulatory Group, 134 S. Ct. at 2456 (Justice Alito, in dissent, arguing that if the term "pollutant" excludes greenhouse gases for purposes of defining "major sources," it should exclude greenhouse gases from these programs altogether).

184. *Utility Air Regulatory Group*, 134 S. Ct. at 2447–49.

185. 42 U.S.C. § 7475(a)(4).

186. *Utility Air Regulatory Group*, 134 S. Ct. at 2447–49.

Applying that reasoning here, even if a court were to conclude that the ten-year deadline for a primary standard indicates that Congress did not intend a primary standard for greenhouse gases—because, like the unachievable numeric limit at issue in *UARG*, there is no practical way to achieve that primary standard deadline—that would not resolve whether greenhouse gases can be regulated under the NAAQS program altogether. It would only resolve that the EPA may not impose a primary standard.

To be more precise, because Section 172(a)(2)(A) provides that "[t]he attainment date for an area designated nonattainment with respect to a *national primary ambient air quality standard*"[187] shall be no longer than ten years, this result would simply mean that, as in *UARG*, the obligation to impose a "national primary ambient air quality standard"—defined under the Act as the "air quality standards the attainment of which . . . are requisite to protect the public health"[188]—would not apply to greenhouse gases.

The question would then remain whether greenhouse gases can be regulated under other portions of this Clean Air Act program. And just as the Court in *UARG* found that these emissions can be regulated under the BACT provision, there is no impediment to their regulation under the NAAQS program through a secondary standard.

Indeed, Congress defined a "secondary ambient air quality standard" differently from a primary standard, providing that the term refers to the "level of air quality the attainment and maintenance of which . . . is requisite to protect the public welfare [which, again, includes the climate[189]] from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air."[190] Following the reasoning in *UARG*, and given that the Act provides no specific deadline by which the EPA must require attainment for a secondary standard, there is no reason the term "air pollutant" in the context of a secondary standard could not include greenhouse gases, regardless of its application to a primary standard.[191]

In sum, just as the Court in *UARG* concluded the definition of the term "pollutant" can differ within different parts of the PSD program, there is no reason the definition could not similarly differ under the different parts of the NAAQS program—that is, the primary, as distinguished from the secondary standard. Furthermore, unlike the Tailoring Rule, where the Court found the EPA's

187. 42 U.S.C. § 7502(a)(2)(A) (emphasis added).

188. *Id.* § 7409(b)(1).

189. *Id.* § 7602(h).

190. *Id.* § 7409(b)(2).

191. *See also* Carolyn McNiven, *Using Severability Clauses To Solve The Attainment Deadline Dilemma In Environmental Statutes*, 80 CALIF. L. REV.1255 (Oct. 1992) (arguing that to the extent an agency cannot reasonably comply with an attainment deadline, a reviewing Court should invoke the statute's severability clause to invalidate that deadline); 42 U.S.C. §7615 ("If any provision of this chapter . . . is held invalid . . . the remainder of this chapter shall not be affected thereby").

reliance on a threshold to exclude certain sources from regulation to be impermissible in the absence of any indication that this is what Congress had in mind, here the primary and secondary standards are simply different forms of protection, set out in the statute itself, for regulating the *same* sources. Thus, the fact that Congress chose to direct the EPA to consider two different forms of protection indicates that even were a court to reject the promulgation of a primary standard in this instance, it would still remain within the EPA's authority to impose the secondary standard.

To be sure, a faithful implementation of even only a secondary standard would still require sweeping changes across the many sectors with significant greenhouse gas emissions. Consequently, opponents are likely to argue that, in light of *UARG* even this more limited approach would go beyond what Congress intended in the NAAQS program.

This argument will have no force. In particular, the problem in *UARG* was that the definition at issue —of a "major source"—could not be reasonably applied to greenhouse gases in light of the levels of pollution requiring regulation, and it was on that basis that the Court found the term "air pollutant" in the definition of "major source" did not include greenhouse gases.[192] In the NAAQS program, by contrast, Congress expressly provided that in setting a secondary standard, the EPA must determine the pollutant levels "requisite to protect the public welfare," which Congress expressly defined as including "effects on . . . *climate*,"[193] and required the EPA to do so only "as expeditiously as practicable."[194]

Thus, contrary to the situation in *UARG*, through the secondary standard Congress itself determined that the EPA must regulate pollutants—like greenhouse gases—causing adverse impacts on the climate. Given that the EPA has already determined that these pollutants are adversely impacting the climate (and thus public welfare), it will be well within the Agency's authority to impose a greenhouse gas NAAQS, which, the Court has also made clear, must be imposed irrespective of economic factors.[195] In sum, there would be no substantial argument that the EPA lacks the authority to regulate greenhouse gases under a secondary standard, irrespective of how the authority to impose a primary standard is resolved.

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In conclusion, the ten-year deadline for attainment of a primary NAAQS is not an obstacle to a greenhouse gas NAAQS. The EPA can design a greenhouse gas NAAQS with an average and form that complies with the ten-year primary standard. Alternatively, it may impose a secondary standard designed to reach attainment as expeditiously as possible.

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192. Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427, 2445–47(2014).
193. 42 U.S.C. §§ 7409(b)(2); 7602(h) (emphasis added).
194. *Id.* § 7502(a)(2)(B).
195. Whitman v. American Trucking Ass'ns, Inc., 531 U.S. 457, 471(2001).

2. The Unique Nature of the SIPs That Will Address Greenhouse Gas Emissions Also Poses No Obstacle to a Greenhouse Gas NAAQS

A New Approach To The Greenhouse Gas Allocation Challenge: Brief Summary

Critics have objected to a greenhouse gas NAAQS on the grounds that, unlike the existing NAAQS pollutants, greenhouse gases are well-mixed throughout the atmosphere—and thus no state, or even combination of states, can alone provide the necessary reductions in greenhouse gas concentrations in the atmosphere.

The Clean Air Act is as well-designed to address these pollutants as those already regulated. In particular, Section 110(2)(D) expressly instructs the EPA, in setting attainment objectives for states, to consider the role that the *other states* are playing in causing the same pollution problem. Indeed, in 2014 the Supreme Court approved a complicated apportionment scheme to address other air pollutants that cross state lines, finding the EPA's approach an "efficient and equitable solution to the allocation problem."[1] Similarly, the EPA can craft an efficient and equitable apportionment of greenhouse gas emission reductions among the states.

The Act also provides for the EPA to account for the pollution contribution emanating from *outside* the United States. Section 179B calls for the EPA to approve SIPs where the obstacle to a state achieving attainment is "emissions emanating from outside of the United States." The 2015 Paris Agreement, and recent work on carbon budgets, allows the EPA to rely on Section 179B to determine overall United States contributions to greenhouse gas reductions.

Taken together, these provisions provide a roadmap for a greenhouse gas NAAQS. The road begins with a global carbon budget, equitably allocated among countries. The 2015 Paris Agreement and work on carbon budgets provide a framework for allocating the United States emissions budget, and the EPA would rely on Section 179B to carry over the requisite budget for purposes of setting the NAAQS. The road then moves to the states, where the EPA would equitably allocate the United States' carbon budget. Under this approach, each state would ultimately be allocated a specific budget to achieve in its SIP, with all the standard SIP flexibility to achieve that budget on the provided timetable.

[1]EPA v. EME Homer City Generation, L.P., 134 S. Ct. 1584, 1607 (2014).

Another principal argument against a greenhouse gas NAAQS has been the claim that there is no reasonable approach to apportioning greenhouse gas emission reductions, given that emissions all over the world have the same impacts on

climate change and their well-mixed nature.[196] Developments over the past few years also address these concerns. *First*, with regard to international emissions, the 2015 Paris Agreement gives the EPA the framework to determine the greenhouse gas reductions necessary in the United States to achieve a greenhouse gas NAAQS. *Second*, once a United States carbon budget is established, the Supreme Court's 2014 decision in *Homer* demonstrates that the EPA has the necessary discretion to reasonably apportion emission reductions within each nonattainment area. Moreover, the significant work that went into developing the CPP provides a critical starting point from which the EPA can build in order to develop a NAAQS program that will address greenhouse gas emissions in the context of state SIPs.[197]

One obvious obstacle to a greenhouse gas NAAQS has been how the EPA would determine the levels of greenhouse gas emission reductions necessary to move towards attainment. With traditional NAAQS pollutants, which have more localized (even if cross-border) effects, the EPA can set attainment levels, and air quality agencies can develop SIPs that will achieve that end level of attainment (again, taking into account cross-border pollution) on the determined schedule. For greenhouse gases, of course, there is no obvious approach to prescribing what each state must do to move toward attainment.

The significant research that has been done in recent years on carbon budgets addresses this threshold concern. In particular, scientists have evaluated how much more greenhouse gases can be emitted into the atmosphere to avoid exceeding 1.5° Celsius of warming.[198] This body of research provides the EPA with a new tool on which to rely when evaluating the emission reductions necessary to move toward attainment goals.

As with all NAAQS, the EPA will be charged with determining those emission reductions based on the best available science.[199] For present purposes, it is sufficient to note that one recent scientific study concluded that to avoid exceeding 1.5° Celsius of warming, the remaining carbon budget is approximately 477

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196. *See, e.g.*, Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44,354, 44,481 (July 30, 2008).

197. Any argument that greenhouse gases are unsuited for regulation simply because they have no localized effects is foreclosed both by *Massachusetts v. EPA*—which already rejected the argument that these pollutants may not be regulated under the Clean Air Act because their impacts are global—as well as by the EPA's endangerment finding, which determined that these pollutants are endangering public health and welfare. Final Rule, 74 Fed. Reg. 66,499 (2009) (codified at 40 C.F.R. ch. 1). Accordingly, there would be no impediment to the EPA relying on the well-established greenhouse gas concentration measuring station in Mona Loa, Hawaii to evaluate concentration levels for purposes of the NAAQS regime. *See*, Earth System Research Laboratory, Global Monitoring Division (available at https://www.esrl.noaa.gov/gmd/obop/mlo/news.php) (last visited Jan. 17, 2019).

198. *See, e.g.*, Katarzyna B. Tokarska & Nathan P. Gillett, *Cumulative Carbon Emissions Budgets Consistent with 1.5C Global Warming*, 8 NATURE CLIMATE CHANGE 296 at Supplementary Table S1: 477 $GtCO_2$ from January 2016 onward.

199. And a reviewing court can reasonably be expected to be deferential to the EPA's judgments. *See, e.g.,* Coalition of Battery Recyclers Ass'n v. EPA, 604 F.3d 613 (D.C. Cir. 2010).

billion tons, or approximately 13 years at current emissions levels.[200] This will provide the EPA with the requisite baseline to develop a greenhouse gas NAAQS.

a. Clean Air Act Section 179B Calls on the EPA, in Considering SIPs, to Take Emissions from Outside the United States into Account, and the Paris Agreement Provides a Framework for Approaching That Task

While determining a global carbon budget will provide the initial baseline from which to allocate carbon emission reductions, the obvious next step requires the EPA to determine how much of those reductions will come from the United States, which will in turn become the baseline from which to allocate reductions among states.[201]

The EPA's authority to establish a United States allocation derives from Clean Air Act Section 179B, in which Congress explicitly addressed the problem of taking pollution emitted from outside the country into account in the NAAQS program.[202] In particular, Section 179B expressly provides for the EPA to approve SIPs that would otherwise comply with the Act "but for emissions emanating from outside of the United States."[203] Thus, if there is a reasonable basis on which

200. Tokarska & Gillett, *supra* note 198. Other studies have suggested the budget is significantly lower, or higher. *Compare* Nicholas J. Leach et al., *Current level and rate of warming determine emissions budgets under ambitious mitigation*, NATURE GEOSCIENCE (2018) (estimating remaining budget at 700 billion tons), *with, e.g.*, Millar *et al.*, *Emission budgets and pathways consistent with limiting warming to 1.5 ℃*, *supra* note 150; Joeri Rogelj, et al., *Scenarios Towards Limiting Global Mean Temperature Increase to Below 1.5 ℃*, 8 NATURE CLIMATE CHANGE 325 (2018). This Article does not propose a specific carbon budget, which must be based on the best science available to the EPA at the time it makes its decision, and will be subject to appropriate revision as the science advances. Rather, the legal question explored here is whether, once such a budget is established, the Act provides the EPA with the necessary tools to implement a greenhouse gas NAAQS by allocating appropriate budgets among the states.

201. The EPA will also need to account for non-anthropogenic sources of greenhouse gas emissions, as it does for other pollutants. *See, e.g.*, National Air Ambient Quality Standards for Ozone, 73 Fed. Reg. 16,436, 16,443 note 13 (Mar. 29, 2008) (codified at 40 C.F.R. §§50.15-58) (setting the "Policy Relevant Background" for ozone).

202. 42 U.S.C. § 7509a(a).

203. *Id.* Skeptics could point to the title of the Section—"International *border areas*"—as evidence that Section 179B is only intended to apply to pollutants emitted from those countries that share a border with the United States. However, nothing in the plain language of the provision itself provides such a limitation, and in such cases the title of a section does not circumscribe its application. *See, e.g.*, Lapina v. Williams, 232 U.S. 78, 92 (1917) ("[I]t is only in a doubtful case that the title of an act can control the meaning of the enacting clauses . . . ."). Moreover, in his April, 2018 Presidential Memorandum on implementing the NAAQS program, President Trump also specifically directed that, in addressing the extent to which "international transport of criteria pollutants" impact each "State's ability to meet and attain NAAQS," the EPA must consider, "where appropriate, emissions that may emanate from any location outside the United States, *including emissions from Asia*," and also including "future trends in pollution from foreign sources . . . ." Promoting Domestic Manufacturing and Job Creation - Policies and Procedures Related to Implementation of Air Quality Standards, 83 Fed. Reg. 16,761 (April 16, 2018) (emphasis added). The Memorandum thus reinforces the conclusion that Section 179B applies to pollution sources everywhere, not just from United States border countries.

the EPA can determine the levels of emissions from outside the United States that are the obstacle to attainment for greenhouse gases, they can be taken into account in establishing a greenhouse gas NAAQS.[204]

Five years ago, it was considerably more difficult to articulate how the EPA could make these determinations. First, how would the EPA determine what portion of the carbon budget the United States would be limited to? Second, on what basis could the EPA presume that other countries would take the steps necessary to reduce their own emissions in the manner required to stay within the overall budget, and thus move the world toward attainment?

The carbon budget work discussed above, taken together with the 2015 Paris Agreement, significantly advance the feasibility of such allocations and assumptions.

To achieve the Paris Agreement's objectives, countries established "nationally determined contributions" ("NDCs") reflecting their commitments to necessary emission reductions.[205] To date, the initial NDCs are insufficient to achieve the Paris Agreement's goals. Thus, for example, one analysis indicates that the current United States NDC, which is "reducing its greenhouse gas emissions by 26%–28% below its 2005 level in 2025 and to make best efforts to reduce its emissions by 28%,"[206] is only about one-fifth of the reductions required for the country to make the necessary contribution to reducing greenhouse gas emissions.[207] Collectively, the world's existing NDCs are far below the requisite reductions required to achieve the Paris Agreement's emission temperature increase targets.[208]

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204. One scholar has argued that Section 179B could be wielded as a shield by states to force approval of SIPs that do not reduce greenhouse gas emissions, because states could show that emissions outside the United States are responsible for ongoing nonattainment. Oren, *When Must EPA Set Ambient Air Quality Standards? Looking Back at* NRDC v. Train, *supra* note 9, at 159; Oren, *Is The Clean Air Act At A Crossroads*, *supra* note 9, at 1248. However, to invoke this provision a state must show it is complying with "all the requirements applicable to it" *except for the attainment deadline*, and thus it provides no loophole at all. 42 U.S.C. § 7509a(a)(1).

205. UNFCCC Paris Agreement, art. 3. While the Trump Administration has announced its intention to withdraw from the Paris Agreement, the United States will remain in the Agreement at least until after the next Presidential election. UNFCCC Paris Agreement, art. 28. ¶¶ 1–2. In any event, even if the United States withdraws from the Agreement, it will remain in effect for the other countries of the world, and thus the EPA can continue to rely on it to project the reductions in greenhouse gases from other countries that will be necessary to move the world toward a greenhouse gas NAAQS.

206. *See Intended Nationally Determined Contributions (INDCs) as Communicated by Parties*, UN FRAMEWORK CONVENTION ON CLIMATE CHANGE, http://www4.unfccc.int/Submissions/INDC/Published%20Documents/United%20States%20of%20America/1/U.S.%20Cover%20Note%20INDC%20and%20Accompanying%20Information.pdf.

207. *See* Equity and The Ambition Ratchet, *Towards a Meaningful Dialogue in 2018: Report* (Nov. 2017) at 3.

208. *See* United Nations Environment Programme, *The Emissions Gap Report 2018*, at 14 (Nov. 27, 2018) (explaining that the "current NDCs imply global warming of about 3°C by 2100, with warming continuing afterwards").

However, the Paris Agreement's "ratchet mechanism" expressly contemplates the submission of increasingly ambitious NDCs, in order to limit warming to the temperature target set out in the Agreement.[209] Thus, given the temperature targets of the Paris Agreement and the commitment of the world's nations to achieving those targets, the EPA could reasonably assume that countries around the world will, over time, take the necessary steps to reduce emissions sufficiently to move toward the attainment objective.[210]

The Paris Agreement and the work on climate budgets thus provide the EPA with multiple avenues for determining the domestic carbon budget it could rely on as a baseline to establish state NAAQS, as discussed in the next subsection. For example, under the most ambitious approach, the EPA could look at all other nations' NDCs at the time it conducts its analysis and determine that the United States carbon budget should be the *remaining* emissions that would be available to reach attainment, assuming those NDCs are not further strengthened. This would have the benefit of not requiring more ambitious NDCs in order to achieve attainment, but, depending on the level of the NDCs at the time the EPA undertakes this evaluation, such an approach may leave an unworkably small emissions budget for the United States.

Alternatively, the EPA might set a greenhouse gas NAAQS by relying on the United States' *then-current* NDC as the country's emission goal, if that NDC were science-based and appropriate for reaching the temperature targets set out in the Paris Agreement. Under this scenario, when the United States submits increasingly ambitious NDCs, as expressly contemplated by the Paris Agreement, the NAAQS would be adjusted to reflect the latest emission reduction goals. The strength of this approach would be that, if the NDC were science-based and sufficient, the EPA would not need to determine the United States carbon budget, and instead would incorporate the NDC determined by the government as a whole.

As a third alternative, rather than relying on the NDCs, the EPA could rely on the carbon budget research work itself to determine the levels of emissions reduction the United States must achieve to reach attainment, assuming each country reduces its emissions to the levels required to meet the Paris Agreement's goals,

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209. The first updated NDCs are due by 2020, and every five years thereafter. UNFCCC Paris Agreement, art. 4.

210. There is certainly precedent for an agency to base its decision-making on the fruits of an international agreement. *See, e.g.*, Defenders of Wildlife v. Gutierrez, 532 F.3d 913 (D.C. Cir. 2008). Indeed, in *Gutierrez*, the agency at issue, the Coast Guard, argued that it not only had the *authority* to defer to the International Maritime Organization's ("IMO") determinations regarding appropriate locations for shipping lanes, it was *required* to conform its decisions with those made by the IMO. *Id.* at 924. Although the D.C. Circuit rejected the Coast Guard's specific argument, and instead concluded that the Agency retained discretion whether to conform its decisions with those made by the IMO, there was not even a dispute as to whether the Agency had the discretion to *choose* to do so. *Id.; see also, e.g.*, Sluss v. U.S. Dept. of Justice, 898 F.3d 1242 (D.C. Cir. 2018) (evaluating agency compliance with an international agreement).

as each party to the agreement has committed to do. As noted, present research suggests the United States budget to limit temperature rise to well below 2° Celsius averages 25 $GtCO_2eq$ to 57 $GtCO_2eq$.[211] To even meet even these more moderate goals, United States global emissions would need to peak by 2020, decline sharply thereafter, and typically reach zero net emissions by 2050.[212]

This Article does not argue that the EPA should pursue any particular approach to the allocation question in order to set a baseline carbon budget for the United States. Rather, these options merely serve to illustrate that, in light of the research on carbon budgets and the 2015 Paris Agreement, the EPA can reasonably rely on Section 179B to determine the level of greenhouse gas reductions that will collectively be required by the United States, by finding that the states will reach attainment "but for emissions emanating from outside of the United States."[213] The next section considers how that U.S carbon budget can reasonably be allocated *among* the states.[214]

b. The Supreme Court's Decision in Homer Demonstrates that the EPA Can Meaningfully Apportion Greenhouse Gas Reductions Within the United States, and the Clean Power Plan Provides an Initial Structure from Which the EPA Can Frame a Greenhouse Gas NAAQS

Once the EPA has determined the level of emission reductions the United States will need to achieve to move towards attainment, the remaining task will be to apportion those reduction obligations among the states. Because each state's greenhouse gas emissions are well-mixed in the atmosphere, it is more challenging to consider how that apportionment might be carried out for a greenhouse gas NAAQS than for the existing NAAQS pollutants. However, two developments in the past five years suggest a possible path forward on this issue: the Supreme Court's 2014 decision in *Homer*, and the CPP.

First, the Supreme Court explained in *Homer* that, in crafting the Clean Air Act, Congress recognized that "[a]ir pollution is transient, heedless of state boundaries."[215] Section 110(2)(D) of the Act addresses this problem, providing that state SIPs must contain provisions to prohibit emissions that would "contribute

211. *See* Equity and The Ambition Ratchet, *supra* note 207, at 3; Schleussner, et al., *Science and Policy Characteristics of the Paris Agreement Temperature Goal*, 6 NATURE CLIMATE CHANGE 827 (2016).

212. Rogelj et al., *supra* note 200.

213. 42 U.S.C. § 7509a(a)(2).

214. The EPA could also take emissions from other countries into account by invoking Clean Air Act Section 115, which authorizes the EPA to require states to address emissions that contribute to air pollution endangering public health or welfare in other countries, if the other countries provide the United States with reciprocal protections. *See* Burger, et al., *Legal Pathways To Reducing Greenhouse Gas Emissions Under Section 115 of the Clean Air Act*, 28 GEO. ENVTL. L. REV. 359 (2016). Indeed, the EPA might fruitfully combine an initiative to develop a greenhouse gas NAAQS with a separate, but complementary, regulation under Section 115.

215. EPA v. EME Homer City Generation, L.P., 134 S. Ct. 1584, 1593 (2014).

significantly to nonattainment in . . . any other state . . . ."[216] This "Good Neighbors" Provision addresses how emissions *among* the states may impact each state's ability to implement its respective SIPs.

Homer, the Supreme Court's most recent case addressing cross-state air pollution, concerned how the EPA could appropriately address upwind pollution traveling into downwind states. Relying on the Good Neighbors Provision, the EPA crafted a regulation — called the Transport Rule — under which each upwind state meaningfully contributing to this problem would be required to implement cost-effective pollution controls. In particular, under the EPA's two-step approach, the Agency first identifies which states contribute at least 1% of one of the NAAQS pollutants to a downwind state. Then, under step two, the EPA determines the cost level at which the contributing states, taken together, would sufficiently reduce their contributions, and crafts state emission budgets based on those results.[217]

The D.C. Circuit concluded that the EPA's approach was impermissible because, among other concerns, it did not limit emission controls within each state to the state's *proportional* contribution to pollution in downwind states. According to the majority opinion, the Agency had exceeded its discretion by focusing on the most cost-effective pollution reduction measures, rather than limiting the regulations to what was necessary to reduce each state's emissions based solely on those contributions.[218]

In a 6-2 decision, the Supreme Court disagreed. Noting that the Good Neighbors Provision is aimed at eliminating "'amounts' of pollution that 'contribute significantly to nonattainment' in downwind states," the Court explained that the statute "calls upon the agency to address a thorny causation problem: How should the EPA allocate among multiple contributing upwind States responsibility for a downwind State's excess pollution?"[219] Because the EPA's approach to addressing that thorny problem—by limiting regulation to those states contributing more than 1% of a NAAQS pollutant to a downwind state, and then, among those qualifying states, eliminating emissions based on cost-thresholds that apply uniformly across states and sources—was "an efficient and equitable solution to the allocation problem," the Court determined that it was a permissible approach under the statute.[220]

Here, the EPA could similarly craft an "efficient and equitable solution to the allocation problem" as regards greenhouse gas emissions, by determining the most cost-effective means to reduce those emissions, and using those results to

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216. 42 U.S.C. § 7410(a)(2)(D)(i)(I).

217. *See* Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals, 76 Fed. Reg. 48,208 (Aug. 8, 2011).

218. *See* EME Homer City Generation, L.P. v. EPA, 696 F.3d 7 (D.C. Cir. 2012), *rev'd*, 572 U.S. 489 (2014).

219. *Homer*, 134 S. Ct. at 1602–04.

220. *Id*. at 1606–07.

develop state emission budgets. *Homer* thus supports the proposition that the EPA should have sufficient discretion to apportion greenhouse gas emission reductions among the states in a manner that will equitably address each state's contribution to greenhouse gas nonattainment.

To be sure, the Court in *Homer* explained that the EPA may not require any one state to reduce pollution "more than the amount necessary to achieve attainment in every downwind state to which it is linked."[221] Subsequently, the D.C. Circuit ruled in favor of several as-applied challenges to the Transport Rule, finding that the manner in which parts of the Rule allocated pollution-reduction obligations meant that several states were impermissibly required to reduce pollution below the levels necessary to ensure attainment in linked downwind states.[222]

The uniform nature of greenhouse gases makes this limitation irrelevant to a greenhouse gas NAAQS. In particular, all states will be uniformly linked to each other, as each state will be contributing to *all* states' greenhouse gas NAAQS exceedances.[223] Thus, the disproportionate burdens which were at issue in *Homer* would not be present for a greenhouse gas NAAQS.

Second, the CPP, which is premised on modifications to SIPs in carrying out compliance, as provided in Section 111(d), could also provide a useful framework for developing the SIP approaches necessary to implement a greenhouse gas NAAQS.[224] In the CPP, the EPA began by determining the emissions reductions that could be achieved by implementing the Best System of Emission Reduction ("BSER") for power plants, as required by Clean Air Act Section 111.[225] Through that analysis, the EPA calculated the overall emission reductions that each state must achieve, without dictating that those reductions come from the power plants themselves.[226]

For a greenhouse gas NAAQS, the EPA's analysis at this step of the process would be to determine the overall annual greenhouse gas emissions coming from all sectors in the United States, and to compare that to the United States carbon budget. Comparing those values will allow the EPA to determine the overall level of emission reductions necessary.[227]

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221. *Id.* at 1608.

222. EME Homer Generation L.P v. EPA, 795 F.3d 118 (D.C. Cir. 2015).

223. *See also, e.g.*, Michigan v. EPA, 213 F.3d 663 (D.C. Cir. 2000) (upholding the EPA's cross-state pollution rule for nitrogen oxides).

224. S*ee* Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Sources, 80 Fed. Reg. 64,661, 64,664 (2015).

225. *See id.*

226. *Id.*

227. For example, if the United States carbon budget were 50 billion tons of $C0_2$, and annual total baseline emissions were 5 billion tons, then the analysis would start by assuming that in the coming years total emissions would need to be reduced sufficiently from that baseline to reach zero emissions before exceeding the 50-billion-ton threshold.

For the CPP, in the next step of the process the EPA provided each state with "broad flexibility" as to the manner in which it would achieve the required emission reductions.[228] In particular, although a state could simply choose to incorporate the plant-specific performance requirements that the EPA had determined to be BSER, the state could alternatively adopt a different approach, so long as it would achieve the same "state-specific CO2 goals."[229] Thus, critically for comparing the CPP to a greenhouse gas NAAQS, the CPP provided states "considerable flexibility" to determine both how to best allocate the reduction goals and the timeframes for implementation.[230] The CPP also included programs to speed adoption of renewable energy and energy efficiency measures that could help states achieve their emission reduction goals.[231]

Many of these elements can be appropriately modified for a greenhouse gas NAAQS. Thus, for example, applying the same approach as in *Homer*, the EPA might determine the most cost-effective thresholds of measures that can be taken to sufficiently reduce the country's emissions to stay within the carbon budget. Applying these measures across sectors in each state, the EPA could then reasonably allocate emission reduction targets among states.

Once that is accomplished, and relying on the CPP model, the EPA could then provide each state with flexibility in how it will achieve the required emission reductions, along with federal programs—such as renewable energy and energy efficiency initiatives—that will assist the states in meeting their goals. Under that approach, as with the CPP, each state would ultimately be permitted to develop the SIP measures most appropriate for that state, as long as those measures will accomplish the required emission reductions. And, with each state taking the required measures, the United States would be reducing its emissions as necessary to make its appropriate contribution towards overall attainment goals.[232]

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Putting these pieces together, then, it is apparent that the Act contains the necessary provisions to design and implement a NAAQS for greenhouse gas emissions. *First*, the EPA would add greenhouse gases to the list of criteria air pollutants, establish air quality criteria, and set primary and secondary standards. *Second*, the EPA would—either through reliance on carbon budgeting research or through some other appropriate method—rely on Section 179B to determine the United States' contribution toward greenhouse gas emission reductions over

228. 80 Fed. Reg. at 64,665.
229. *Id*.
230. *Id*. at 64,666.
231. *Id*. at 64,664–65.
232. To be sure, the legality of the CPP has not been definitively resolved. However, as noted, CPP opponents themselves have argued that the program's broad flexibility is more suited to a NAAQS. *See supra* note 64.

time. And *third*, the EPA would rely on Section 110(d) to reasonably apportion those domestic emissions among the states.

III. THE CLEAN AIR ACT'S SECTION 111(D) EXCLUSION, AND CONCERNS ABOUT CONGRESSIONAL BACKLASH, SHOULD NOT STAND IN THE WAY OF A GREENHOUSE GAS NAAQS

The final concerns with a greenhouse gas NAAQS are whether such regulations would preclude action on greenhouse gases under Clean Air Act Section 111(d) and whether, if the EPA were to move forward, Congress might amend the Clean Air Act to remove the EPA's power to regulate.[233] As this Part explains, neither of these concerns should be an obstacle to the EPA finally proceeding with greenhouse gas NAAQS regulations.

A. THE RELATIONSHIP BETWEEN A NAAQS AND REGULATION UNDER SECTION 111(D) IS NOT AN OBSTACLE TO A GREENHOUSE GAS NAAQS

Clean Air Act Section 111 provides that, upon listing a stationary source category, and identifying new source standards, the EPA must also set such standards for existing sources in that category under Section 111(d), "for any air pollutant (i) for which air quality criteria have not been issued or which is not included on a list published under" Section 108—the NAAQS program.[234] The CPP was promulgated pursuant to this Clean Air Act authority.

When the EPA was promulgating the CPP, it was natural to ask whether, in light of this restrictive language prohibiting Section 111(d) regulations for NAAQS pollutants, a greenhouse gas NAAQS would preclude the CPP. Years after the CPP was issued, however, that concern has lost much of its force, for several reasons. *First*, while a pre-existing greenhouse gas NAAQS may have precluded the CPP, the most reasonable reading of Section 111(d) is that imposing such a NAAQS now would have no effect on a *pre-existing* regulation under Section 111(d). In particular, the exclusion prevents a Section 111(d) rule for pollutants as to which "air quality criteria *have . . . been issued*" previously, or which have been "*included* on [the] list" of NAAQS.[235] Thus, the plain language suggests that if a Section 111(d) Rule precedes a NAAQS, the 111(d) Rule would not be excluded by the NAAQS.

Moreover, any argument that a new greenhouse gas NAAQS could somehow eliminate a *pre-existing* Section 111(d) regulation for greenhouse gases like the CPP would be inconsistent with both the text of this provision and the logic behind it. The text addresses the EPA's *mandate* to issue Section 111(d) regulations, confining that mandate to pollutants "for which [NAAQS] have not been

233. Mullins & Enion, *supra* note 9, at 10884–85.
234. 42 U.S.C. § 7411(d).
235. *Id.* (emphasis added).

issued or which is not included on [the] list" of criteria air pollutants.[236] Nothing in that language states, or even suggests, that if a NAAQS is issued *after* a Section 111(d) regulation, the Section 111(d) regulation somehow disappears.

It is also unclear how Congress would have intended such a result to work. Most importantly, under the NAAQS program, the addition of a pollutant to the list of criteria air pollutants and issuance of air quality criteria are only the first steps towards the control of such a pollutant—which does not occur until SIPs are approved several years later. Thus, reading this language to *immediately cancel* a Section 111(d) regulation as soon as a pollutant is listed under Section 108 would mean that Congress intended a significant *gap* in the regulation of the same pollutants that are so severe that they are found to endanger public health and welfare. Nothing in the text or legislative history suggests such a counter-intuitive result. Rather, at minimum the Section 111(d) regulation would remain in effect until the NAAQS regulation is implemented through SIP approvals.

Second, while it will take several years to implement the SIPs for a greenhouse gas NAAQS, the many years of delay surrounding the CPP—which has been stayed since shortly after it was finalized—demonstrate that there is no basis to assume that regulating under the Section 111 sector-by-sector approach can bring about emission reductions more quickly. Indeed, the Trump Administration is now working to repeal the CPP or at least significantly weaken it.[237] Although there will be strong grounds to challenge these regulatory roll-back efforts, the salient point is that these developments demonstrate there are no longer likely to be significant timing gains to be had from regulating these sources' greenhouse gas emissions through the CPP rather than a NAAQS.

Finally—and perhaps most importantly—once SIPs that include greenhouse gas emissions are in effect, *regulations under Section 111(d) should no longer be necessary*, because the sources that would have become subject to 111(d) source regulations will all be regulated under the NAAQS program. Thus, although a greenhouse gas NAAQS may preclude the EPA from issuing new Section 111(d) rules for those pollutants following the NAAQS promulgation—the most important aspects of those standards would simply be incorporated into the SIPs.[238]

That leaves the uncertain question as to the outcome of the CPP. If the current EPA finalizes the proposed repeal[239] and/or completes its replacement rule

236. *Id.*

237. *See* Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 82 Fed. Reg. 48,035 (Oct. 16, 2017); 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).

238. *See* Mullins & Enion, *supra* note 9, at 10885–86.

239. 82 Fed. Reg. 48,035 (Oct. 16, 2017) (repeal proposal).

limited to modest improvements of the plants themselves,[240] states and environmental advocacy groups are likely to challenge the new regulation as contrary to the Act. If they prevail, the appropriate relief could be for the Court to reinstate the CPP by vacating the repeal—in which case, the CPP would still precede a greenhouse gas NAAQS, and remain in place.[241] On the other hand, if such a challenge were to fail, then it would be even clearer that there is no meaningful trade-off to be made between the CPP and a greenhouse gas NAAQS.

To be sure, these outcomes remain uncertain, and regardless of the 111(d) exclusion, as a practical matter a new administration may find itself faced with a choice between re-starting the process of regulating stationary sources on a sector-by-sector level under Section 111(d) or proceeding with a greenhouse gas NAAQS. For all the reasons discussed herein, however, the argument that the EPA should avoid a greenhouse gas NAAQS to clear a path for more timely and efficient regulation of greenhouse gases from stationary sources under Section 111 has far less force than it may have had years ago.

For all these reasons, concerns about the impacts of a greenhouse gas NAAQS on the EPA's power to regulate these emissions under Section 111(d) should not stand in the way of the EPA finally moving forward.

B. CONCERNS THAT CONGRESS COULD REMOVE THE EPA'S AUTHORITY TO REGULATE GREENHOUSE GASES UNDER THE NAAQS PROGRAM DOES NOT COUNSEL AGAINST THE AGENCY FINALLY MOVING FORWARD

A last major objection posed to a greenhouse gas NAAQS concerns the possibility that Congress might amend the statute to expressly preclude the EPA's authority to issue a NAAQS for greenhouse gases. The recent election results, which have given Democrats control of the House of Representatives, certainly alleviates that concern in the short-term. More importantly, however, because the decade-long uncertainty about the scope of the EPA's power poses obstacles to *other* efforts to address the climate crisis, this concern also should also not deter the EPA from moving forward.[242]

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240. 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).

241. *See, e.g.*, In re Polar Bear Endangered Species Act Listing, 818 F. Supp. 2d 214, 239 (D.D.C. 2011) (concluding that "the effect of vacating the final Special Rule for the polar bear will be to reinstate the rule previously in force"); Oceana, Inc. v. Evans, 389 F. Supp. 2d 4, 7 n. 2 (D.D.C. 2005) ("numerous courts of appeals have stated that the effect of vacating a rule is generally to reinstate the rule previously in force"); Georgetown Univ. Hospital v. Bowen, 821 F.2d 750, 757 (D.C. Cir. 1987) ("this circuit has previously held that the effect of invalidating an Agency rule is to reinstat[e] the rules previously in force")(citations omitted).

242. Of course, a larger concern could be whether Congress might remove the EPA's authority over greenhouse gases altogether. However, given that such efforts failed while Republicans controlled both Houses of Congress and the Presidency, that outcome is extremely unlikely. *See, e.g.*, Stopping EPA Overreach Act of 2017, H.R. 637 (115th Cong.) (February 2017 bill that would have amended the Clean

For example, numerous municipalities have recently filed tort suits seeking to hold fossil fuel companies financially responsible for the harms their activities are causing through rising sea levels, severe weather, and other consequences of climate change.[243] Defendants have been seeking dismissal of these cases by arguing, *inter alia*, that plaintiffs' claims are barred in light of the EPA's authority to regulate greenhouse gases under the Clean Air Act, and two cases have already been dismissed largely on that basis.[244]

To be sure, in 2011 the Supreme Court ruled that federal nuisance claims against power plants over greenhouse gas emissions are displaced by Clean Air Act Section 111, because that provision expressly provides for the EPA to regulate those plants' greenhouse gas emissions (which it did with the CPP).[245] However, in more recent cases defendants and their allies are arguing that even entities that are *not* regulated under Section 111 remain immune from tort liability, on the grounds that any and all such regulation of greenhouse gases must be done by the EPA in light of its comprehensive power under the Clean Air Act.[246]

If it turns out the EPA cannot enact a greenhouse gas NAAQS, these defenses to climate change tort suits will have less force. Accordingly, resolving the scope of the EPA's power to regulate under a NAAQS—even if it meant Congress expressly removing that power—may be an improvement over the current *status quo*, under which the *possibility* of a greenhouse gas NAAQS theoretically exists, but the EPA refuses to act.

Air Act to exclude carbon dioxide, water vapor, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride pollution from the scope of the Act).

243. *See, e.g.*, Richmond v. Chevron, No. c18-00055 (Super Ct. Cal. Jan. 22, 2018); Patrick Parenteau, *US governments are suing the world's largest oil companies for making climate change a 'public nuisance'*, Business Insider, July 18, 2018, https://perma.cc/44LA-GQMQ.

244. *See* Oakland v. BP, 325 F.Supp.3d 1017, (N.D. Cal. June 25, 2018); City of New York v. BP, 325 F. Supp. 3d 466 (S.D.N.Y. July 19, 2018).

245. Am. Elec. Power Co. v. Connecticut, 564 U.S. 410 (2011).

246. Thus, in these decisions, courts are painting a much broader brush than in *AEP*, finding that claims against other entities are also preempted given the Clean Air Act's broad scope. *See Oakland*, 325 F.Supp.3d 1017, 1025 (granting motions to dismiss against fossil fuel companies on several grounds, including that "plaintiffs' claims require a balancing of policy concerns—including the harmful effects of greenhouse gas emissions, our industrialized society's dependence on fossil fuels, and national security," and concluding that, through the Clean Air Act, "Congress entrusted such complex balancing to the EPA in the first instance, in combination with state regulators") (citations omitted); *City of New York*, 325 F. Supp. 3d 466 (similarly dismissing action based on Clean Air Act displacement); *see also* Brief of Indiana and 11 other States in King County v. B.P., No. 18-758RSL (W.D. Wash. Oct. 3, 2018) (arguing that the political question doctrine precludes review of greenhouse gas tort claims because of the comprehensive nature of the Clean Air Act, including the NAAQS program); *accord* Brief of the United States in Juliana v. United States, No. 15-1517 (D. Or. Oct. 5, 2018) at 9 (in litigation under the Public Trust Doctrine to force federal agencies to take action to reduce greenhouse gas emissions, Defendants argue that a "[t]rial would force the government to address climate policy not through APA procedures and other Agency actions authorized by statutes *such as the Clean Air Act*, but instead through a judicially-supervised and as-yet unknown process imposed by this Court." (emphasis added)).

Similarly, opponents of greenhouse gas regulation under other provisions of the Clean Air Act have referred to the EPA's unutilized authority to impose a greenhouse gas NAAQS to object to addressing the climate crisis with other tools in the Act itself. For example, in seeking to restrict the EPA's authority to address greenhouse gas emissions from aircraft, opponents have argued that the EPA cannot act because the EPA has not acted to regulate greenhouse gases under the NAAQS program.[247]

Accordingly, the current *status quo* arguably provides the worst of all worlds: no greenhouse gas NAAQS, but the outstanding possibility of such regulations being used to oppose *other* regulatory efforts.

In short, it is painfully clear—more than ten years after the Supreme Court established greenhouse gases are an air pollutant that the Clean Air Act is designed to address—that the fear of legislative change should not delay action to harness the Act's strongest tool to fight the largest air pollution threat facing the nation and the world. Indeed, given how close humanity has come to the tipping point where the worst effects of climate change simply cannot be forestalled,[248] it matters less and less with each passing year whether Congress removes a power that the EPA refuses to invoke.

CONCLUSION

At bottom, although the outcome may be uncertain, when the EPA returns to its science-based mission in a new administration, it will be time to act on a greenhouse gas NAAQS. The worst outcomes—be it a legislative removal of the EPA's authority, a court ruling that the EPA has no power to act, or any other outcome that does not actually result in the outcome sought—will be no worse than the current *status quo*, and can only provide guidance for what comes next. The world simply cannot wait another decade to resolve any remaining questions about this crucial EPA power.

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247. *See, e.g.*, Finding That Greenhouse Gas Emissions From Aircraft Cause or Contribute to Air Pollution That May Reasonably Be Anticipated To Endanger Public Health and Welfare, 81 Fed. Reg. at 54,438 (endangerment finding for aircraft, summarizing arguments made by opponents relying on NAAQS). As another example, when the D.C. Circuit rejected the EPA's effort to regulate hydrofluorocarbons based on their adverse climate change impacts, the Court specifically relied on the EPA's authority under the NAAQS program as a basis to restrict the Agency's authority to act under Clean Air Act Section 612, 42 U.S.C. § 7671k. *See* Mexichem Fluor, Inc. v. EPA, 866 F.3d 451, 460 (D.C. Cir. 2017). Indeed, as noted, *see supra* note 64, even in the CPP litigation industry opponents and their state allies relied on the NAAQS program in support of their argument that Congress did not intend to allow the EPA to rely on Section 111(d) to require generation-shifting or other measures that go beyond the fence-line of the power plants themselves—suggesting that these are the kinds of measures that could only be imposed under the NAAQS program. *See* State of West Virginia v. EPA, No. 15-1363, Brief of Petitioners at 54–56 (Apr. 22, 2016).

248. *See* IPCC [Intergovernmental Panel on Climate Change], *Global Warming of 1.5℃, an IPCC special report*, http://www.ipcc.ch/report/sr15/.