

HEAT EXPANDS ALL THINGS: THE PROLIFERATION OF GREENHOUSE GAS REGULATION UNDER THE OBAMA ADMINISTRATION

JONATHAN H. ADLER*

During his campaign for the White House, Barack Obama called for decisive action to address the threat of global climate change. Specifically, then-Senator Obama called for reducing, by 2050, greenhouse gas (GHG) emissions in the United States by 80% through the imposition of a “cap-and-trade” regime.¹ He pledged that, as President, legislation to achieve this goal would be among his top priorities.²

Congressional leaders also endorsed decisive action on climate change. In 2009, the House of Representatives enacted a far-reaching climate bill that included a cap-and-trade system and endorsed the 80% reduction goal.³ The Senate refused to follow suit, however, and it appears unlikely that a cap-and-trade bill or other meaningful climate legislation will pass Congress in the next two years.⁴ But the death of cap-and-trade does not mean the death of greenhouse gas regulation.

* Professor of Law and Director, Center for Business Law & Regulation, Case Western Reserve University School of Law. Thanks to Daniel Smith for his research assistance.

1. See The Office of the President-Elect, *Agenda: Energy & Environment*, CHANGE.GOV, http://change.gov/agenda/energy_and_environment_agenda/ (last visited Mar. 19, 2011); see also Barack Obama, U.S. Sen., Remarks at Portsmouth, New Hampshire: Real Leadership for a Clean Energy Future (Oct. 8, 2007), http://www.barackobama.com/2007/10/08/remarks_of_senator_barack_obam_28.php.

2. See John M. Broder, *Obama Affirms Climate Change Goals*, N.Y. TIMES, Nov. 19, 2008, <http://www.nytimes.com/2008/11/19/us/politics/19climate.html>.

3. The American Clean Energy and Security Act sought to reduce GHG emissions by 3% below 2005 levels by 2012, 17% below 2005 levels by 2020, and 83% below 2005 levels by 2050. H.R. 2454, 111th Cong. (2009). It is unlikely that this level of reductions would have been achieved. See *infra* notes 135–37 and accompanying text.

4. See Darrell Samuelsohn & Coral Davenport, *Democrats Pull Plug on Climate Bill*, POLITICO (July 22, 2010, 1:01 PM), <http://www.politico.com/news/stories/0710/40109.html>.

Although Congress did not put climate change legislation on President Obama's desk, the Obama Administration still moved ahead with various regulatory measures to control GHG emissions.⁵ Using authority under the Clean Air Act and other existing environmental statutes, the Environmental Protection Agency (EPA) and other agencies have been expanding existing regulatory programs to cover GHG emissions and address climate change concerns.⁶ Several measures are already in place and others are in the regulatory pipeline, although citizen suit litigation could produce still more.

These initiatives will produce a dramatic expansion of federal environmental controls on private economic activity. Taken together, these controls could represent the largest expansion of federal environmental regulation in decades, and yet they have never been explicitly endorsed, let alone authorized, by Congress. Worse still, there is little reason to believe that these measures will do much to reduce the threats posed by global climate change. Extensive GHG regulation will not notably mitigate projected warming.

Federal regulation of GHGs is not entirely the Obama Administration's doing. Federal regulatory authority over GHGs was facilitated—if not mandated—by the Supreme Court's decision in *Massachusetts v. EPA*.⁷ Yet the Obama Administration has not resisted this newfound authority. To the contrary, the EPA and other agencies have embraced their opportunity to extend regulatory authority into new fields and have rejected legislative proposals to cabin their newfound power.

The extension of federal regulatory authority to control GHG emissions under existing statutory frameworks is a mistake. Such regulation will impose substantial regulatory costs for minimal environmental gain. Centralized regulatory authority offers little hope of controlling the planetary thermostat. Instead, mitigating the threat of anthropogenic climate change requires a different approach—one that is not authorized under

5. See U.S. DEP'T OF STATE, U.S. CLIMATE ACTION REPORT 2010, at 39 (2010), available at <http://www.state.gov/g/oes/rls/rpts/car5/index.htm> ("Since assuming office, President Obama has moved quickly to establish new federal policies and measures designed to reassert American leadership in solving the global climate challenge.").

6. See *infra* Part III.

7. 549 U.S. 497 (2007).

existing law and that does not require dramatic expansions of the federal regulatory state.

Part I of this Article explains how the push for GHG regulation is not new. An environmentalist petition filed in 1999 eventually led to the Supreme Court decision authorizing federal regulation of GHGs under the Clean Air Act. Part II outlines the Obama Administration's use of this authority. The Clean Air Act, however, is not the only source of federal regulatory authority over GHGs. Part III provides an overview of some of the other regulatory initiatives undertaken by the Obama Administration to limit GHG emissions, or otherwise address the threat of global climate change.

The expansion of federal regulation does not guarantee an increase in environmental protection. In the case of GHGs, expansive regulatory action is unlikely to reduce the threat of climate change. Rather, as Part IV explains, such efforts are likely to be futile in the near to medium term. If policymakers wish to reduce the threat of climate change, they need to chart an alternative course. Part V explains why the best approach to climate change mitigation should focus on technological innovation and diffusion so as to make significant GHG emission reductions possible and affordable.

I. MASSACHUSETTS V. EPA AND THE ROAD TO EPA REGULATION

Extensive scientific research suggests human activity is having a demonstrable effect on the global climate system.⁸ Anthropogenic emissions have increased the concentration of carbon dioxide and other GHGs in the atmosphere, which has

8. See William Collins et al., *The Physical Science Behind Climate Change*, SCI. AM., Aug. 2007, at 68 (noting that the 2007 Intergovernmental Panel on Climate Change (IPCC) report concluded that it was "very likely" that human activity was responsible for most of late twentieth century warming, whereas the 2001 IPCC report concluded that human responsibility was only "likely"); see also INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS 665 (2007) ("Greenhouse gas forcing has *very likely* caused most of the observed global warming over the last 50 years."); NAT'L RESEARCH COUNCIL, ADVANCING THE SCIENCE OF CLIMATE CHANGE 27 (2010) ("Climate change is occurring, is caused largely by human activities, and poses significant risks for—and in many cases is already affecting—a broad range of human and natural systems.").

contributed to a gradual warming of the climate.⁹ The precise nature and degree of the human contribution is unknown, and may even be unknowable given the complexity of the global climate system.¹⁰ Nonetheless, even so-called “skeptics” accept that anthropogenic emissions contribute to global warming, though they dispute the magnitude of the threat.¹¹

The road to federal regulation of GHGs under the Clean Air Act began in 1999, when a handful of environmentalist organizations petitioned the EPA to control GHG emissions from new motor vehicles under Section 202 of the Act.¹² EPA General Counsel Jonathan Cannon had recently told a congressional committee that he believed the Agency had the authority to regulate GHG emissions but had no intent to do so at that time.¹³ The petition aimed to force the EPA’s hand. According to the environmentalist groups, global warming threatened human health and welfare, obligating the Agency to act.¹⁴

9. See Collins et al., *supra* note 8, at 65 (“Over the past 20 years, evidence that humans are affecting the climate has accumulated inexorably, and with it has come ever greater certainty across the scientific community in the reality of recent climate change and the potential for much greater change in the future.”).

10. This uncertainty need not preclude action to mitigate the threat of climate change. The case for taking action to address rising atmospheric concentrations of greenhouse gases need not be premised upon apocalyptic climate projections. See, e.g., ROGER PIELKE, JR., *THE CLIMATE FIX: WHAT SCIENTISTS AND POLITICIANS WON’T TELL YOU ABOUT GLOBAL WARMING* 128–29 (2010); Jonathan H. Adler, *Taking Property Rights Seriously: The Case of Climate Change*, 26 SOC. PHIL. & POL’Y 296, 307–09 (2009).

11. See PATRICK J. MICHAELS & ROBERT C. BALLING, JR., *CLIMATE OF EXTREMES: GLOBAL WARMING SCIENCE THEY DON’T WANT YOU TO KNOW* 11–20 (2009); see also PATRICK J. MICHAELS & ROBERT C. BALLING, JR., *THE SATANIC GASES: CLEARING THE AIR ABOUT GLOBAL WARMING* (2000); ROY W. SPENCER, *CLIMATE CONFUSION: HOW GLOBAL WARMING HYSTERIA LEADS TO BAD SCIENCE, PANDERING POLITICIANS AND MISGUIDED POLICIES THAT HURT THE POOR* 6 (2008); John R. Christy, *The Global Warming Fiasco, in GLOBAL WARMING AND OTHER ECO-MYTHS: HOW THE ENVIRONMENTAL MOVEMENT USES FALSE SCIENCE TO SCARE US TO DEATH* (Ronald Bailey ed., 2002).

12. See *Control of Emissions from New Highway Vehicles and Engines*, 68 Fed. Reg. 52,922, 52,922–23 (Sept. 8, 2003) [hereinafter *Control of Emissions*]. The GHGs specifically at issue are: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and hydrofluorocarbons (HFCs) *Id.* at 52,923.

13. Memorandum from Jonathan Z. Cannon, Gen. Counsel, EPA, to Carol M. Browner, Adm’r, EPA 2 (Apr. 10, 1998), <http://www.virginialawreview.org/inbrief/2007/05/21/cannon-memorandum.pdf>.

14. *Control of Emissions*, *supra* note 12, at 52, 923.

The petition remained unanswered until 2003.¹⁵ Neither the Clinton nor Bush Administrations was eager to unleash the power of the Clean Air Act on GHGs. Tired of waiting, the environmentalist petitioners and several northeastern states threatened to sue the Agency for its failure to act. In September 2003, the EPA denied the petition, declaring that it lacked statutory authority to regulate GHGs as pollutants under the Act, and that even if it had such authority, it would decline to exercise it because there were more effective ways of addressing the threat posed by global warming.¹⁶ The EPA reasoned that the Act was written to address conventional air pollutants such as particulates and ozone smog, and not globally dispersed emissions such as carbon dioxide.¹⁷ The Agency further concluded that coordinated international efforts made more sense than haphazard regulation built on an Act written for a different purpose.¹⁸

The environmentalist and state petitioners were neither convinced by the EPA's analysis nor content to wait for congressional action on global warming. Instead, they filed suit, joined by a large number of states and interest groups.¹⁹ A three-judge panel of the U.S. Court of Appeals for the D.C. Circuit split

15. The EPA requested public comment on the petition in January 2001, see *Control of Emissions from New and In-use Highway Vehicles and Engines*, 66 Fed. Reg. 7486 (Jan. 23, 2001), but it did not respond to the petition until September 2003. See *Control of Emissions*, *supra* note 12.

16. See *Control of Emissions*, *supra* note 12, at 52,925.

17. *Id.* at 52,926–27.

18. *Id.* at 52,927.

19. The state petitioners were California, Connecticut, Illinois, Maine, Massachusetts, New Jersey, New Mexico, New York, Oregon, Rhode Island, Vermont, and Washington. Other government parties were the District of Columbia, American Samoa, New York City, and Baltimore. The environmentalist petitioners were the Center for Biological Diversity, Center for Food Safety, Conservation Law Foundation, Environmental Advocates, Environmental Defense, Friends of the Earth, Greenpeace, International Center for Technology Assessment, National Environmental Trust, Natural Resources Defense Council, Sierra Club, Union of Concerned Scientists, and U.S. Public Interest Research Group. See *Massachusetts v. EPA*, 549 U.S. 497, 505 nn.2–4 (2007). Various businesses supported the state and environmentalist petitioners, including the Aspen Skiing Corporation, Calpine, and Entergy, as did some trade associations and groups representing renewable energy interests. See generally Bruce Yandle & Stuart Buck, *Bootleggers, Baptists, and the Global Warming Battle*, 26 HARV. ENVTL. L. REV. 177, 208 (2002) (discussing business support for GHG emission control policies).

three ways, ultimately rejecting the petitioners' claims, teeing the case up for the Supreme Court.²⁰

Massachusetts v. EPA, decided in 2007, is arguably the most consequential Supreme Court decision of the past five years. Among other things, the Court held, five to four, that the EPA had authority to regulate GHGs as air pollutants under the Clean Air Act and that the Bush Administration had failed to provide an adequate explanation for its refusal to regulate.²¹ The Court concluded that there was no ambiguity in the Act of the sort that could trigger *Chevron* deference and that "greenhouse gases fit well within the Clean Air Act's capacious definition of 'air pollutant.'"²² Writing for the majority, Justice John Paul Stevens explained that the Act's "broad language" was designed to ensure sufficient "flexibility" so as to ensure that the Clean Air Act would not become obsolete.²³ He further brushed aside concerns that the Act's complex regulatory structure was a poor fit for global climate control, even though it had been designed and refined to combat localized air pollution problems.²⁴

Assuming that carbon dioxide and other GHGs constituted air pollutants subject to regulation under the Act, the Bush Administration's refusal to regulate was arbitrary and unmoored from its statutory obligations. In denying the environmentalist and state petition, the EPA did not deny the reality of human contributions to global climate change, nor did it minimize the threat. To the contrary, the EPA endorsed President Bush's remarks that the United States "must address" the threat of climate change and noted other policy initiatives intended to "reduce the risk" of global warming.²⁵ The EPA simply pursued a "different policy approach" that was a better fit for the nature of the problem.²⁶ Trying to use the Clean Air Act to regulate global atmospheric concentrations of carbon dioxide and other GHGs did not "make sense," according to the

20. *Massachusetts v. EPA*, 415 F.3d 50, 53, 58 (D.C. Cir. 2005).

21. *Massachusetts v. EPA*, 549 U.S. 497, 528, 534–35 (2007).

22. *Id.* at 532.

23. *Id.*

24. *Id.* at 532–33.

25. *Control of Emissions*, *supra* note 12, at 52,929–31. The majority in *Massachusetts v. EPA* took note of the EPA's concessions and "attach[ed] considerable significance" to Agency statements that global warming is a problem that must be addressed. *See Massachusetts v. EPA*, 547 U.S. at 526.

26. *Control of Emissions*, *supra* note 12, at 52,929–31.

Agency, and would have constituted “an inefficient, piecemeal approach” to the problem.²⁷ A better approach, according to the EPA, would be to pursue international agreements so as to ensure global cooperation on a global concern.

The EPA was likely correct as a policy matter.²⁸ The United States is not capable of reducing, let alone controlling, atmospheric concentrations of GHGs on its own, under the Clean Air Act or otherwise. The global atmosphere is a global commons, and it can only be protected through concerted global action. Yet the relevant statutory language did not permit the EPA to consider broader policy concerns or engage in a roving inquiry about whether it is desirable to adopt regulatory controls on GHGs. It had to exercise its discretion within the Act’s statutory limits.²⁹

Under the Clean Air Act, the EPA is required to regulate motor vehicle emissions of any “air pollutant” that in the “judgment” of the Administrator “cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.”³⁰ Therefore, if GHGs are “air pollutants,” the only question left for the EPA is whether their emissions contribute to public endangerment.³¹ Although the Court did not order the EPA to issue an endangerment finding, that result was a *fait ac-*

27. *Id.* at 52,931.

28. See Arnold W. Reitze, Jr., *Federal Control of Greenhouse Gas Emissions*, 40 ENVTL. L. 1261, 1323 (2010) (“The CAA is not a tool designed to deal with GHG emissions, or more specifically CO₂.”); see also Jason Scott Johnston, *Climate Change Confusion and the Supreme Court: The Misguided Regulation of Greenhouse Gas Emissions Under the Clean Air Act*, 84 NOTRE DAME L. REV. 1, 2 (2008); Arnold W. Reitze, Jr., *Federal Control of Carbon Dioxide Emissions: What Are the Options?*, 36 B.C. ENVTL. AFF. L. REV. 1, 16 (2009).

29. *Massachusetts v. EPA*, 547 U.S. at 533 (“[T]he use of the word ‘judgment’ is not a roving license to ignore the statutory text. It is but a direction to exercise discretion within defined statutory limits.”).

30. See 42 U.S.C. § 7521(a)(1) (2006).

31. *Massachusetts v. EPA*, 547 U.S. at 533 (“Under the clear terms of the Clean Air Act, EPA can avoid taking further action only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.”). Under the Court’s holding, it is possible that the EPA could have tried to withhold its judgment, perhaps by explaining that it was not going to make or reject an endangerment finding at this time because it was devoting resources to other concerns. Yet this would have been a difficult position for the Agency to maintain because of repeated public pronouncements about the threat of climate change—pronouncements that all but endorsed an actual endangerment finding.

compli. After years of Agency pronouncements and studies detailing the potential harms of global warming, on top of studies by the National Academy of Sciences and other respected authorities, the Agency had little room to claim before the Court that global warming was not a threat. After *Massachusetts v. EPA*, the question of whether the EPA would regulate GHGs eventually was obviated and replaced only by a question of when such regulation would take place.³²

II. ENDANGERMENT AND ITS CONSEQUENCES

The Obama Administration wasted little time before moving ahead with GHG regulation. After a notice-and-comment rulemaking, the EPA made a formal finding on December 15, 2009 that GHG emissions from new motor vehicles caused or contributed to air pollution that could be reasonably interpreted to endanger public health or welfare.³³ This finding was the trigger for the regulation of GHG emissions from new motor vehicles under Section 202 of the Act, and much else as well. Once a substance is regulated as a pollutant under one portion of the Act, other provisions are triggered as well. Still other provisions of the Clean Air Act contain virtually identical endangerment language, all but ensuring further regulation of GHGs under the Act once an initial determination of endangerment had been made.

The EPA's endangerment finding will be very difficult to challenge in court.³⁴ The language of Section 202 is fairly precautionary. The EPA is not required to prove that global warming is upon us, let alone that it threatens environmental catastrophe. Nor is the Agency required to show that the net effects of climate change on human health are negative, or that regulation of GHG

32. This was also the view of EPA Administrator Lisa Jackson, who maintained that the EPA was obligated to regulate GHGs in the wake of *Massachusetts v. EPA*. See Letter from Lisa P. Jackson, Adm'r, EPA, to Sen. Jay Rockefeller (Feb. 22, 2010), http://epa.gov/oar/pdfs/lpj_letter.pdf ("As a result of the Court's decision, EPA became obligated to treat greenhouse-gas emissions as air pollution under the Clean Air Act and to engage with the best available science in determining whether those emissions endanger Americans' health or welfare.").

33. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496 (Dec. 15, 2009) (final rule).

34. At the time of this writing, several petitions for review have been filed by various states, trade associations, and anti-regulatory organizations.

emissions would be worthwhile. Indeed, the Agency is precluded from considering costs at this stage. All the EPA must show is that it could reasonably anticipate that global warming threatens public health or “welfare,” an expansive term that the Act explicitly defines to include effects on climate, “economic values” and “personal comfort and well-being.”³⁵ Reviewing courts will not substitute their reading of the relevant scientific evidence for that of the EPA, so it is also no use arguing that the Agency placed too much weight on one study while discounting another. Thus, even if courts were convinced the threat from anthropogenic warming was small and that positive effects of a modestly warmer climate could outweigh any negative effects, it would not justify overturning the EPA’s judgment.

The first immediate consequence of the endangerment finding was the EPA’s adoption of more stringent regulations governing automotive fuel economy as a means of reducing GHG emissions from new cars and trucks. Because Section 202 provides that the EPA “shall” promulgate regulations limiting emissions of regulated pollutants from new cars and trucks once an endangerment finding is made, this regulation was inevitable. On April 1, 2010, the EPA and the National Highway Traffic Safety Administration (NHTSA) promulgated regulations requiring automakers to improve the fuel economy and reduce GHG emissions from light-duty vehicles (that is, cars and light trucks).³⁶ These rules effectively require automakers to produce vehicles with an average fuel efficiency of 34.1 miles per gallon by 2016.³⁷ According to EPA and NHTSA estimates, this will reduce by 2030 light-duty vehicle GHG emissions by approximately 21% compared to a business-as-usual scenario.³⁸ These regulations could increase new vehicle prices by \$1,000, by the EPA’s own estimates,³⁹ though this cost could be offset by in-

35. 42 U.S.C. § 7602(h) (2006) (“All language referring to effects on welfare includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants.”).

36. Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule, 75 Fed. Reg. 25,324 (May 7, 2010).

37. *Id.* at 25,330.

38. *Id.* at 25,328.

39. *Id.*

creased fuel savings. These increased costs also could spur vehicle downsizing, resulting in a negative impact on overall auto safety.⁴⁰ These rules will be followed with additional regulations governing larger motor vehicles. In November 2010, the EPA and NHTSA proposed regulations to increase fuel economy and reduce GHG emissions from medium- and heavy-duty vehicles, including larger trucks, vans, buses, and tractors.⁴¹

The new fuel economy rules are only the first of several regulatory measures set in motion by the endangerment finding. Although the EPA made its finding under Section 202, other provisions of the Act have virtually identical endangerment language. Section 111, for example, governs emissions for newly built or modified industrial facilities and likewise requires the Agency to set standards for stationary sources of emissions that cause or contribute to “air pollution which may reasonably be anticipated to endanger public health or welfare.”⁴² If greenhouse gases satisfy the requirements of Section 202, they surely satisfy Section 111 as well.

Section 111 requires that the EPA impose emission control requirements—“new source performance standards” or NSPS—for those categories of stationary sources that contribute “significantly” to the air pollution at issue.⁴³ If the EPA determines that a given category of sources, such as coal-fired steam turbines,⁴⁴ cement kilns,⁴⁵ copper smelters,⁴⁶ or pulp

40. For a discussion of the potential safety consequences of automotive fuel economy regulations, see Robert W. Crandall & John D. Graham, *The Effect of Fuel Economy Standards on Automobile Safety*, 32 J.L. & ECON. 97 (1989).

41. Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles, 75 Fed. Reg. 74,152 (Nov. 30, 2010). The regulation covers on-road vehicles with a gross vehicle weight of 8,500 pounds or more, excluding trailers. *Id.* at 74,153.

42. 42 U.S.C. § 7411(b)(1)(A) (2006) (requiring the Agency to set emission performance standards for stationary sources that “cause[] or contribute[] significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare”).

43. *Id.* § 7411(f). It should be noted that this section only applies if there is no National Ambient Air Quality Standard for the emissions in question. Thus, should the EPA classify carbon dioxide or other GHGs as criteria air pollutants, as discussed below, *infra* notes 96–103 and accompanying text, then these provisions would not be in force.

44. See 40 C.F.R. §§ 60.40a–46 (2009) (standards of performance for fossil-fuel fired steam generators for which construction is commenced after August 17, 1971).

45. See *id.* §§ 60.60–66 (standards of performance for Portland cement plants).

46. See *id.* §§ 60.160–166 (standards of performance for copper smelters).

mills,⁴⁷ contributes “significantly” to the accumulation of GHGs in the atmosphere, it is required to establish a “standard of performance” that represents the best-demonstrated technology for reducing emissions from that category of sources, taking into account the costs of imposing such controls.⁴⁸ These controls must be adopted by new and modified sources within the relevant categories.⁴⁹ The EPA also is required to “review and, if appropriate, revise” these standards “at least every 8 years.”⁵⁰ The EPA has not yet promulgated NSPS for GHGs for any source category, but the consideration of such standards is ongoing.⁵¹

In addition, until GHGs are regulated as criteria air pollutants subject to National Ambient Air Quality Standards (NAAQS),⁵² Section 111 requires the EPA to issue guidelines to states for the creation of standards for existing sources for which NSPS have been promulgated.⁵³ States are required to establish and impose emission standards for existing sources similar to those the EPA sets for new and modified sources. In applying these standards to any given source, however, the state may “take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies.”⁵⁴ If a state fails to

47. *See id.* §§ 60.280–.285 (standards of performance for kraft pulp mills).

48. *See* 42 U.S.C. § 7411(a)(1), (f)(1) (2006) (defining “standard of performance” as “a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated”).

49. *See id.* § 7411(b)(1). Although this provision, by its terms, only applies to “new” sources, Section 111 of the Act defines “new source” to mean “any stationary source, the construction *or modification* of which is commenced after the publication of regulations . . . prescribing a standard of performance under this section which will be applicable to such source.” *Id.* § 7411(a)(2) (emphasis added). This definition aims to discourage regulated entities from extending the life of existing sources through retrofits and other modifications to avoid the NSPS requirements for new sources.

50. *See id.* § 7411(b)(1)(B).

51. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry and Standards of Performance for Portland Cement Plants, 75 Fed. Reg. 54,970, 54,996–97 (Sept. 9, 2010) (discussing consideration of performance standards for GHGs).

52. *See infra* notes 96–103 and accompanying text.

53. *See* 42 U.S.C. § 7411(d) (2006).

54. *See id.* § 7411(d)(1)(B).

adopt an NSPS plan that meets with EPA approval, the Agency must impose a regulatory plan of its own.⁵⁵

A more significant effect of the endangerment finding and the promulgation of GHG emission controls for new motor vehicles is the triggering of the Clean Air Act's new source review and Title V permitting requirements. Section 165 of the Act, implemented through Prevention of Significant Deterioration (PSD)⁵⁶ provisions, governs so-called "major" stationary sources of air pollution.⁵⁷ Under Section 165, companies are required to adopt emission controls—the "best available control technology" (BACT)—for all emissions subject to regulation by any part of the Act if they construct or modify any facility that qualifies as a "major" stationary source.⁵⁸ Construction or modification of a facility makes it a "new" source for purposes of this regulation, which is part of what is commonly referred to as "New Source Review." Older facilities are grandfathered in, but only so long as they do not make any modifications that could increase emissions of regulated pollutants.⁵⁹ Other related provisions require major sources to file permits demonstrating their regulatory compliance.

The Clean Air Act defines a "major" source for purposes of the PSD provisions as a facility that emits or has the potential to emit 250 tons per year of a regulated pollutant, or 100 tons per year for some specified facilities.⁶⁰ For purposes of Title V's permitting requirements, "major sources" are those facilities that emit or have the potential to emit over 100 tons per year.⁶¹ For traditional air pollutants, such as sulfur dioxide or nitrogen oxides, these thresholds mean that only the biggest and dirtiest

55. *See id.* § 7411(d)(2).

56. *See* EPA, *Prevention of Significant Deterioration (PSD) Basic Information*, EPA.GOV, <http://www.epa.gov/NSR/psd.html> (last updated Nov. 10, 2010).

57. *See* 42 U.S.C. § 7475 (2006).

58. *See id.* § 7475(a)(4).

59. This aspect of the New Source Review rules creates a disincentive to modernize and replace older facilities. Insofar as one could expect newer and modified facilities to be more efficient and to emit less per unit of output, grandfathering can create incentives that are counterproductive for pollution control.

60. *See id.* § 7479(1).

61. 42 U.S.C. § 7661(2) (2006) adopts the definition provided in *id.* § 7602(j), defining a "major" source as "any stationary facility or source of air pollutants which directly emits, or has the potential to emit, one hundred tons per year or more of any air pollutant." For regulation of hazardous air pollutants, *id.* § 7661(2) incorporates the even more stringent definition contained in *id.* § 7412 (2006).

facilities are subject to federal controls—several thousand facilities nationwide. This is not the case with GHGs, and particularly with carbon dioxide, which is emitted in far greater quantities than traditional pollutants. Indeed, some efforts to control traditional pollutants increase carbon dioxide emissions by design, as increased carbon dioxide emissions are a consequence of more complete combustion. Though many industrial facilities emit over 250 tons of carbon dioxide per year, so do many commercial and residential buildings.

Applying the Clean Air Act's stationary source regulation and permitting provisions to all facilities with the potential to emit over 250 tons per year of carbon dioxide would cause the EPA's existing program to explode. According to the EPA:

If PSD and Title V requirements apply at the applicability levels provided under the CAA, many small sources would be burdened by the costs of individualized PSD control technology requirements and permit applications. In addition, State permitting authorities would be paralyzed by enormous numbers of these permit applications; the numbers are orders of magnitude greater than the current inventory of permits and would vastly exceed the current administrative resources of the permitting authorities.⁶²

The precise number of facilities that would be subject to these regulatory requirements is unclear, but there is no question that it would be substantial. In proposing to impose its regulatory controls on GHG emissions, the EPA estimated that a strict application of Section 165 would increase the number of required air pollution permits "more than 140-fold."⁶³ According to the EPA, the number of facilities required to submit PSD applications would increase from 280 per year to over 40,000 per year.⁶⁴ The number of facilities subject to Title V permitting requirements would increase from approximately 15,000 to about six million.⁶⁵

62. Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 74 Fed. Reg. 55,292, 55,294 (Oct. 27, 2009) [hereinafter GHG Tailoring Rule] (proposed rule).

63. *Id.* at 55,301 (2009).

64. *Id.* If anything, this is a conservative estimate, as it is only based upon a 250-tons-per-year threshold and does not include those facilities subject to a 100 tons-per-year threshold.

65. *Id.* at 55,295.

This explosion in regulatory requirements would burden both the public and private sectors. Processing just one permit for a new or modified industrial source can require over 300 person-hours for a regulatory agency, and can cost the facility seeking the permit several hundred thousand dollars.⁶⁶ Permitting residential and commercial buildings should be less difficult, but is still estimated to require approximately sixty person-hours per permit.⁶⁷ As a consequence, the EPA estimates that applying the PSD requirements to GHGs would cost regulatory agencies over \$250 million per year.⁶⁸ The costs of applying Title V's permitting requirements are even greater. Even assuming that most Title V permits can be processed quickly and require fewer than forty-five person-hours, the "massive influx" of six million permit applications "would overwhelm permitting authorities' administrative resources."⁶⁹ According to the EPA, "the total nationwide additional burden for permitting authorities for Title V permits from adding GHG emissions at the 100-tpy threshold would be 340 million hours, which would cost over \$15 billion."⁷⁰

As incredible as it may seem, the EPA's estimate of the costs of applying the Clean Air Act to "major" stationary sources may be too conservative. A study commissioned by the U.S. Chamber of Commerce estimated that the 250-ton threshold would encompass over one million businesses nationwide.⁷¹ Based upon an analysis of sector-specific energy use data from the Energy Information Association and the U.S. Census, the Chamber of Commerce study concluded that nearly 200,000 manufacturing facilities, approximately 20,000 farms, and at least one million commercial buildings would be covered, including a substantial percentage of hospitals, hotels, and large restaurants.⁷² Even 10% of churches and other places of worship could qualify. The Chamber study reported that on aver-

66. *Id.* at 55,301.

67. *Id.*

68. *Id.*

69. *Id.* at 55,302.

70. *Id.*

71. See U.S. CHAMBER OF COMMERCE, A REGULATORY BURDEN: THE COMPLIANCE DIMENSION OF REGULATING CO₂ AS A POLLUTANT 3 (2008), available at <http://www.uschamber.com/co2>.

72. *Id.*

age “a building with over 40,000 square feet uses enough hydrocarbons to become a regulated source.”⁷³

Because the EPA knows the regulatory nightmare and political backlash that enforcing Section 165 could create, the Agency has proposed to “tailor” its GHG regulation to limit its applicability. In September 2009, the EPA proposed to set a new threshold of 25,000 tons per year for the imposition of these requirements, even though the statute sets an express limit of 250.⁷⁴ Under this proposed threshold, the EPA estimates that fewer than 15,000 facilities would need to obtain permits for their greenhouse gas emissions, most of which are already subject to New Source Review regulation for other emissions.⁷⁵ EPA Administrator Lisa Jackson explained that the proposal was a “common sense rule that is carefully tailored to apply to only the largest sources.”⁷⁶ Although a commonsensical approach, the regulatory proposal was at odds with the plain text of the act.⁷⁷ Nonetheless, Administrator Jackson signaled her willingness to adopt an even more elastic reading of the statute if necessary.⁷⁸

The EPA justified its elastic reading of the Act on the ground that a lower threshold is not feasible for greenhouse gases. There is no statutory text to support this decision, and so the EPA relied on the doctrines of “administrative necessity” and of avoidance of “absurd results.”⁷⁹ According to the EPA, applying the Clean Air Act as written to greenhouse gas emissions would “extensively disrupt” existing regulatory programs, and perhaps make them “impossible” to administer.⁸⁰ Yet the EPA was not able to identify any case in which something as clear as a numerical statutory threshold was cast aside because of concerns about implementation. Indeed, it is

73. *Id.* at 11. See also Reitze, *Federal Control of Greenhouse Gas Emissions*, *supra* note 28, at 1302 (summarizing industry estimates of the number of facilities subject to PSD for greenhouse gas emissions).

74. See GHG Tailoring Rule, *supra* note 62, at 55,292.

75. *Id.* at 55,295.

76. Press Release, EPA, New EPA Rule Will Require Use of Best Technologies to Reduce Greenhouse Gases from Large Facilities/Small Businesses and Farms Exempt (Sept. 30, 2009).

77. As the EPA acknowledged in its notice of the proposed rule, “the applicability provisions for PSD and Title V are clear on their face.” GHG Tailoring Rule, *supra* note 62, at 55,306.

78. See generally Letter from Lisa P. Jackson to Jay Rockefeller, *supra* note 32.

79. GHG Tailoring Rule, *supra* note 62, at 55,303–20.

80. *Id.* at 55,303–05.

common for Congress to enact statutory requirements that agencies lack the resources to fulfill and to which courts do not afford relief. In this specific case, however, the Clean Air Act's text is explicit, and the Supreme Court in *Massachusetts v. EPA* expressly rejected the EPA's claims that applying the Act to GHGs would be impossible or unadministrable.⁸¹

The EPA's final tailoring rule backed even further away from the express text of the Clean Air Act.⁸² This rule creates new temporary thresholds for the applicability of Section 165 and Title V of the Clean Air Act that will change over time. For the first six months of 2011, GHG-permitting requirements will only apply to those stationary sources already subject to the PSD program, and BACT will only be required for those already-regulated facilities that increase their GHG emissions by 75,000 tons per year or more.⁸³ From July 2011 through June 2013, the permitting requirements will be extended to new construction projects that emit 100,000 tons or more of GHGs per year and to modifications that increase GHG emissions by 75,000 tons or more per year.⁸⁴ At the same time, the EPA announced that sometime in 2011 it will begin another rulemaking—to be completed in 2012—that will consider whether to extend the requirements to those facilities emitting 50,000 tons or more of GHGs per year.⁸⁵ Facilities emitting less than 50,000 tons per year, however, will not be subject to BACT or Title V requirements prior to April 30, 2016, at the earliest.⁸⁶

According to the EPA, this represents a “common sense” approach to imposing regulatory requirements on stationary sources.⁸⁷ The problem for the EPA is that there is no basis for this timetable in the Act, nor does the statute delegate to the

81. See 549 U.S. 497, 533–34 (2007).

82. Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31,514 (June 3, 2010) (final rule).

83. *Id.* at 31,516.

84. *Id.*

85. *Id.*

86. *Id.*

87. Some would argue there can be no “common sense” approach to climate change under the PSD provisions as they only impose controls on new and modified sources. Focusing exclusively on such sources makes it “impossible to have a least-cost solution” and creates an incentive to keep older, heavier emitting sources online longer. See Craig N. Oren, *Is the Clean Air Act at a Crossroads?*, 40 ENVTL. L. 1231, 1245–46 (2010).

EPA the authority necessary to develop such a scheme. The EPA maintains that applying the numerical thresholds expressly provided for in the statute is not feasible for GHGs because they are emitted in much higher volumes than traditionally regulated pollutants. Although the EPA is likely correct on this point, this does not give it license to rewrite the Act or to shift the decimal point on a pollution threshold ever-rightward until only a politically acceptable number of facilities are subject to regulation.

Although the EPA's interpretation creates a reprieve for thousands of facilities that would otherwise be subject to GHG regulation under the Act, its adoption increases the Agency's discretionary authority. If it may revise the numerical emission thresholds established in the Clean Air Act in response to temporary political or economic concerns, then the Agency is the master of its domain and it is the Agency, not Congress, that effectively determines the scope of its own authority.⁸⁸ Thus, even while eschewing the imposition of regulatory controls on large portions of the economy, the Agency is expanding its authority and loosening the statutory reins imposed by Congress.

At the same time, the EPA is increasing its authority vis-à-vis state agencies over GHG regulation, at least where the Agency fears that states will be insufficiently aggressive. Under the "cooperative federalism" model embodied in the Clean Air Act and most major federal environmental statutes, the PSD and Title V regulatory requirements are implemented largely by state environmental agencies, subject to EPA oversight.⁸⁹ Yet the EPA is concerned about state implementation of these programs as applied to GHG emissions. As a consequence, shortly after promulgating the tailoring rule, the EPA put several states

88. For a lengthy discussion of why courts should not presume Congress has delegated agencies discretion to determine the scope of their own jurisdiction, and thus should not give *Chevron* deference where the scope of agency jurisdiction is at issue, see Nathan Alexander Sales & Jonathan H. Adler, *The Rest Is Silence: Chevron Deference, Agency Jurisdiction, and Statutory Silences*, 2009 U. ILL. L. REV. 1497, 1532–63.

89. See Jonathan H. Adler, *When Is Two a Crowd? The Impact of Federal Action on State Environmental Regulation*, 31 HARV. ENVTL. L. REV. 67, 87 (2007) (summarizing the "cooperative federalism" approach to environmental regulation).

on notice that they would not have EPA authorization to implement these programs for GHGs.⁹⁰

Regulating GHGs under the applicable source-specific portions of the Act is difficult enough for the EPA as is, but that is only one of the EPA's many obligations now that the endangerment finding has been made. In all likelihood, the EPA will also need to begin treating carbon dioxide and other GHGs as criteria air pollutants, triggering another set of regulatory requirements.

Under Section 108 of the Act, the EPA Administrator is required to create a list of criteria air pollutants that includes "each air pollutant . . . emissions of which, in his judgment, cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare" that is emitted into the ambient air by "numerous or diverse mobile or stationary sources."⁹¹ This endangerment standard is practically indistinguishable from that in Section 202. The only potential distinction is additional language in Section 108 providing that the pollutant in question must be one for which the EPA Administrator "plans to issue air quality criteria under this section."⁹² There is little reason, however, to believe that the EPA could refuse to regulate greenhouse gases on this basis. In fact, this argument was flatly rejected by the U.S. Court of Appeals for the Second Circuit over thirty years ago in *Natural Resources Defense Council v. Train*.⁹³ The EPA argued that it could choose not to include lead as a criteria air pollutant because it did not plan to issue air quality criteria on lead and there were more cost-effective means of controlling lead emissions.⁹⁴ The Second Circuit found the former argument wholly unpersuasive and the latter irrelevant given the text of the Act. As the rationale would apply equally to carbon dioxide, the EPA's argument must fail unless *NRDC v. Train* is overruled or otherwise legally modified.⁹⁵

Under Section 109, once a pollutant is listed the EPA must develop a criteria document and establish NAAQS for the pol-

90. Press Release, EPA, EPA Proposes Rules on Clean Air Act Permitting for Greenhouse Gas Emissions (Aug. 12, 2010).

91. 42 U.S.C. § 7408(a)(1) (2006).

92. *Id.* § 7408(a)(1)(C).

93. 545 F.2d 320, 325–26 (2d Cir. 1976).

94. *Id.* at 324.

95. Some scholars argue that *NRDC v. Train* was wrongly decided and "is of limited authority." See Oren, *supra* note 87, at 1252–53.

lutant.⁹⁶ Once the NAAQS is in place, Section 110 requires states to submit State Implementation Plans (SIPs) to ensure that every metropolitan area in the nation meets the requirements.⁹⁷ Here is where the difficulties would begin, because the SIP process was designed for controlling localized, ambient pollution problems, not protecting the global atmosphere.⁹⁸ The problem with trying to set a NAAQS for GHGs is that it simply makes no sense.⁹⁹ There is no way for state and local regulators to ensure that individual cities, or even larger regions, meet an air-quality standard for a globally dispersed atmospheric pollutant. Local emissions could be reduced to zero, and a given area would still violate the NAAQS if global emissions had not declined. It would be a pointless regulatory exercise.

The EPA might argue that the NAAQS regulatory regime is fundamentally ill-suited to GHG control. The Agency would have a point, albeit one rejected by the *Massachusetts v. EPA* majority. The meaningful measure of GHG pollution levels is their concentration in the global atmosphere, not the locally ambient air. There is nothing any given jurisdiction can do to comply with a NAAQS for carbon dioxide unless emissions are controlled worldwide. No state could possibly meet a GHG NAAQS set in accordance with the Act's requirements. Nonetheless, the *Massachusetts v. EPA* majority explicitly rejected the idea that recognizing GHGs as pollutants under the CAA would produce any unintuitive or illogical results,¹⁰⁰ so this argument is foreclosed. At best, state failure to submit acceptable plans would eventually lead to the adoption of a Federal Implementation Plan under Section 179,¹⁰¹ after years of litigation.¹⁰²

96. 42 U.S.C. § 7409 (2006).

97. *Id.* § 7410.

98. See Jonathan B. Wiener, *Think Globally, Act Globally: The Limits of Local Climate Policies*, 155 U. PA. L. REV. 1961, 1962 (2007).

99. Indeed, even some environmentalist organizations claim to oppose this approach. See Oren, *supra* note 87, at 1246 ("Then-counsel for the Sierra Club has said he would join industry in opposing the use of the ambient standard system" for greenhouse gas emission control.).

100. 549 U.S. 497, 530 (2007).

101. 42 U.S.C. § 7509.

102. Jonathan Wiener, *Climate Policy After Mass v. EPA*, THE FACULTY BLOG (Apr. 3, 2007, 2:24 PM), http://uchicagolaw.typepad.com/faculty/2007/04/climate_policy_.html.

The EPA may be in no hurry to develop a GHG NAAQS, but environmentalist groups could force the Agency's hand. On December 2, 2009, for instance, the Center for Biological Diversity (CBD) filed a petition with the EPA demanding that the EPA adopt a GHG NAAQS.¹⁰³ It was a petition of just this sort that set the greenhouse regulatory train in motion, and the CBD is more than ready to file suit if the EPA does not comply. If successful, the CBD will force the EPA to bring the full force of the Clean Air Act down on GHG emissions, and the resulting increase in regulatory expenditure in time and money will be substantial.

III. SPREADING REGULATORY HEAT

Not all of the new regulatory initiatives to address the threat of climate change are related to the Clean Air Act. The EPA and other federal agencies have also begun to use additional sources of regulatory authority to control GHG emissions or otherwise address climate change concerns.¹⁰⁴ Some states, most notably California, have also sought to begin regulating GHGs,¹⁰⁵ and various states and environmentalist organizations still seek to use the courts to encourage or induce further regulatory efforts.

Even beyond the confines of the Clean Air Act, the EPA is the primary regulatory agency concerned with climate change. Among the Obama Administration's first climate-related regulatory initiatives was a mandatory reporting requirement for GHG emissions for industrial facilities and other large emission sources. In a regulation that became effective on December 29, 2009, the EPA required reporting by any facility responsible for emissions of 25,000 tons per year or more of GHGs, as well as by firms in certain specified industries.¹⁰⁶ Although the regulation concerns emissions of GHGs into the air, the regulation

103. Petition from the Center for Biological Diversity to Lisa P. Jackson, Adm'r, Environmental Protection Agency, Petition To Establish National Pollution Limits for Greenhouse Gases Pursuant to the Clean Air Act (Dec. 2, 2009).

104. See Margaret Kriz Hobson, *A Change of Weather*, NAT'L J., Dec. 19, 2009, at 36 (reporting on the Obama Administration's "government-wide strategy of acknowledging and attempting to curb global warming").

105. See, e.g., Global Warming Solutions Act of 2006 (AB32), CAL. HEALTH & SAFETY CODE §§ 38500–38599 (West 2010).

106. The regulation also requires firm-wide reporting in certain industries, including vehicle and engine manufacturers and some fossil fuel suppliers. See Mandatory Reporting of Greenhouse Gases, 74 Fed. Reg. 56,260 (Oct. 30, 2009).

was not adopted under the Clean Air Act. Rather, the authority for the reporting requirement was provided by the FY2008 Consolidated Appropriations Act,¹⁰⁷ signed into law by President George W. Bush in December 2007.¹⁰⁸

Although one might not think of climate change as a water pollution problem, this might not stop climate-related regulation under the Clean Water Act.¹⁰⁹ In December 2007, the CBD petitioned the EPA to revise federal water quality criteria for marine pH levels in response to ocean acidification that could be caused by increased atmospheric levels of carbon dioxide. The EPA agreed to respond to this petition in January 2009.¹¹⁰ The Obama Administration subsequently settled a related lawsuit and issued a memorandum calling upon states to take ocean acidification into account in state water quality programs.¹¹¹ Specifically, the EPA determined that states should identify those coastal waters impaired by ocean acidification, a step that could lead to more stringent pollution control requirements under other portions of the Clean Water Act and delegated state programs.¹¹²

The EPA also moved to give states more leeway to regulate GHG emissions, at least so long as states seek to be more stringent than the federal government. In December 2005, the California Air Resources Board (CARB) applied to the EPA for a waiver of preemption under the Clean Air Act for regulations that CARB sought to impose on motor vehicle GHG emissions.¹¹³ During the Bush Administration, the EPA denied California's request, citing a preference for nationally applicable regulation of motor vehicle

107. See H.R. 2764, Pub. L. No. 110-161, 121 Stat. 1844, 2128 (2007).

108. See Mandatory Reporting of Greenhouse Gases, 74 Fed. Reg. 56,260, 56,264 (Oct. 30, 2009).

109. See Robin Kundis Craig, *Climate Change Comes to the Clean Water Act: Now What?*, 1 WASH & LEE J. ENERGY, CLIMATE & ENV'T 9 (2010).

110. See Letter from Benjamin H. Grumbles, Asst. Adm'r, EPA, to Ms. Miyoko Sakashita, Ctr. for Biological Diversity (Jan. 16, 2009), http://www.biologicaldiversity.org/campaigns/ocean_acidification/pdfs/EPA_Response_to_CBD_Ocean_Acidification_Petition.pdf.

111. Memorandum from Denise Keehner, Director, Office of Wetlands, Oceans and Watersheds, EPA, to the Water Division Directors, Regions 1-10, Integrated Reporting and Listing Decisions Related to Ocean Acidification (Nov. 15, 2010).

112. See, e.g., Craig, *supra* note 109, at 30 (discussing how impairment due to ocean acidification could result in more stringent National Pollutant Discharge Elimination System (NPDES) permit requirements).

113. See Letter from Cal. Air. Res. Bd. to Stephen L. Johnson, Adm'r, EPA (Dec. 21, 2005).

emissions.¹¹⁴ Immediately upon taking office, President Obama instructed the EPA to reconsider its prior decision.¹¹⁵ The waiver was formally granted six months later, authorizing California, and other states by extension, to adopt more stringent motor vehicle GHG controls than the federal government.¹¹⁶

Although the EPA is responsible for most climate change related federal regulatory initiatives, it is not alone. Under the Obama Administration a number of other agencies have begun to implement measures to address GHG emissions.¹¹⁷ For example, in October 2009, President Obama issued Executive Order 13514 requiring all federal agencies to reduce their GHG emissions and improve their environmental performance.¹¹⁸ Among other things, this order required all federal agencies to set a GHG emission reduction target for 2020, to reduce vehicle fleet petroleum use by 30% by 2020, and implement a “net-zero-energy” building requirement by 2030.¹¹⁹ President Obama also directed the Department of Energy to set more stringent energy efficiency standards for appliances, including both commercial equipment and residential products, under the Energy Policy Act of 2005.¹²⁰

The Council on Environmental Quality is another culprit, having promulgated draft guidance on the “Consideration of the Effects of Climate Change and Greenhouse Gas Emissions” under the National Environmental Policy Act (NEPA).¹²¹ This guidance outlines how federal agencies must evaluate and consider the po-

114. See Letter from Stephen L. Johnson, Adm’r, EPA, to Arnold Schwarzenegger, Governor, Cal. (Dec. 19, 2007), <http://www.epa.gov/otaq/climate/20071219-slj.pdf>. For a discussion of the legal and policy issues surrounding California’s waiver request, see generally Jonathan H. Adler, *Hothouse Flowers: The Vices and Virtues of Climate Federalism*, 17 TEMP. POL. & CIV. RTS. L. REV. 443 (2008).

115. See John M. Broder & Peter Baker, *Obama’s Order Likely to Tighten Auto Standards*, N.Y. TIMES, Jan. 26, 2009, at A1.

116. Press Release, EPA, EPA Grants California GHG Waiver (June 30, 2009), <http://yosemite.epa.gov/opa/admpress.nsf/bd4379a92ceceac8525735900400c27/5e448236de5fb369852575e500568e1b!OpenDocument>. For a fuller discussion of the legal and policy issues raised by California’s request for a waiver of pre-emption, see Adler, *supra* note 114, at 453–62.

117. See generally U.S. DEP’T OF STATE, *supra* note 5, at 39–75.

118. Exec. Order No. 13,514, 74 Fed. Reg. 52,117 (Oct. 8, 2009).

119. *Id.* at 52,117–19.

120. Memorandum from Barack Obama, President, to the Sec’y of Energy, Appliance Efficiency Standards (Feb. 5, 2009), http://www.whitehouse.gov/the_press_office/ApplianceEfficiencyStandards/.

121. 75 Fed. Reg. 8,046 (Feb. 23, 2010).

tential climate change impacts and resulting GHG emissions of significant federal actions subject to regulation under NEPA.¹²²

The Interior Department launched a “coordinated strategy” to address the impact of climate change on lands and waters managed by agencies within the Department.¹²³ Secretarial Order No. 3289 created, among other things, a “Climate Change Response Council” that will require each bureau and office within the Department to incorporate climate change concerns into Agency management plans and decision-making, including “major decisions regarding potential use of resources under the Department’s purview.”¹²⁴ In addition, Secretarial Order No. 3285 “prioritized development of renewable energy on public lands and offshore waters to reduce our dependence on foreign oil and to reduce greenhouse gas pollution.”¹²⁵ The Interior Department is responsible for managing approximately 20% of the nation’s land, in addition to large portions of the Outer Continental Shelf.¹²⁶ The Forest Service is also considering how climate change concerns should alter its management of national forests.¹²⁷

The Fish and Wildlife Service designated 187,000 square miles of “on-shore barrier islands, denning areas and offshore sea-ice” as critical habitat for polar bears, which are listed as a threatened species.¹²⁸ The Endangered Species Act requires federal agencies to consult with the Service when undertaking, funding, or permitting actions that could adversely critical habitat.¹²⁹

Finally, the SEC decided by a three-to-two vote to issue an interpretive guidance for public companies on how the SEC’s dis-

122. *Id.*

123. *See* Secretarial Order No. 3,289, Addressing the Impacts of Climate Change on America’s Water, Land, and Other Natural and Cultural Resources (Dep’t of the Interior Sept. 14, 2009) [hereinafter Order No. 3,289].

124. *Id.* at 2–3.

125. *See id.* at 3; *see also* Secretarial Order No. 3285, Renewable Energy Development by the Department of the Interior (Dep’t of the Interior Mar. 11, 2009).

126. *See* Juliet Eilperin, *Interior Launches Climate Strategy*, WASH. POST, Sept. 15, 2009, at A3 (“Interior manages one-fifth of the nation’s land mass and nearly 1.7 billion acres on the Outer Continental Shelf.”).

127. *See* Hobson, *supra* note 104, at 37.

128. Press Release, Dep’t of the Interior, U.S. Fish and Wildlife Service Announces Final Designation of Polar Bear Critical Habitat (Nov. 24, 2010), <http://www.doi.gov/news/pressreleases/US-Fish-and-Wildlife-Service-Announces-Final-Designation-of-Polar-Bear-Critical-Habitat.cfm>.

129. 16 U.S.C. § 1536(a)(2) (2006).

closure requirements apply to economic and legal risks relating to climate change. The SEC concluded that public companies may have an obligation to disclose risks associated with proposed climate change legislation, regulation, and international agreements, the indirect economic consequences of such regulation, and potentially material impacts of climate change on their business.¹³⁰

These measures, in addition to the regulatory mandates underway at the EPA, represent a dramatic assertion of federal regulatory authority to address the threat of climate change. The Administration is utilizing in this effort virtually every policy lever it can reach. The question, though, is whether all of this federal regulatory activity will make a meaningful difference in addressing the threat of climate change.

IV. THE FUTILITY OF FEDERAL REGULATION

Federal efforts to control GHG emissions may be in full gear, but they are far from sufficient to meet the Administration's stated "80 by 50" goal and will do little to reduce the risks of global climate change. Existing environmental statutes were not designed to control GHG emissions and are not well-suited to achieve state climate policy goals. More stringent regulatory measures are not the answer either. Even dramatic near-to-medium term reductions in GHG emissions from the United States will fail to reduce the buildup of GHGs in the atmosphere. Unless atmospheric concentrations are controlled, global warming will continue apace.

Regulation of GHG emissions under the Clean Air Act, as discussed above, will impose a wide range of regulatory burdens throughout the economy, but is unlikely to come anywhere close to the aspirational goal of reducing emissions 80% by 2050. This is made clear when one looks at the projected or likely emissions reductions from various regulatory measures, none of which come close to achieving 80% reductions for covered facilities or technologies. New regulations on light-duty motor vehicles are expected to reduce automotive GHG emissions by 21% by 2030—

130. Commission Guidance Regarding Disclosure Related to Climate Change, Securities Act Release No. 9106, Exchange Act Release No. 61,649, 75 Fed. Reg. 6,290 (Feb. 8, 2010).

only 25% of the needed reduction in the first twenty years.¹³¹ Application of NSPS to coal-fired power plants could produce up to 10% GHG emission reductions from those sources, according to one recent analysis.¹³² As coal-fired power plants are responsible for nearly one-third of GHG emissions in the United States, this would represent a 3% reduction in aggregate GHG emissions¹³³—a tiny portion of the proposed 80% reduction of the Obama Administration. Other analyses suggest that this estimate is overly optimistic, and that NSPS is unlikely to reduce GHG emissions by more than 5% from existing facilities.¹³⁴ If the 80 by 50 goal is to be achieved, insufficient emission reductions in one sector will need to be made up elsewhere. Yet there does not appear to be any sector subject to EPA regulation capable of achieving emission reductions in excess of the 80 by 50 target.

The House-passed climate legislation endorsed by the Obama Administration would have substantially expanded federal regulation even further, without solving the climate policy challenge. By one estimate, it would have required nearly 150 federal agency rulemakings.¹³⁵ Another analysis of the bill concluded that it required the EPA's Administrator "to perform over 600 tasks in connection with the operation of the law," and created responsibilities for eleven more federal agencies and departments, in addition to "multiple planning and reporting mandates for state governments."¹³⁶ Despite all this regulatory effort, however, the bill would not have achieved its stated goal of reducing GHG emissions by 80%,¹³⁷ let alone have stemmed anthropogenic global warming.

131. See Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule, 75 Fed. Reg. 25,324, 25,328 (May 7, 2010).

132. See NATHAN RICHARDSON ET AL., GREENHOUSE GAS REGULATION UNDER THE CLEAN AIR ACT: STRUCTURE, EFFECTS, AND IMPLICATIONS OF A KNOWABLE PATHWAY 36 (2010), available at www.rff.org/documents/RFF-DP-10-23.pdf.

133. *Id.* at 35, 44.

134. See Franz T. Litz & Nicholas M. Bianco, *What to Expect from EPA: Regulation of Greenhouse Gas Emissions Under the Clean Air Act*, 40 ENVTL. L. REP. 10480, 10482 tbl.II (2010).

135. See E. Donald Elliott, *Lessons from Implementing the 1990 CAA Amendments*, 40 ENVTL. L. REP. 10592 (2010).

136. See Steven F. Hayward & Kenneth P. Green, *Waxman-Markey: An Exercise in Unreality*, AEI ENERGY & ENV'T OUTLOOK 2, July 2009, at 2.

137. See *id.*; Jesse Jenkins, *Analysis of Waxman-Markey ACES Climate Bill: Full Breakthrough Institute Collection*, BREAKTHROUGH BLOG (June 26, 2009, 12:15 AM),

The unfortunate reality is that the 80 by 50 target is unrealistic given existing and projected technologies. Reducing emissions by 80% below 2005 levels requires reducing emissions to their lowest point in a century.¹³⁸ Specifically, it means reducing emissions to the approximate level of 1910, when the nation's population was only ninety-two million people and per capita income was below \$6,200.¹³⁹ By 2050, however, the population of the United States is expected to exceed 400 million, meaning that per capita emissions would need to be more than 75% below their 1910 level—somewhere in the neighborhood of 2.4 tons of carbon-dioxide-equivalent per year—or to levels not seen since the end of Reconstruction.¹⁴⁰ Even nations that derive much of their electricity from carbon-free sources, such as nuclear power, come nowhere close to this level.¹⁴¹ 2.4 tons per year is slightly less than the per capita GHG emissions of nations such as Grenada and Botswana.¹⁴²

Even if the 80 by 50 goal were readily achievable through regulatory impositions, it would still be insufficient to stem the accumulation of GHGs in the atmosphere. The goal of atmospheric stabilization requires global action. Emissions from all around the globe contribute to the buildup of GHGs in the atmosphere, and it is the global atmospheric concentration of GHGs that drives climate change. Emissions in the United States could fall to zero and the climate problem would still not be solved if emissions continue to increase elsewhere. Indeed, even if all Western developed nations eliminated all net GHG

http://thebreakthrough.org/blog/2009/06/aces_analysis_full_breakthroug.shtml. In most existing cap-and-trade programs credits "are heavily over-allocated and allow excessive banking of credits, undermining their effectiveness in achieving meaningful emission reductions." Teresa B. Clemmer, *Staving Off the Climate Crisis: The Sectoral Approach Under the Clean Air Act*, 40 ENVTL. L. 1125, 1137–38 (2010); see also Lesley K. McAllister, *The Overallocation Problem in Cap-and-Trade: Moving Toward Stringency*, 34 COLUM. J. ENVTL. L. 395 (2009).

138. See Hayward & Green, *supra* note 136, at 3.

139. *Id.* (per capita income in 2008 dollars). Hayward and Green's calculations are based upon Department of Energy data.

140. *Id.*

141. France generates approximately 80% of its electricity with nuclear power, has much higher population density than the United States, and still has per capita emissions of over 6.5 tons per year. *Id.* at 3–4.

142. *Id.* at 4.

emissions tomorrow, atmospheric concentrations would continue to climb for decades.¹⁴³

The United Nations Framework Convention on Climate Change, agreed to in 1992, established the goal of stabilizing atmospheric concentrations of greenhouse gases at a level that avoids “dangerous anthropogenic interference with the climate system.”¹⁴⁴ Although this level is not defined anywhere, it is accepted generally that the framework required stabilizing atmospheric concentrations to a level between 450 and 550 parts per million (ppm), if not lower, so as to avoid an average global temperature increase of two degrees Celsius.¹⁴⁵ Meeting such a goal would require more than marginal reductions in emissions from existing technologies. It would require truly revolutionary technological changes.¹⁴⁶ Simply allowing existing infrastructure to remain in place, even while stopping all additional develop-

143. See INT’L ENERGY AGENCY, *WORLD ENERGY OUTLOOK 2008*, at 48 (2008) (showing atmospheric GHG concentrations would still rise above 450ppm by mid-century even if OECD member nation emissions are excluded).

144. United Nations Framework Convention on Climate Change art. 2, May 9, 1992, 1771 U.N.T.S. 107.

145. See, e.g., S. Pacala & R. Socolow, *Stabilization Wedges: Solving the Current Climate Problem for the Next 50 Years with Current Technologies*, 305 SCI. 968, 968 (2004) (“Proposals to limit atmospheric CO₂ to a concentration that would prevent most damaging climate change have focused on a goal of 500 +/- 50 parts per million (ppm), or less than double the preindustrial concentration of 280 ppm.”). Some environmentalist organizations advocate a significantly lower target of 350 ppm, which would require even more ambitious measures. See Andrew C. Revkin, *Campaign Against Emissions Picks Number*, N.Y. TIMES, Oct. 24, 2009, at A8. See generally 350.ORG, <http://www.350.org>.

146. See, e.g., John Alic et al., *Opinion, A New Strategy for Energy Innovation*, 466 NATURE 316, 316 (2010) (“Limiting the concentration of carbon dioxide and other greenhouse gases in Earth’s atmosphere requires a technological and economic revolution.”); Scott Barrett, *The Coming Global Climate-Technology Revolution*, 23 J. ECON. PERSP. 53, 53 (2009) (arguing that “stabilizing concentrations will require a technological revolution—a ‘revolution’ because it will require fundamental change, achieved within a relatively short period of time”); Martin I. Hoffert et al., *Advanced Technology Paths to Global Climate Stability: Energy for a Greenhouse Planet*, 298 SCI. 981, 981 (2002) (“Arguably, the most effective way to reduce CO₂ emissions with economic growth and equity is to develop revolutionary changes in the technology of energy production, distribution, storage, and conversion.”). The challenge could be even greater than generally assumed, as it is possible that conventional estimates already incorporate unrealistic assumptions about the rate of emission-reducing technological change in business-as-usual scenarios. See Roger Pielke Jr., Tom Wigley & Christopher Green, *Dangerous Assumptions*, 452 NATURE 531, 531 (2008).

ment, would be enough by itself to approach the 450 ppm lower bound.¹⁴⁷ And stopping global development is not an option.

GHG emissions have continued to increase with economic growth, despite gains in energy efficiency. For example, global emissions of carbon dioxide from fuel combustion increased 38% between 1990 and 2007.¹⁴⁸ Emissions in developing nations are climbing particularly rapidly in conjunction with much-needed economic development. In 2008, nearly 1.5 billion people around the world lacked access to electricity, including 809 million in Asia.¹⁴⁹ For affected nations, electrification is understandably a greater priority than emissions reduction. India and China, the first and fourth leading emitters of GHG, are essential to any atmospheric stabilization plan and yet have made clear that they will not participate in any regime that would require them to forego future economic growth.¹⁵⁰

Because the atmosphere is a global commons, no country has much incentive to reduce its own emissions without the assurance that other nations will follow suit.¹⁵¹ Worse, those countries most essential to the control of global emissions—the United States and China in particular—have the least incentive to act.¹⁵² Although some countries may be willing to enact environmental policies for the benefit of other nations because it is the “right thing” to do, the more expensive such measures are

147. See Stephen J. Davis, Ken Caldeira & H. Damon Matthews, *Future CO₂ Emissions and Climate Change from Existing Energy Infrastructure*, 329 SCI. 1330, 1330 (2010).

148. See INT’L ENERGY AGENCY, CO₂ EMISSIONS FROM FUEL COMBUSTION: HIGHLIGHTS 44 (2010), available at <http://www.iea.org/co2highlights/CO2highlights.pdf>.

149. See *Access to Electricity*, IEA.ORG, <http://www.iea.org/weo/electricity.asp> (last visited Mar. 12, 2011).

150. According to Indian Prime Minister Manmohan Singh, “[d]eveloping countries cannot and will not compromise on development.” See L. Barber, *Transcript: Wen Jia-bao*, FIN. TIMES, Feb. 2, 2009, <http://www.ft.com/cms/s/0/795d2bca-f0fe-11dd-8790-0000779fd2ac.html> (“[I]t’s difficult for China to take quantified emission reduction quotas at the Copenhagen conference, because this country is still at an early stage of development.”); Ravi Nessman, *India: Climate Deal Can’t Sacrifice Poor Nations*, GUARDIAN (UK), Oct. 22, 2009, <http://www.guardian.co.uk/world/feedarticle/8767757>; see also Robert W. Hahn, *Climate Policy: Separating Fact from Fantasy*, 33 HARV. ENVTL. L. REV. 557, 564 (2009) (arguing that “there is no simple way to get major developing countries, such as India and China, to participate in an agreement”).

151. See generally Garrett Hardin, *The Tragedy of the Commons*, 162 SCI. 1243 (1968).

152. See Cass R. Sunstein, *The World vs. the United States and China? The Complex Climate Change Incentives of the Leading Greenhouse Gas Emitters*, 55 UCLA L. REV. 1675, 1676–77 (2008).

likely to be, the less likely it is that any individual nation will take such autonomous action. Even assuming a degree of non-self-interested behavior in international affairs, there is a limit to how great a cost individual nations will bear for the benefits of other nations or the world at large.¹⁵³

If planet-wide GHG emission reductions are to be achieved, the cost of emission reductions will have to decline dramatically. Western developed nations have shown themselves unwilling to implement costly emission control policies, and developing nations are even more resistant to sacrificing economic growth to forestall projected climate changes. The international phase-out of chlorofluorocarbons under the Montreal Protocol was not agreed to until after it became economical to do so.¹⁵⁴ Climate change is a far more difficult, and more costly, problem. The reality is that “when policies focused on economic growth confront policies focused on emissions reductions, it is economic growth that will win out every time.”¹⁵⁵ Unless and until it becomes easier—and far less costly—to meet the world’s economic and development needs while controlling GHG emissions, meaningful emission reductions will not happen.

V. PLOTTING AN ALTERNATIVE COURSE

Reducing net emissions so as to reduce atmospheric GHG concentrations, while maintaining economic growth and expanding access to energy for those in developing nations, cannot be achieved with existing or readily foreseeable technologies.¹⁵⁶ According to a recent report of the National Academy of Sciences, atmospheric stabilization “will require scientific and engineering genius to create new energy systems that avoid emitting all but a

153. See Hahn, *supra* note 150, at 576 (“[D]omestic energy politics will constrain the approaches that particular countries will take to reducing emissions.”).

154. See Cass R. Sunstein, *Of Montreal and Kyoto: A Tale of Two Protocols*, 31 HARV. ENVTL. L. REV. 1, 5 (2007).

155. PIELKE, *supra* note 10, at 46.

156. See Jason Scott Johnson, *A Looming Policy Disaster*, REG., Fall 2008, at 40 (“[R]eally large reductions in greenhouse gas emissions depend upon the widespread adoption of new technologies that are either not yet technologically and economically feasible—most prominently carbon capture and sequestration—or whose large-scale implementation possibilities are seemingly inherently limited and are at best unclear . . .”).

small fraction of today's GHGs while simultaneously powering global economic growth."¹⁵⁷

Centralized federal regulation is a poor match for the climate policy challenge. Regulatory requirements may work tolerably well at mandating the diffusion and adoption of viable technologies, but command-and-control regulation has a poor record of driving technological advancement in a desired direction, particularly where revolutionary innovations are required.¹⁵⁸ Market-based regulatory systems, including cap-and-trade systems, have not fared much better. The Clean Air Act's acid rain program may well have reduced the cost of reducing sulfur dioxide emissions through the use of a tradable permit mechanism, but the program did not significantly drive technological innovation.¹⁵⁹ The program's emissions reduction targets were "well within the range of capabilities of existing technology," and thus did more to encourage diffusion of pollution control innovations that were already available.¹⁶⁰

If the United States and other nations are to have any hope of stabilizing atmospheric concentrations of GHGs at a desirable level, dramatic technological innovation is required. Therefore, climate policy efforts should focus, first and foremost, on spurring and facilitating precisely that type of innovation. Such regulatory mandates being pursued by the EPA under the Clean Air Act divert limited public and private resources and emphasize measures that provide few climate mitigation benefits.

A climate policy focused on technological innovation would eschew regulatory mandates while creating incentives for innovation and accelerating the diffusion of low-carbon tech-

157. NAT'L ACAD. OF SCI., *LIMITING THE FUTURE MAGNITUDE OF CLIMATE CHANGE*, at ix (2010). See also Hoffert et al., *supra* note 146, at 981 ("Arguably, the most effective way to reduce CO₂ emissions with economic growth and equity is to develop revolutionary changes in the technology of energy production, distribution, storage, and conversion.").

158. See Jonathan H. Adler, *Eyes on a Climate Prize: Rewarding Energy Innovation to Achieve Climate Stabilization*, 35 HARV. ENVTL. L. REV. 1, 35–42 (2011).

159. See David M. Driesen, *An Environmental Competition Statute*, in BEYOND ENVIRONMENTAL LAW: POLICY PROPOSALS FOR A BETTER ENVIRONMENTAL FUTURE 175–76 (Alyson C. Flournoy & David M. Driesen eds., 2010).

160. Lee Lane, *The Green Movement and the Challenge of Climate Change*, AEI ENERGY AND ENV'T OUTLOOK, Feb. 2009, at 3; Anne E. Smith, Jeremy Platt & A. Denny Ellerman, *The Costs of Reducing Utility SO₂ Emissions—Not as Low as You Might Think* (Ctr. for Energy and Env't. Policy Research, Working Paper No. 98010, 1998).

nologies. Such a policy agenda might include some of the following elements:

- *Technology-Inducement Prizes*: A more promising means of encouraging technological innovation than traditional ex ante R&D grants is the endowment of large financial prizes for those who develop technologies capable of meeting identifiable climate-related needs, such as more powerful battery and power storage technologies, more efficient and reliable forms of renewable energy, more energy efficient infrastructure, and less costly carbon sequestration technologies.¹⁶¹
- *Reducing Barriers to Alternative Energy Sources*: New technologies often face sizable regulatory hurdles. This is as true with renewable energy sources as it has been with nuclear power. Proposed development of off-shore wind farms, tidal power, and other low- or zero-carbon energy sources have been delayed and made more costly by various regulatory requirements. If such technologies are to be adopted, regulatory barriers to their adoption must be reduced.
- *Encouraging Diffusion Through Procurement*: Federal procurement provides the federal government with substantial power to drive the development and diffusion of technologies in the markets for various goods and services. The federal government should develop procurement guidelines that provide substantial incentive for the development and marketing of low-carbon technologies and services.
- *Shifting the Tax Burden from Labor and Wealth Creation to Carbon*: A sure way to increase the incentive to reduce the use of carbon-based fuels, increase energy efficiency, and provide incentives on the margin for the development and adoption of climate-friendly technologies is to place a price on carbon. The easiest way to do this would be to replace existing taxes on labor and wealth creation, including some payroll, income and corporate taxes, with taxes on the carbon content of fuels.¹⁶²

161. The value of technology inducement prizes in climate policy is discussed at length in Adler, *supra* note 158.

162. See Reuven S. Avi-Yonah & David M. Uhlmann, *Combating Global Climate Change: Why a Carbon Tax Is a Better Response to Global Warming than Cap and*

This is not an exhaustive list of potential policy measures, but these proposals are representative of things policymakers could do to emphasize and accelerate the development and diffusion of climate-friendly technologies to make atmospheric stabilization an economically and practically viable alternative.

VI. CONCLUSION

Global climate change may be the most difficult environmental challenge humanity has ever faced. Addressing concerns about global warming without unnecessarily curtailing individual liberty and economic growth is an even greater challenge. Because carbon dioxide and other GHGs are so ubiquitous, it is difficult for governments to control GHG emissions without controlling large portions of the economy and suppressing future economic growth.

The Obama Administration has moved aggressively to curtail GHG emissions. These efforts are likely to impose substantial costs and expand federal regulatory power, but are unlikely significantly to mitigate, let alone to prevent, global climate change. Even substantial emission reductions will not alter the climate's trajectory to any meaningful degree, and those measures capable of stabilizing the atmosphere today are unthinkable in a liberal society. If the threat of global climate change is to be addressed at an acceptable cost to economic liberty and human prosperity, policymakers must chart a new course that emphasizes technological innovation and provides incentives to adopt low-carbon technologies as they become available. Only this approach has the hope of keeping us free and cool.

Trade, 28 STAN. ENVTL. L.J. 3 (2009); Michael J. Waggoner, *The House Erred: A Carbon Tax Is Better than Cap and Trade*, TAX NOTES, Sept. 21, 2009.