

Articles

ITERATIVE FEDERALISM AND CLIMATE CHANGE

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INTRODUCTION

Since the adoption of the Kyoto Protocol in 1997, the U.S. government has not only repudiated the agreement, but has enacted no comprehensive legislation to reduce carbon dioxide and other emissions that scientists agree with near unanimity are warming the globe.¹ 2009 may see signifi-

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¹ See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS (2007), available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf. The Bush Administration not only repudiated the Kyoto Protocol, see United Press Int'l, *Bush Defends Rejection of Kyoto Treaty*, NEWSMAX.COM, Mar. 30, 2001, <http://archive.newsmax.com/archives/articles/2001/3/29/164418.shtml>, it also vigorously opposed legal efforts to force the federal government to regulate carbon emissions under the Clean Air Act, see *Massachusetts v. EPA*, 549 U.S. 497 (2007); *Regulating Greenhouse Gas Emissions Under the Clean Air Act*, 73 Fed. Reg. 44,354, 44,354–55 (July 30, 2008) (to be codified at 40 C.F.R. ch. 1) (seeking comment more than a year after the *Massachusetts v. EPA* decision to “advance the public debate” and whether to regulate rather than to make “a policy decision by the EPA”). The Obama Administration has proposed new na-

cant federal action given President Obama's support for large cuts in greenhouse gas emissions and the passage by the House of Representatives of the first major bill committing the United States to significant emissions reductions.² But the Obama Administration will face many other more immediate challenges—including a stubbornly deep recession—and congressional cooperation on climate change is by no means certain.³

While the federal government has remained idle, as numerous commentators have observed, a surprisingly large number of states have stepped in to fill the policy void.⁴ Many states have enacted renewable portfolio standards, created incentives for carbon capture and sequestration, mandated energy efficiency standards, and established public benefit funds to support energy efficiency and renewable energy.⁵ Other states have gone further, adopting overall greenhouse gas emissions caps,⁶ crafting greenhouse gas emissions standards for new automobiles,⁷ and capping utility

tional standards to reduce greenhouse gas emissions from automobiles. For a description of the process that led to the new standards, see the text accompanying notes 155–67.

² OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, A NEW ERA OF RESPONSIBILITY: RENEWING AMERICA'S PROMISE 21 (2009), available at http://www.whitehouse.gov/omb/assets/fy2010_new_era/A_New_Era_of_Responsibility2.pdf (President Obama's budget overview for fiscal year 2010); Lisa Lerer & Patrick O'Connor, *House Passes Climate-Change Bill*, POLITICO.COM, June 26, 2009, <http://www.politico.com/news/stories/0609/24232.html>.

³ For an interesting account of the difficulties Obama will face in getting Congress to pass comprehensive climate change legislation, see Ted Nordhaus & Michael Shellenberger, *Getting Real on Climate Change*, AM. PROSPECT, Dec. 1, 2008, at 32.

⁴ See PEW CTR. ON GLOBAL CLIMATE CHANGE, CLIMATE CHANGE 101: STATE ACTION 1 (2006) [hereinafter CLIMATE CHANGE 101], available at http://www.pewclimate.org/docUploads/101_States.pdf ("In the absence of federal leadership to address climate change, many states and regions have begun taking action on their own."); BARRY G. RABE, PEW CTR. ON GLOBAL CLIMATE CHANGE, GREENHOUSE & STATEHOUSE: THE EVOLVING STATE GOVERNMENT ROLE IN CLIMATE CHANGE (2002), available at http://www.pewclimate.org/docUploads/states_greenhouse.pdf; Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 159 (2006) ("Despite exhortations to the contrary, the federal government continues to address issues of purely local effect while the states continue to address issues of national—and even international—effect.").

⁵ See CLIMATE CHANGE 101, *supra* note 4, at 4–5; Barry Rabe, *Race to the Top: The Expanding Role of U.S. State Renewable Portfolio Standards*, 7 SUSTAINABLE DEV. L. & POL'Y 10 (2007).

⁶ California, for example, has passed legislation to reduce its carbon emissions to 1990 levels by 2020. CAL. HEALTH & SAFETY CODE § 38550 (West Supp. 2009). The governor, through executive order, has called for emissions reductions of 80 percent below 1990 levels by 2050. See Cal. Exec. Order No. S-3-05 (June 1, 2005), available at <http://www.dot.ca.gov/hq/energy/ExecOrderS-3-05.htm>.

⁷ Again California is the leader in enacting legislation to limit greenhouse gas emissions from passenger automobiles. See CAL. HEALTH & SAFETY CODE §§ 42823, 43018.5 (West 2006). Under the complexities of the federal Clean Air Act, other states may opt into the California standards, and to date fourteen states have indicated they will follow California's lead. See Pew Ctr. On Global Climate Change, *Vehicle Greenhouse Gas Emissions Standards*, http://www.pewclimate.org/what_s_being_done/in_the_states/vehicle_ghg_standard.cfm (last visited June 30, 2009). California cannot put its regulations into effect without a waiver from the federal EPA; on December 19, 2007, the EPA Administrator announced he was denying the waiver. Press Release, EPA, *America Receives a National Solution for Vehicle Greenhouse Gas Emissions* (Dec. 19, 2007), available at <http://yosemite.epa.gov/opa/admpress.nsf/eebfaebc1afd883d85257355005afd19/41b4663d8d3807c58>

emissions.⁸ Many, if not most, of these initiatives will continue to have force even after Congress begins to regulate.

Several scholars have puzzled over why many states have chosen to regulate climate change given the lack of obvious economic incentive to do so. State actors are part of a classic collective action problem: no single state can solve the problem absent action by other states—including nation-states, in the case of global climate change. Moreover, states cannot fully realize the benefits of their regulatory actions to control carbon emissions. The free rider incentives are large.⁹ Theories about why states have acted to reduce carbon emissions include that states are simply responding to electorate preferences to gain political advantage¹⁰ and that competition among states for economic development drives state behavior.¹¹

In this Article, I contend that the accounts of state involvement on climate change miss a large part of the story. By emphasizing how the states have partly filled the regulatory voids created by federal inaction, this conventional story misses the important—indeed critical—backdrop of the federal government and federal law. The most innovative state responses to climate change are neither the product of state regulation alone nor are they exclusively the result of federal action. Instead, such regulations are the results of repeated, sustained, and dynamic lawmaking efforts involving both levels of government—what I term “iterative federalism.”

Iterative federalism schemes are responsible for two of the most significant climate change initiatives to come from the states: California’s automobile greenhouse gas emissions standards and the Regional Greenhouse Gas Initiative (RGGI). These examples of iterative environmental federalism share two characteristics. First, rather than treat all fifty states as

52573b6008141e5!OpenDocument. The EPA provided its official explanation for the waiver denial on February 29, 2008. California State Motor Vehicle Pollution Control Standards; Notice of Decision Denying a Waiver of Clean Air Act Preemption for California’s 2009 and Subsequent Model Year Greenhouse Gas Emission Standards for New Motor Vehicles, 73 Fed. Reg. 12,156, 12,168–69 (Mar. 6, 2008). California has sued to overturn the waiver denial. Petition for Review, California v. EPA (9th Cir. Jan. 2, 2008), available at http://ag.ca.gov/cms_attachments/press/pdfs/n1514_epapetition-1.pdf. On June 30, 2009 the Obama Administration announced it was overturning the waiver denial and granting the state’s waiver request. See Press Release, EPA, EPA Grants California GHG Waiver (June 30, 2009), available at <http://yosemite.epa.gov/opa/admpress.nsf/bd4379a92ceceecac8525735900400c27/5e448236de5fb369852575e500568e1b!OpenDocument>. For a further explanation of the Obama action, see the text accompanying notes 155–67. For an overview of the California law, see Ann E. Carlson, *Federalism, Preemption and Greenhouse Gas Emissions*, 37 U.C. DAVIS L. REV. 281 (2003).

⁸ See Reg’l Greenhouse Gas Initiative, About RGGI, <http://www.rggi.org/about> (last visited June 29, 2009).

⁹ For explications of this point, see J.R. DeShazo & Jody Freeman, *Timing and Form of Federal Regulation: The Case of Climate Change*, 155 U. PA. L. REV. 1499, 1516–21 (2007); Kirsten H. Engel & Scott R. Saleska, *Subglobal Regulation of the Global Commons: The Case of Climate Change*, 32 ECOLOGY L.Q. 183, 190–94 (2005).

¹⁰ DeShazo & Freeman, *supra* note 9, at 1519; Engel & Saleska, *supra* note 9, at 189.

¹¹ See Barry G. Rabe, Mikael Román & Arthur N. Dobelis, *State Competition as a Source Driving Climate Change Mitigation*, 14 N.Y.U. ENVTL. L.J. 1, 12–43 (2005).

legally homogenous, federal law has singled out a state or group of states for special regulatory power. California's special status in regulating automobile emissions under the Clean Air Act (CAA), which the federal government used to enact its greenhouse gas emissions legislation, provides one example.¹² The establishment of the Ozone Transport Commission (OTC) in the 1990 amendments to the Clean Air Act provides another.¹³ Second, federal law enables this special state regulatory power by requiring the state regulator to comply with national environmental standards. Out of this dynamic, in which the federal government has not acted itself but has quasi-deputized a state or region to act while simultaneously regulating its actions, a distinct version of federalism emerges. Under this system, one level of government—either the singled-out state actor or the national government—moves to regulate a particular environmental policy area. The initial policymaking then triggers a series of iterations adopted in turn by the higher or lower level of government. The process then extends back to the policy originator, and so forth.

Thus, while the national government *has* failed to lead on climate change regulation, federal law has in fact played a key role in state responses. The federal government's long history of environmental policymaking has shaped and enabled state responses to the regulation of carbon emissions. Indeed, the concept of iterative federalism extends even further: without the role played by the federal government in enabling the particular states or regions to act, these two state initiatives would not have occurred. Understanding the important federal role in these state initiatives requires looking not only at the inactive federal government and its active state counterparts, but also at the interaction between state and federal law—iterative federalism.

A clarification is in order. In identifying examples of iterative federalism, I mean to distinguish federalism schemes that involve areas where state and federal jurisdiction merely overlap through independent exercises of policymaking authority.¹⁴ Instead, I focus on schemes of federalism where federal law consciously designates a particular and distinct state or group of states to regulate and relies on that regulatory arrangement to enhance compliance with federal standards.

This deployment of federal law has succeeded in creating a particularly robust and dynamic series of iterations that have resulted in two separate and impressive substantive achievements. First, this federal-state dynamic

¹² Clean Air Act, 42 U.S.C. § 7543(b)(1), (e)(2)(A) (2006).

¹³ *Id.* § 7511c(a).

¹⁴ I do not mean to suggest that areas in which state and federal policymaking jurisdiction overlap cannot produce a dynamic, iterative process of federalism. Indeed, many federal policies have been influenced heavily by earlier state policy iterations, including in the environmental area. California's leadership on energy efficiency standards is an example. Instead, I suggest that the particular regulatory relationship embodied in the iterative federalism schemes produces a robust iterative relationship that promotes an iterative, back-and-forth process of federalism.

has led to significant state initiatives on climate change that are more thorough and significant than the states would have been likely to produce on their own. Indeed, the federal role in producing these initiatives also helps explain both why some states have stepped forward to regulate on climate change and why they have chosen their particular regulatory paths.

Second, the two examples of iterative federalism I describe have succeeded in getting states closer to compliance with National Ambient Air Quality Standards than they would have been otherwise. Although much of our environmental policy debate—particularly in academia—has focused on whether policies produced by various levels of government are efficient,¹⁵ this Article measures success by a different metric: whether iterative federalism achieves federal standards regulating public health and welfare. Measured against this metric, iterative federalism appears to work quite well. Therefore, in addition to identifying iterative federalism as a significant dynamic within environmental law, I am also arguing that, from a normative perspective, iterative federalism is quite useful as a regulatory tool. As a result, in the national debate on climate change, Congress should be particularly hesitant to completely preempt state action lest it lose a significant source of regulatory experimentation.

This Article also contributes to the ongoing theoretical debates about federalism within the environmental context. My claim about how iterative federalism is a significant factor in state climate change leadership moves the federalism debate beyond two key claims that have emerged in legal scholarship. The first claim is that a flurry of state environmental regulatory activity can lead to uniform federal legislation as a result of pressure from the regulated community. The second claim is that states are more likely to produce efficient levels of environmental regulation because of interstate competition for capital and residents. In this Article, I identify a third pattern.

In their seminal paper, Donald Elliott, Bruce Ackerman, and John Millian argued more than twenty years ago that a flurry of state regulatory activity often spurs a federal response as industry clamors for centralized regulation.¹⁶ They claimed that a high degree of state environmental regulatory activity can spur uniform federal legislation as a result of pressure from the regulated community. While this dynamic may explain certain developments in environmental law, it cannot fully explain the breadth of state climate change action to date. Instead, the reverse is also true: federal law

¹⁵ Richard Revesz in particular has argued that devolution of environmental policymaking to the states is more likely to produce socially optimal levels of regulation than centralized policymaking. See Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the "Race to the Bottom" Rationale for Environmental Regulation*, 67 N.Y.U. L. REV. 1210 (1992).

¹⁶ E. Donald Elliott, Bruce A. Ackerman & John C. Millian, *Toward a Theory of Statutory Evolution: The Federalization of Environmental Law*, 1 J.L. ECON. & ORG. 313, 326–29 (1985).

has spurred state regulatory activity by bolstering state regulatory capacity and leadership, ultimately leading to climate change regulation.

Iterative federalism schemes also shed light on the ongoing debate about devolution versus centralization in environmental policymaking. Richard Revesz has argued that states are more likely to produce efficient levels of environmental regulation because of interstate competition for capital and residents.¹⁷ His influential article led to a robust academic debate about federalism and environmental law, focused to a large extent on which level of government—state or national—will provide the optimal level of environmental services. Proponents of state devolution base their preference for state regulation principally on Tieboutian-influenced economic models about interstate competition, which predict that states will compete among themselves to produce an efficient level of regulation.¹⁸ Centralization proponents, by contrast, argue that the nationalization of environmental law overcomes various market failures, including lax environmental standards among states that “race to the bottom” in an attempt to attract business, economies of scale in federal regulation, and interstate externalities.

A close examination of iterative federalism schemes suggests that innovative regulatory mechanisms can have the best of both worlds. These schemes facilitate some of the chief benefits of devolution—policy experimentation and avoidance of untested and potentially expensive national mandates—while simultaneously addressing interstate externalities, national product market economies of scale, and the race to the bottom. These iterative federalism schemes also test empirically the contrasting hypotheses about devolution and centralization. For example, California’s experience in regulating mobile sources bolsters claims of centralization proponents that regulators often operate under conditions of scientific uncertainty and with poor information about the economic effects of their regulatory proposals. This particular regulation thus offers illustrative evi-

¹⁷ Revesz, *supra* note 15. Revesz’s work is the seminal law review article on this subject. For critiques of Revesz’s work, see, for example, Kirsten H. Engel, *State Environmental Standard-Setting: Is There a “Race” and Is It “to the Bottom?”*, 48 HASTINGS L.J. 271 (1997); Daniel C. Esty, *Revitalizing Environmental Federalism*, 95 MICH. L. REV. 570 (1996); Scott R. Saleska & Kirsten H. Engel, “*Facts are Stubborn Things*”: An Empirical Reality Check in the Theoretical Debate over the Race-to-the-Bottom in State Environmental Standard-Setting, 8 CORNELL J.L. & PUB. POL’Y 55 (1998); Richard B. Stewart, *Environmental Regulation and International Competitiveness*, 102 YALE L.J. 2039 (1993). For defenses of Revesz’s article, see Henry N. Butler & Jonathan R. Macey, *Externalities and the Matching Principle: The Case for Reallocating Environmental Regulatory Authority*, 14 YALE L. & POL’Y REV. 23 (1996); Daniel A. Farber, *Environmental Federalism in a Global Economy*, 83 VA. L. REV. 1283, 1301–06 (1997). For Revesz’s own defense of his work, see Richard L. Revesz, *The Race to the Bottom and Federal Environmental Regulation: A Response to Critics*, 82 MINN. L. REV. 535 (1997). For the seminal article on race-to-the-bottom and corporate law, see William L. Cary, *Federalism and Corporate Law: Reflections upon Delaware*, 83 YALE L.J. 663 (1974); for a powerful rejoinder, see Ralph K. Winter, Jr., *State Law, Shareholder Protection, and the Theory of the Corporation*, 6 J. LEGAL STUD. 251 (1977).

¹⁸ See Revesz, *supra* note 15, at 1236–42.

dence suggesting that claims about a working competitive regulatory market among states are overstated. But these examples challenge the pro-centralization camp's assumptions as well. The California experience demonstrates a significant benefit of devolution: minimizing the risk of overly stringent national regulation while allowing individual states to experiment and take risks. Premature federal adoption of California's rigorous emissions standards might have proven much costlier than allowing California first to experiment and then having the federal government act. Similarly, the experience with the OTC—which adopted a ten-state regional cap-and-trade scheme to regulate nitrogen oxides (NO_x)—provided an experimental base for persuading the federal government to expand the program's reach to areas of the country much less politically supportive of regulation. The state regulation also enabled the program to overcome potential public choice pathologies at the federal level. By the same token, the OTC states were pushed to develop stringent strategies for reducing air pollution through their need to comply with national air standards—standards that form the linchpin of the centralized federal role in controlling air pollution.

To put schemes of iterative federalism into context, I outline in Part I the central parameters of the well-known debate about the appropriate locus of regulatory power in environmental policymaking. Part II analyzes the various iterations arising from the California and OTC experiences, culminating with the adoption of greenhouse gas emissions standards and the RGGI cap-and-trade scheme, respectively. In analyzing these iterations, I draw conclusions relevant to the federalism debate in environmental law. I present these conclusions in Part III.

I. ENVIRONMENTAL FEDERALISM

The debate about whether the federal government or the fifty states are superior environmental policymakers began not long after Congress enacted many of the major federal environmental statutes in the early 1970s. In 1974, James Krier criticized the National Ambient Air Quality Standards (NAAQS) produced by the EPA under the 1970 amendments to the CAA as “irrational” given the distinctly local nature of many air pollution problems.¹⁹ In 1977, Richard Stewart outlined the strengths and weaknesses of centralized federal regulation of environmental problems and argued for a much less centralized role for the federal government.²⁰

¹⁹ James E. Krier, *The Irrational National Air Quality Standards: Macro- and Micro-Mistakes*, 22 UCLA L. REV. 323, 323–25 (1974).

²⁰ Richard B. Stewart, *Pyramids of Sacrifice? Problems of Federalism in Mandating State Implementation of National Environmental Policy*, 86 YALE L.J. 1196 (1977). Stewart's article also extensively analyzed the constitutionality of federal regulation, which may receive renewed attention given the current composition of the Supreme Court.

Stewart set forth the central justifications for the federalization of environmental policymaking along with cogent critiques. The most compelling and obvious case for federal regulation is in the presence of interstate externalities: states lack the incentive to regulate more stringently to reduce pollution that enters other states, making federal regulation necessary to correct this market failure.²¹ Commentators generally accept the need for federal uniformity in regulating national product markets like automobiles.²² However, proponents of centralization argue for a much broader role for the federal government than merely controlling cross-border pollution or setting product standards. The federal government can, for example, take advantage of economies of scale in developing and administering regulations, rather than establishing fifty separate bureaucracies working on similar goals. Centralization advocates also argue that the federal government has superior resources and the ability to conduct more sophisticated, coordinated research and development.²³ Observers have suggested that the federal government is less subject to public choice pathologies than many states, which may be dominated by a particular industry group and may lack the strong presence of environmental advocacy groups.²⁴ Businesses also frequently argue in favor of a uniform set of standards rather than fifty separate ones, particularly in the regulation of national product markets.²⁵ Most prominent among centralization arguments is that states may attempt to attract industry and jobs by reducing environmental standards below optimal levels—the race to the bottom.²⁶ Congress relied on this rationale in adopting a number of key federal environmental statutes,²⁷ and for years its accuracy was accepted as a truism.

Though a prominent federal role for environmental policymaking was controversial from the outset, the 1992 publication of Revesz's article attacking, on theoretical grounds, the race-to-the-bottom rationale for the federalization of environmental law reinvigorated the debate in the legal academy.²⁸ Revesz relied heavily on Charles Tiebout's famous article, which theorizes that competition among multiple jurisdictions for residents

²¹ See HENRY N. BUTLER & JONATHAN R. MACEY, USING FEDERALISM TO IMPROVE ENVIRONMENTAL POLICY 17 (1996); Revesz, *supra* note 17, at 540–42; Peter Swire, *The Race to Laxity and the Race to Undesirability: Explaining Failures in Competition Among Jurisdictions in Environmental Law*, 14 YALE L. & POL'Y REV. 67, 99–100 (1996).

²² See, e.g., Revesz, *supra* note 17, at 544 (“Uniformity [of standards for products] can be desirable for products with important economies of scale in production. In such cases, disparate regulation would break up the national market for the product and be costly in terms of foregone economies of scale.”).

²³ See Esty, *supra* note 17, at 573.

²⁴ *Id.* at 598.

²⁵ See Roderick M. Hills, Jr., *Against Preemption: How Federalism Can Improve the National Legislative Process*, 82 N.Y.U. L. REV. 1, 29 (2007).

²⁶ Stewart, *supra* note 20, at 1211–12.

²⁷ See Revesz, *supra* note 15, at 1210–11.

²⁸ *Id.*

can to some extent replicate competition in private markets.²⁹ Tiebout wrote his article in response to a claim by public finance economists Musgrave and Samuelson that no competitive market exists for the provision of government services and that therefore it is conceptually impossible to produce an efficient level of public goods.³⁰ Tiebout pointed out that the Musgrave-Samuelson claim assumes that only the federal government provides public goods. By focusing instead on local governments, Tiebout hypothesized that if multiple regulatory jurisdictions compete for residents by offering an array of governmental regulatory and taxation schemes, such competition can lead to efficient levels of regulation.³¹

Oates and Schwab applied Tiebout's work to the environmental field and posited—based on a series of restrictive assumptions—that multijurisdictional competition in the provision of environmental regulation may not lead to a race to the bottom.³² Instead, such competition can produce socially optimal levels of environmental regulation.³³ Revesz used this theory to argue for “a rebuttable presumption in favor of decentralization.”³⁴

While Revesz's work spawned a mini-industry both critiquing and defending it, Revesz, at a minimum, succeeded in shifting the debate away from the rhetorical to the empirical.³⁵ The results of the empirical debate have been mixed: as one set of commentators observed, “it has been easy for federal policy advocates to show that state policy is often ineffective and/or ill-advised, but more difficult to show that its irrationality would skew state policy in one direction (toward deregulation)”³⁶ Yet on its own terms, the debate Revesz spawned, at some level, is ultimately unresolvable: whether state environmental policy is efficient is difficult to

²⁹ Charles M. Tiebout, *A Pure Theory of Local Expenditures*, 64 J. POL. ECON. 416 (1956).

³⁰ *Id.* at 416–18.

³¹ *Id.* at 418. The Tiebout hypothesis has spawned an extensive literature, some of it negative. See, e.g., Truman F. Bewley, *A Critique of Tiebout's Theory of Local Public Expenditures*, 49 ECONOMETRICA 713 (1981) (arguing that relaxing a number of assumptions necessary to Tiebout's theory results in lack of Pareto optimality); John D. Donahue, *Tiebout? Or Not Tiebout? The Market Metaphor and America's Devolution Debate*, 11 J. ECON. PERSP. 73 (1997) (critiquing blithe assumptions about Tiebout because, inter alia, not only are citizens not as mobile or as “price sensitive” as consumers, but those who move may not represent the median voter (e.g., loners, childless, seniors), and collective action problems exist with certain state issues like gambling, where states can reap benefits (tax revenue, employment) while transferring some of the costs (e.g., increased gambling addiction) onto other states).

³² Wallace E. Oates & Robert M. Schwab, *Economic Competition Among Jurisdictions: Efficiency Enhancing or Distortion Inducing?*, 35 J. PUB. ECON. 333, 335–42 (1988).

³³ *Id.*

³⁴ Revesz, *supra* note 17, at 536.

³⁵ Rabe, Román, and Dobelis put it nicely: “The productive result of this debate was to debunk the notion, absent economic externalities, of a general race to the bottom in state environmental regulation, and replace it with an empirical dispute about the rationality of states as environmental regulators—compared, of course, to the federal government.” Rabe, Román & Dobelis, *supra* note 11, at 6.

³⁶ *Id.* (footnote omitted).

measure numerically. Rather, efficiency depends instead on whether the competitive market among states actually exists and functions sufficiently. Even assuming that efficiency should be the appropriate measure of sound environmental policy,³⁷ it is quite difficult to know—and commentators have suggested plenty of reason to doubt—whether conditions exist to produce the type of competition necessary to replicate the Tiebout and Oates-Schwab hypothetical models. Among the most cogent critiques of the Revesz position is that the Oates-Schwab model assumes that state regulators know (a) the amount of new business they can generate by lowering environmental standards, (b) the effect of new business on wage levels, (c) the effect of new business on the environment, and (d) the preferences of their citizens. Such “assumption of perfect measurement” is particularly problematic in environmental law where decisionmakers routinely face high levels of uncertainty.³⁸

Whether or not some states do race to the bottom by relaxing environmental standards, scholars opposed to centralized regulation offer their own affirmative reasons to support decentralized environmental policymaking. Decentralization, for example, takes into account the fact that environmental benefits and harms vary across regions, and allows states and localities to factor those differences into their policy choices. Similarly, the costs of producing environmental benefits vary across regions. Therefore, devolution proponents argue, local, tailored solutions are more effective than national ones. For example, local conditions like wind patterns and geographical terrain matter in establishing environmental policy. National standards fail to capture the nuances of these local conditions.³⁹ Finally, different areas of the country value environmental protection differently—some states may wish to promote environmental protection at the expense of growth while others may wish to do the opposite. National standards fail to honor these differential preferences in a manner that state regulation can.⁴⁰

Debates about centralization versus decentralization have focused largely, though not exclusively, on underlying theories about maximizing the efficient provision of environmental goods. Such debates pay less attention to the actual operation of federal and state environmental statutes.

³⁷ See Swire, *supra* note 21, at 75–76, 97 n.113 (critiquing use of efficiency as appropriate measuring rod for environmental policy and pointing out difficult problems of valuation of environmental goods like clean air).

³⁸ *Id.* at 95–96; see also Richard B. Stewart, *The Development of Administrative and Quasi-Constitutional Law in Judicial Review of Environmental Decisionmaking: Lessons from the Clean Air Act*, 62 IOWA L. REV. 713, 716 n.16 (1977) (discussing endogeneity of preferences for environmental protection and difficulties endogeneity creates for making choices about environmental quality).

³⁹ See Krier, *supra* note 19, at 326–27.

⁴⁰ *Id.* at 327–28; Richard L. Revesz, *Federalism and Environmental Regulation: A Public Choice Analysis*, 115 HARV. L. REV. 553, 636–41 (2001) (positing that states with strong environmental legislation have strong voter preferences in favor of strict environmental standards).

For example, despite the fact that the federal CAA establishes national standards through the NAAQS, the statute also leaves significant room for state variation through its system of cooperative federalism, which delegates to states the authority to implement the Act. The Clean Water Act similarly operates under a system of cooperative federalism. There are many substantive environmental areas in which states and the federal government have overlapping areas of jurisdiction whereby both levels of government are essentially free to regulate. For this reason, several scholars have embraced a more “contextual” or “dynamic” notion of environmental federalism that accounts for the nuances of individual environmental statutes, the nature of the environmental problem being addressed, and the history of legislative activity in any particular environmental policy area.⁴¹

Though the theoretical debates about centralization versus decentralization have yet to be resolved definitively, their parameters provide a useful framework for situating and analyzing iterative federalism schemes. To understand this framework fully, I now analyze California’s experience with mobile source emissions regulations and the OTC’s various iterations of cap-and-trade programs. Traditional arguments about federalism serve as a backdrop for this analysis.

II. ITERATIVE FEDERALISM SCHEMES

Iterative federalism schemes reject a central assumption among virtually all federalism theories that states are to be treated as a single analytic unit. Rather than treating all fifty states as legally homogenous, iterative federalism focuses on regulatory schemes under which federal law has granted a state or group of states special regulatory power, designating a particular state entity as a “superregulator.” In the case of mobile source emissions, California is the distinct state. In the case of regional ozone regulation, the superregulator is a regional body of northeastern states.

But this superregulator status is not granted without restrictive parameters. In both iterative federalism examples this Article cites, the federal government grants the special state entity its unique power to meet stringent national air quality standards. Furthermore, in both instances, the federal EPA retains a role in approving the regulatory activity of the superregulator body.⁴²

In order to put the regulatory efforts of California and the OTC in context, some background about the operation of the Clean Air Act is necessary. The basic framework for controlling air pollution since the enactment of the modern CAA in 1970 is one of cooperative federalism: the EPA, through its delegated authority under the Act, has issued NAAQS for harm-

⁴¹ See, e.g., William W. Buzbee, *Contextual Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 108 (2005); Engel, *supra* note 4.

⁴² RGGI grew out of this arrangement but is obviously not a product of federal law. For elaboration, see *infra* notes 236–41 and the accompanying text.

ful air pollutants. The EPA has designated six criteria pollutants necessitating NAAQS, including carbon monoxide, lead, nitrogen dioxide, ozone, and particulate matter. The standards—set as allowable parts per million—are designed to protect human health and, in some instances, the physical environment.⁴³

The CAA delegates to states the authority to implement the NAAQS through the adoption of State Implementation Plans (SIPs).⁴⁴ States have a fair amount of discretion to devise their plans in a manner that takes into account local geographic and economic conditions, voter preferences, and other such factors, so long as a state's SIP contains measures that will either attain or maintain the national standards and, importantly, mitigate the transport of interstate air pollution.⁴⁵ Though states were supposed to meet the NAAQS by 1975, Congress has twice extended the NAAQS deadlines, and numerous areas of the country—principally the cities of the northeast and parts of Texas and California—remain out of compliance for ozone and particulate matter.⁴⁶

The California mobile source and OTC examples are exceptions to the standard model of cooperative federalism contained in the CAA. These examples of regulatory exceptionalism have produced a robust series of policy iterations that have not only resulted in large air pollution reductions, but also have expanded the initial regulatory experimentation beyond the borders of the superregulator jurisdictions. Both iterative federalism schemes have also produced two ambitious and interesting legislative initiatives to reduce carbon emissions. California has enacted greenhouse gas emissions standards for passenger automobiles, and the OTC states have just begun the nation's first cap-and-trade program to reduce carbon emissions from utilities.⁴⁷ Just as the air pollution iterations have expanded beyond the superregulator's borders, it is likely that the climate change regulatory schemes will do so as well.

⁴³ For a listing of the current NAAQS, see EPA, National Ambient Air Quality Standards (NAAQS), <http://www.epa.gov/air/criteria.html> (last visited July 14, 2009). The human health standards are designated "primary standards" and the physical environment standards—including crops, ecosystems, and visibility—are called "secondary standards." *Id.*; see also Clean Air Act, 42 U.S.C. § 7409(a)–(b) (2006).

⁴⁴ 42 U.S.C. §§ 7409–10. The Act contains important exceptions to cooperative federalism. For example, the federal government regulates mobile source emissions almost exclusively. *Id.* § 7543(a). However, California has special authority to enact standards more stringent than the federal standards. See *id.* § 7543(b), (e)(2)(A); *infra* Part II.A.

⁴⁵ 42 U.S.C. § 7410.

⁴⁶ EPA, REPORT ON THE ENVIRONMENT 2-23, 2-29 to -30 (2008); see also Matthew L. Wald, *Clean Air Deadline Is History*, N.Y. TIMES, Jan. 3, 1988, at E9 (recounting history of delays and deadline extensions under the Clean Air Act). Nonattainment does not, however, signal failure in the war against air pollution. To the contrary, air quality has improved significantly since the 1970s.

⁴⁷ See Reg'l Greenhouse Gas Initiative, *supra* note 8.

A. Motor Vehicle Emissions Standards

In 2003 California passed the first domestic greenhouse gas legislation regulating tailpipe emissions from automobiles.⁴⁸ More specifically, the legislation—known as AB 1493—directs the state’s Air Resources Board (CARB) to issue regulations “that achieve the maximum feasible and cost-effective reduction of greenhouse gas emissions from motor vehicles.”⁴⁹ The regulations were supposed to take effect for model year 2009 automobiles, but the EPA has denied the state’s request for a waiver from the Clean Air Act preemption provision.⁵⁰ The Obama Administration has indicated that it will grant California’s waiver request, but any EPA approval will come too late for 2009 cars.⁵¹ CARB has now issued regulations that will reduce greenhouse gas emissions by about twenty-two percent by 2012 and thirty percent by 2016, as compared with the 2002 automotive fleet.⁵²

California’s greenhouse gas emissions standards are the end result—what I call Iteration 9—of years of leadership on the part of the state in regulating mobile source emissions. The various mobile source iterations that have resulted from California’s superregulator status offer several insights relevant to the current debate about environmental federalism. First, the superregulator provision has resulted in cleaner California air than would likely exist in the absence of the provision. Though California has been an obvious leader in regulating motor vehicle emissions, it has sometimes dragged its feet in regulating, and federal law has pushed the state to do more.⁵³

Second, California’s leadership on climate change issues is not merely the product of state leadership. California’s climate change regulations are a direct result of federal law, which has played a central role both in allowing the state to regulate and in demanding stricter regulation of air pollution. This federal role has bolstered the state’s environmental leadership on mobile source regulation, which in turn has led to the adoption of the state’s climate change legislation.

⁴⁸ CAL. HEALTH & SAFETY CODE § 43018.5(a) (West 2006).

⁴⁹ *Id.*

⁵⁰ The EPA provided its official explanation for the waiver denial on February 29, 2008. California State Motor Vehicle Pollution Control Standards; Notice of Decision Denying a Waiver of Clean Air Act Preemption for California’s 2009 and Subsequent Model Year Greenhouse Gas Emission Standards for New Motor Vehicles, 73 Fed. Reg. 12,156, 12,168–69 (Mar. 6, 2008).

⁵¹ See Press Release, EPA, EPA Revisits California Waiver Decision (Feb. 6, 2009), available at <http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/8904b9648e72784e85257555005560f0!OpenDocument>.

⁵² For a straightforward explanation of the regulations, see CAL. ENVTL. PROT. AGENCY AIR RES. BD., FACT SHEET: CLIMATE CHANGE EMISSION CONTROL REGULATIONS (2004), available at http://www.arb.ca.gov/cc/factsheets/cc_newfs.pdf. The regulations can be found at Final Regulation Order: Amendments to Sections 1900 and 1961, and Adoption of New Section 1961.1, Title 13, California Code of Regulations (n.d.), <http://www.arb.ca.gov/regact/grnhsgas/revfro.pdf>.

⁵³ See *infra* notes 170–97 and accompanying text.

Third, California's experience provides an alternative regulatory mechanism to national legislation for national product markets. National legislation is often justified on the grounds that national products should be regulated centrally in order to take advantage of manufacturing economies of scale. Designating California as a superregulator allows for policy experimentation and risk taking—traditional virtues of devolution—without the risk of multiple separate product standards by different states. California's experience can then spread to other states, which under federal law can opt into the state's standards, as well as to the federal government, which has liberally borrowed from California's regulatory provisions over the years.

Fourth, California's regulatory experience sheds empirical light on the centralization/decentralization debate by demonstrating that—as critics of the Oates-Schwab theory in favor of decentralization predict—regulators frequently operate with less than perfect information about the predicted costs and benefits of their regulations. This imperfect information does not necessarily mean that states will race to the bottom; in fact, California has frequently regulated in the face of imperfect information. Moreover, California has often achieved greater pollution reduction at lower cost than initial estimates predicted. However, the information deficit does suggest that the conditions necessary to create state competition that could optimize the provision of environmental goods may not exist. The information deficit also suggests that states that are more susceptible to the claims of interest groups like the automobile and oil industries might well relax environmental standards to suboptimal levels.

However, California's experience bolsters the position of devolution advocates as well. California has engaged in regulatory experimentation in its mobile source standards that has proven to be much more costly than regulators believed. Likewise, some regulations have produced much lower environmental benefits than predicted, particularly in the state's efforts to spur the development of zero-emissions vehicles. The state's superregulator status has thus allowed for failed policy experimentation at the state level, without imposing high and inefficient regulatory costs on the rest of the country.

1. Iterations 1 and 2: The First Emissions Standards.—Southern California has long held the dubious distinction of having the worst air quality in the country. The region's battle with dirty air began in the 1940s when the city of Los Angeles experienced its first major smog episodes.⁵⁴ After heated battles over the extent to which the automobile engine contributed to the air pollution problem, California established its Motor Vehicle Pollution Control Board in 1960 by the Motor Vehicle Pollution Control

⁵⁴ See Cal. Env'tl. Prot. Agency Air Res. Bd., Key Events in the History of Air Quality in California, <http://www.arb.ca.gov/html/brochure/history.htm> (last visited June 29, 2009).

Act.⁵⁵ The board enacted the first tail pipe emissions standards in 1966.⁵⁶ The board established carbon monoxide (CO) and hydrocarbon (HC) standards of 51 grams per mile and 6.3 grams per mile, respectively, for model year 1966 passenger cars.⁵⁷

Los Angeles, however, was not alone in experiencing air quality problems. Urban areas across the country faced similar problems, prompting Congress to follow California's lead with the adoption of the Clean Air Act of 1963⁵⁸ and then the Motor Vehicle Air Pollution Control Act of 1965.⁵⁹ The 1965 Act directed the Health, Education, and Welfare Agency to establish emissions standards. The Agency issued standards identical to the California standards effective for model year 1968 passenger cars,⁶⁰ beginning a long back-and-forth process between the state and federal government.

California and the federal government were not alone in focusing on the contribution of automobile emissions to air pollution. New York, for example, was on the verge of imposing tougher emissions standards than California, when Congress intervened.⁶¹ In 1967, Congress again amended the 1963 CAA and for the first time preempted all states from adopting "any standard relating to the control of emissions from new motor vehicles."⁶² In a victory for California, however, Congress exempted from the preemption provision states that controlled auto emissions prior to March 30, 1966.⁶³ Only California met that requirement.⁶⁴ Elliott, Ackerman, and Millian theorize that this federal legislation came about largely because automobile manufacturers, along with the coal industry, feared inconsistent and potentially more stringent regulations from state and local governments. Environmentalists embraced federal legislation in concert with the industry. Senator Edmund Muskie, a presidential aspirant and chair of a key Senate committee, fought for the legislation in order to distinguish himself from other presidential candidates.⁶⁵ The California provision survived despite attempts by Representative John Dingell of Michigan to kill it. The

⁵⁵ 1960 Cal. Stat. 347.

⁵⁶ See Cal. Envtl. Prot. Agency, *supra* note 54. California adopted crankcase emissions controls in 1960. See JAMES E. KRIER & EDMUND URSIN, POLLUTION AND POLICY: A CASE ESSAY ON CALIFORNIA AND FEDERAL EXPERIENCE WITH MOTOR VEHICLE AIR POLLUTION 1940–1975, at 146 (1977).

⁵⁷ THAD GODISH, AIR QUALITY 279–80 (4th ed. 2004).

⁵⁸ Clean Air Act of 1963, Pub. L. No. 88-206, 77 Stat. 392.

⁵⁹ Motor Vehicle Air Pollution Control Act of 1965, Pub. L. No. 89-272, 79 Stat. 992.

⁶⁰ Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines, 31 Fed. Reg. 5170 (Mar. 30, 1966) (to be codified at 45 C.F.R. pt. 85).

⁶¹ See KRIER & URSIN, *supra* note 56, at 175.

⁶² 42 U.S.C. §§ 1857f-1(a), 1857f-6(a) (Supp. IV. 1965–1968).

⁶³ Clean Air Act, 42 U.S.C. § 7543(a), (b)(1) (2006).

⁶⁴ See Motor Vehicle Mfgs. Ass'n v. N.Y. Dep't of Envtl. Conservation, 17 F.3d 521, 525 (2d. Cir. 1994).

⁶⁵ Elliott, Ackerman & Millian, *supra* note 16, at 326–27.

California congressional delegation fought to exempt California from the preemption provision with strong constituent support engendered in part by a radio program critical of Dingell's efforts.⁶⁶

Shortly thereafter, California and the federal government again tightened emissions standards, largely in concert. For cars beginning with model year 1970, California and federal standards lowered emissions for hydrocarbons to 4.1 grams per mile and for carbon monoxide to 34 grams per mile. Furthermore, for the first time, California required auto manufacturers to install evaporative control systems for new models beginning in 1970.⁶⁷ The federal government followed California's lead, adopting the same evaporative control system requirement for model year 1971 light-duty vehicles.⁶⁸

2. *Iteration 3: The California Pure Air Act.*—In 1968 California used its superregulator power to enact the Pure Air Act, which set increasingly rigorous standards for hydrocarbons and carbon monoxide for model years 1970–1974, and for the first time set standards for nitrogen oxide emissions.⁶⁹ The process by which the state enacted the legislation is an exemplary case study in the rise of an organized environmental constituency, the role of expert legislative staff advice, and the role of automobile industry lobbyists in undermining their own credibility.⁷⁰ Professional legislative staff at the Assembly Office of Research (AOR) played a key role in structuring legislative hearings to maximize media exposure, highlighting air pollution problems, and downplaying automotive industry objections to tough standards. The AOR staff was helped by the rigid stance of the domestic automobile manufacturers that further emissions controls were “impossible,” by the perception that domestic manufacturers withheld information from the legislature, and by a lobbyist—the first hired auto lobbyist in Sacramento—who took positions so hard-line as to be incredible.⁷¹

Table 1 provides the statutory standards enacted in the Pure Air Act.

⁶⁶ See KRIER & URSIN, *supra* note 56, at 182.

⁶⁷ GODISH, *supra* note 57, at 279.

⁶⁸ *Id.*

⁶⁹ 1968 Cal. Stat. 1463, 1467–70.

⁷⁰ See KRIER & URSIN, *supra* note 56, at 184–89.

⁷¹ *Id.* at 185.

Table 1: Pure Air Act Standards⁷²

	<i>Hydrocarbons</i>	<i>Carbon Monoxide</i>	<i>Nitrogen Oxide</i>
<i>1970–71</i>	2.2 grams	23 grams	4.0 grams*
<i>1972</i>	1.5 grams	23 grams	3.0 grams
<i>1974</i>	1.5 grams	23 grams	1.3 grams

* The nitrogen oxide standard applied only for 1971.

The state's Air Resources Board was given authority to set tougher standards than those specified in the statute provided that such standards were both necessary and technologically feasible.⁷³

3. *Iteration 4: The 1970 Amendments to the Clean Air Act.*—Iteration 4, adopted by the federal government, came in the form of the landmark passage of the federal Clean Air Act, promulgated through amendments to existing federal legislation. The iteration did not follow California lock-step, but was instead part of the much broader revisions establishing the contemporary CAA. The 1970 amendments required the EPA to develop regulations reducing emissions of carbon monoxide, hydrocarbons, and nitrogen oxide, and provided rigid guidelines for the Agency. These guidelines included requirements for reduction of carbon monoxide and hydrocarbon emissions by ninety percent for 1975 model year light-duty vehicles, using 1970 cars as a baseline.⁷⁴ The result was that the standards for 1975 should have been 0.41 grams per mile of hydrocarbons and 3.4 grams per mile of carbon monoxide.⁷⁵ For the first time the CAA specified emissions standards for nitrogen oxide, requiring a ninety percent reduction for model year 1976 light-duty vehicles compared with 1971 cars.⁷⁶ Thus, had the 1970 standards actually been adopted,⁷⁷ for the first time federal standards would have been more rigorous than those in California.

Meanwhile, California faced a significantly altered legal landscape in regulating mobile sources.⁷⁸ With the passage of the federal CAA in 1970, not only did California operate with explicit federal legal authority to regulate mobile sources, but the state (indeed all states) were now subject to the NAAQS set by the EPA. The CAA required states, as of January 1972, to submit State Implementation Plans outlining how they would meet the

⁷² 1968 Cal. Stat. 1470.

⁷³ *Id.* at 1466.

⁷⁴ Clean Air Amendments of 1970, Pub. L. No. 91-604, § 6, 84 Stat. 1676, 1690; *see also* Arnold W. Reitze, Jr., *The Legislative History of U.S. Air Pollution Control*, 36 HOUS. L. REV. 679, 704 (1999).

⁷⁵ Federal hydrocarbon standards for model year 1970 cars were 4.1 grams per mile; carbon monoxide standards were 34 grams per mile. GODISH, *supra* note 57, at 280.

⁷⁶ Clean Air Amendments § 6, 84 Stat. at 1690.

⁷⁷ *See infra* notes 83–84 and accompanying text.

⁷⁸ *See* Clean Air Amendments, 84 Stat. 1676.

standards.⁷⁹ The NAAQS were extremely ambitious in order to meet the statutory directive that the standards protect public health with an adequate margin to spare.⁸⁰ As Krier and Ursin describe, in order to meet the oxidant—now called ozone—standard as required, Los Angeles would have to go from 241 days of violations in 1970—measured at a level more generous than the new federal standard—to only one violation at a lower standard by 1975.⁸¹ More graphically, the *Los Angeles Times* described the carbon monoxide standard as requiring “that emissions be controlled to a point at which . . . the sickest emphysema victim on the second worst inversion day of the year should be able to spend eight hours at the busiest street corner of the most polluted city without suffering any ill effects from carbon monoxide.”⁸²

Now, rather than leading the country in setting ambitious auto emissions standards, California faced significant federal pressure to go further, faster. The CAA gave the state the legal authority to do so under the super-regulator provision and required the state to meet extremely stringent NAAQS.

4. *Iteration 5: Gradual Standard Tightening from 1974–1990.*—Despite the stringent reductions mandated by the 1970 CAA amendments, the EPA never adopted the statutory emissions limits in the required time frame. Instead, the economy and politics intervened. The 1974 energy crisis led Congress to amend the CAA yet again to push back the emissions requirement for carbon monoxide and hydrocarbons to 1977 and to loosen the nitrogen oxide standard from 0.4 to 2.0 grams per mile.⁸³ These requirements were extended further on several occasions, and the original 1970 statutory requirements were ultimately not applied federally until model year 1981 cars.⁸⁴

Automobile manufacturers made numerous arguments to the EPA Administrator and to Congress about why the standards should be delayed.⁸⁵ They focused on the argument that implementation of tougher emissions standards would decrease fuel economy at a time when Congress had tightened fuel economy standards in response to the energy crisis.⁸⁶ In finally

⁷⁹ Clean Air Amendments § 3, 84 Stat. at 1679–83. The timing of the issuance of the first NAAQS and the date by which states were to submit their first SIPs is described in KRIER & URSIN, *supra* note 56, at 208–09.

⁸⁰ KRIER & URSIN, *supra* note 56, at 208.

⁸¹ *Id.*

⁸² Dan Fisher, *U.S. Aide Wonders if Clean Air Standards Are Too High*, L.A. TIMES, July 29, 1974, at D10.

⁸³ GODISH, *supra* note 57, at 281.

⁸⁴ *Id.* at 279–81.

⁸⁵ For an extensive recounting of auto industry arguments and subsequent evidence about their accuracy, see Clean Air Act Amendments of 1977, Pub. L. No. 95-95, 91 Stat. 685; H.R. REP. NO. 95-294, at 231–71 (1977), as reprinted in 1977 U.S.C.C.A.N. 1077, 1310–50.

⁸⁶ H.R. REP. NO. 95-294, at 231–71, as reprinted in 1977 U.S.C.C.A.N. 1077, 1310–1350.

requiring the implementation of the standards by 1981, Congress realized that not only could auto manufacturers meet the standards and improve fuel economy, but also that emissions technology “may actually improve fuel economy.”⁸⁷ Part of the basis for this finding was California’s experience, which showed that “California certification cars [were] meeting even lower emission levels for 1977 . . . with no additional loss in fuel economy over 1976 and in some cases a gain.”⁸⁸ The House report accompanying the 1977 amendments to the CAA, which delayed the implementation of the standards, also found that auto manufacturers were withholding crucial technical information about the state of emissions control technology and were delaying technological investment in order to argue for further delays in implementing the standards.⁸⁹

While Congress repeatedly delayed implementation of the standards, both California’s Air Resources Board and the EPA tightened emissions standards administratively. As the table below demonstrates, the federal government and California have either been in lock step or the state has enacted stronger standards, which are subsequently adopted by the federal government. One exception reverses this pattern. For a number of years, California’s standard for carbon monoxide was higher than the federal government’s standard. The state had to enact a higher carbon monoxide standard in order to lower its nitrogen oxide standard because the technology did not exist to lower carbon monoxide without increasing nitrogen oxide emissions.⁹⁰

⁸⁷ *Id.* at 247, as reprinted in 1977 U.S.C.C.A.N. 1077, 1326.

⁸⁸ *Id.* at 249, as reprinted in 1977 U.S.C.C.A.N. 1077, 1328.

⁸⁹ *Id.* at 240–41, as reprinted in 1977 U.S.C.C.A.N. 1077, 1319–20.

⁹⁰ Telephone Interview with Tom Cackette, Chief Deputy Executive Officer, Cal. Air Res. Bd., in Sacramento, Cal. (Sept. 20, 2007).

Table 2: *Light-Duty Emissions Standards 1971–1989 (grams per mile)*⁹¹

<i>Model Year</i>	<i>Exhaust Gas</i>	<i>California</i>	<i>U.S.</i>
1971	HCs	4.1	4.1
	CO	34.0	34.0
	NO _x	4.0	
1972	HCs	2.9	3.0
	CO	34.0	28.0
	NO _x	4.0	4.0
1973–74	HCs	2.9	3.0
	CO	34.0	28.0
	NO _x	4.0	3.0
1975–76	HCs	0.9	1.5
	CO	9.0	15.0
	NO _x	2.0	3.1
1977–78	HCs	0.41	1.5
	CO	9.0	15.0
	NO _x	1.5	2.0
1980	HCs	0.39	0.41
	CO	9.0	7.0
	NO _x	1.0	2.0
1981	HCs	0.39	0.41
	CO	7.0	3.4
	NO _x	0.7	1.0
1983–93	HCs	0.39	0.41
	CO	7.0	3.4
	NO _x	0.4	1.0

The most important tightening of standards occurred as follows:

In 1975, California adopted a nitrogen oxide standard of 2.0 grams per mile and reduced the carbon dioxide standard by more than seventy-five percent.⁹² The federal government followed with the same nitrogen oxide standard three years later and then exceeded California's carbon dioxide standard five years after California adopted its 1975 standard.⁹³

⁹¹ GODISH, *supra* note 57, at 254, 280.

⁹² COMM. ON STATE PRACTICES IN SETTING MOBILE SOURCE EMISSIONS STANDARDS, STATE AND FEDERAL STANDARDS FOR MOBILE-SOURCE EMISSIONS 92–95 (2006) [hereinafter COMM. ON STATE PRACTICES]; GODISH, *supra* note 57, at 280.

⁹³ COMM. ON STATE PRACTICES, *supra* note 92, at 94.

In 1977, California again tightened its hydrocarbon and nitrogen oxide standards; the federal government followed three years later.⁹⁴

In 1980, California strengthened its evaporative emissions standard, which regulates non-tail pipe emissions. The federal government followed suit a year later.⁹⁵

In 1980, California again lowered its nitrogen oxide standard, and the federal government did the same a year later.

In 1984, California instituted the first particulate matter standards and then lowered them in 1985, 1986, and 1989.⁹⁶

From a federalism perspective, the early emissions iterations and federal postponements are quite interesting. Federal law required dramatic reductions in auto emissions in the 1970 CAA, independent from California's actions, yet industry pressure led Congress to postpone the standards twice. One could view the postponements as an example of public choice pathologies at the federal level, given the clout of Michigan's John Dingell, sometimes described as "the congressman representing the American automobile industry."⁹⁷ Industry leaders argued that they lacked the technological means to achieve the reductions cost effectively, and Congress agreed. This example is consistent with Revesz's argument that there is no reason to believe that public choice pathologies appear more consistently at the state level than the federal level.⁹⁸ Indeed, states have more consistently enacted rigorous environmental legislation for the past two decades.

There is, however, an alternative explanation, which Elliott, Ackerman, and Millian attribute to the country's division into fifty distinct states. California could more easily regulate automobile manufacturers because its voters do not share the pain that auto workers in the Midwest might feel from expensive new regulatory requirements. California can engage in "political cost-externalization."⁹⁹ Typically, Elliott et al. would argue, California's aggressive regulatory behavior would lead to preemptive federal standards as industry sought to shield itself both from "excessive" regulation and from multiple regulatory requirements. Here, instead, the unique iterative federalism regulatory structure enacted in 1967 allowed public choice pathologies at the federal level to be corrected at the state level. Furthermore, the iterative federalism structure allowed a state to experiment with potentially costly regulations prior to widespread federal adoption, without imposing multiple regulatory schemes on a nationwide industry. When

⁹⁴ GODISH, *supra* note 57, at 279.

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ David Leonhardt, *What Is John Dingell Really Up To?*, N.Y. TIMES, Sept. 5, 2007, at C1.

⁹⁸ Revesz, *supra* note 40, at 636–41.

⁹⁹ Elliott, Ackerman & Millian, *supra* note 16, at 329.

federal law appeared to be too rigid or politically unpalatable, California's regulatory activity gave the EPA something to follow.

Indeed, Phillips Petroleum, arguing that the federal standards contained in the 1970 amendments should be eliminated or postponed, took out a full page ad in the *New York Times* urging instead that the federal government should adopt "the auto emissions standards adopted by the California Air Resources Board."¹⁰⁰ Phillips reasoned that the federal standards would cost close to \$800 per car whereas the California standards would cost manufacturers only \$290 per car.¹⁰¹ The automobile industry disagreed with Phillips's position, opposing the imposition of California standards nationwide.¹⁰² General Motors described the existing federal standards (not the standards proposed in the 1970 amendments) and the California standards as "close to an optimum from the standpoint of air quality and fuel economy."¹⁰³ The difference in Phillips's and GM's positions was a nuanced one: Phillips vehemently opposed the federal standards because they would have required the installation of catalytic converters in every car, which would in turn require the elimination of lead in gasoline. Nevertheless both industry titans seemed to embrace the underlying split in authority between the federal government and California.

The 1980s deviated somewhat from the previous pattern of California leading the federal government when federal regulatory efforts came to a virtual standstill during the Reagan Administration. California continued to tighten its standards, lowering its nitrogen oxide standard in both 1981 and 1984, and instituting particulate matter standards beginning in 1984.¹⁰⁴ The state subsequently tightened its particulate matter standards three times during the 1980s. Federal standards, by contrast, stayed static.

5. *Iteration 6: 1990 Amendments to the Clean Air Act, Tier 1.*—In 1990, Congress substantially overhauled the CAA with its first major revision in thirteen years.¹⁰⁵ Among its amendments were new emissions standards for various categories of mobile sources, including light-duty vehicles.¹⁰⁶ The first of these standards, designated "Tier 1 standards," were phased in from 1994 through 1996. The standards for vehicles weighing up to 3,750 pounds were identical to California's 1993 standards:

¹⁰⁰ See Phillips Petroleum Co., Advertisement, *America's Best Kept Secret: The Cost of Meeting Federal Auto Emissions Standards*, N.Y. TIMES, Mar. 12, 1973, at 20.

¹⁰¹ *Id.*

¹⁰² See E.M. Estes, Letter to the Editor, *GM Responds*, WALL ST. J., Feb. 24, 1975, at 11 (explaining that GM opposed nationwide imposition of California standards, as did Ford and Chrysler).

¹⁰³ *Id.*

¹⁰⁴ GODISH, *supra* note 57, at 280.

¹⁰⁵ For a description of the long battle preceding the adoption of the 1990 amendments, see Reitze, *supra* note 74, at 712–25.

¹⁰⁶ 42 U.S.C. § 7521(g) (2006).

*Table 3: Tier 1 Light-Duty Emissions Standards 1994–96 and California Light-Duty Emissions Standards 1993 (grams per mile)*¹⁰⁷

<i>HC</i>	<i>CO</i>	<i>NO_x</i>	<i>PM</i>
0.25	3.4	0.4	0.08

Under federal law, manufacturers were allowed to implement the standards gradually so that in 1994, forty percent of the fleet had to comply. In 1995, eighty percent had to meet the standards, and in 1996, the entire fleet had to do so.¹⁰⁸ California, by contrast, had no such phase-in, and the entirety of a manufacturer’s fleet had to meet the 1993 standards for model year 1993 cars. Thus, California led but the federal act allowed for a more gradual phase-in of the California standards.

The 1990 amendments also instructed the EPA to determine, as of the end of 1999, whether additional emissions reductions would be effective for model years 2003 and thereafter. Importantly, the amendments made clear that the EPA was not to impose new emissions standards—other than the 1994 to 1996 standards specified above—“for any model year before the model year 2004.”¹⁰⁹ In 1999, the EPA determined that such reductions would indeed be necessary, and the subsequent regulatory process was affected heavily by California’s efforts to develop zero- and low-emissions vehicles, which are described below.

6. *Iterations 7, 8, and 9: Low-Emissions Vehicles.*—In 1988, the California legislature mandated new reductions in mobile source emissions, requiring a reduction of fifty-five percent or more in reactive organic gases and a fifteen percent reduction in nitrogen oxide, using 1987 models as a baseline. The reductions were to take place by the end of 2000.¹¹⁰ The state’s Air Resources Board responded to the legislation with the enactment of far-reaching regulations in 1990 mandating the production of low-emission (LEV) and zero-emissions (ZEV) vehicles. The LEV and ZEV regulations and subsequent history are important to understanding the evolution of both state and federal standards.

a. *The LEV program: 1990–2007.*—California’s LEV program departed from the state’s previous approach in setting specific emissions standards to be met by all vehicles in a particular weight group (e.g., light, medium, heavy). Instead, the LEV program created fleet average emissions standards based on vehicle classifications, to be phased in over a multi-year period from 1994 to 2003, which allowed auto manufacturers to spread emissions over their entire fleets, provided the averages met the model year

¹⁰⁷ *Id.* § 7521(g)(1)–(2).

¹⁰⁸ *Id.*

¹⁰⁹ *Id.* § 7521(b)(1)(C).

¹¹⁰ CAL. HEALTH & SAFETY CODE § 43018(b) (West 2007).

emissions requirements.¹¹¹ To meet the fleet average requirement, manufacturers could use a mix-and-match approach of four different standards: transitional low-emissions vehicles (TLEVs), low-emissions vehicles (LEVs), ultra-low-emissions vehicles (ULEVs), and zero-emissions vehicles (ZEVs). At the time of the adoption of the original LEV program, large manufacturers had to make two percent of their fleet ZEVs by 1998,¹¹² five percent by 2001, and ten percent by 2003.¹¹³ The regulations set emissions standards for nonmethane organic gases (NMOG)—previously measured as hydrocarbons and also sometimes referred to as volatile organic chemicals or VOCs—carbon monoxide, particulate matter, nitrogen oxide, and formaldehyde, and set fleet average requirements based on NMOG emissions.¹¹⁴

The state's Air Resources Board, in adopting the LEV requirements, fully believed that the program would require auto manufacturers to develop new catalytic technology.¹¹⁵ In addition, CARB believed that manufacturers would need to develop alternative fuel engines rather than rely on traditional combustion engines.¹¹⁶ Yet the auto manufacturers proved CARB wrong by improving existing quality so dramatically that emissions reductions far exceed what CARB believed possible in 1990. As longtime CARB Chairman Alan Lloyd said, “[W]e’ve seen the near impossible accomplished with gasoline vehicles: zero evaporative emissions, exceedingly clean exhaust—cleaner, in some cases, than the outside air entering the cabin for ventilation purposes, and emission control systems that are twice as durable [as] their conventional forbearers, forecasted to last an astonishing 150,000 miles.”¹¹⁷

The LEV I mandate was so successful that in 1998, California adopted the program now known as LEV II, which contained three principal components. For the first time, the light-duty truck category was incorporated

¹¹¹ See CAL. AIR RES. BD., PRELIMINARY DRAFT STAFF REPORT: PROPOSED AMENDMENTS TO CALIFORNIA EXHAUST, EVAPORATIVE AND REFUELING EMISSION STANDARDS AND TEST PROCEDURES FOR PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES “LEV II,” AND PROPOSED AMENDMENTS TO CALIFORNIA MOTOR VEHICLE CERTIFICATION, ASSEMBLY-LINE AND IN-USE TEST REQUIREMENTS “CAP 2000”, at 3–6 (1998) [hereinafter CAL. AIR RES. BD., PRELIMINARY DRAFT STAFF REPORT] (describing LEV program); COMM. ON STATE PRACTICES, *supra* note 92, at 165–69. The current regulations for low emission vehicles can be found at CAL. AIR RES. BD., THE CALIFORNIA LOW-EMISSION VEHICLE REGULATIONS (2007), http://www.arb.ca.gov/msprog/levprog/cleandoc/cleancomplete_lev-ghg_regs_9-07.pdf.

¹¹² The ZEV requirements have been extended on several occasions as discussed *infra* Part II.B.

¹¹³ CAL. AIR RES. BD., STAFF REPORT: LOW-EMISSION VEHICLE AND ZERO-EMISSION VEHICLE PROGRAM REVIEW 30 (1996); COMM. ON STATE PRACTICES, *supra* note 92, at 166–68.

¹¹⁴ COMM. ON STATE PRACTICES, *supra* note 92, at 166.

¹¹⁵ *Id.* at 175. New catalytic technology was necessary to reduce emissions resulting from starting a cold vehicle given that the majority of emissions remaining to be reduced came from such starts. *Id.*

¹¹⁶ *Id.*

¹¹⁷ Press Release, Cal. Air Res. Bd., ARB Modifies Zero-Emission Vehicle (ZEV) Regulation (Apr. 24, 2003), available at <http://www.arb.ca.gov/newsrel/nr042403.htm>.

into the light-duty passenger car category, meaning that light-duty trucks were now subject to the same emissions limits as cars. Secondly, the nitrogen oxide standard was reduced by almost seventy-five percent compared with the LEV I standard. And finally, the LEV II standards required steadily declining NMOG levels—again measured by fleet averages—from 2004 to 2007.¹¹⁸ In addition, the transitional LEV was phased out and the state added a new category, the super-low-emitting vehicle (SLEV), to the regulations.

The fate of the state's ZEV program has been less positive. CARB premised this requirement on the belief that the technology would exist by 1998 to allow for the relatively widespread introduction of electric vehicles in the state.¹¹⁹ Despite a huge investment by GM into developing electric vehicle technology—estimates are that GM spent about \$6.5 billion on research and development—auto manufacturers could not bring the costs down to competitive levels, nor did the technology deliver the convenience and battery life necessary to satisfy consumers.¹²⁰ In numerous reports between 1994 and 2004, CARB assessed the feasibility of meeting the ZEV mandate, concluding that its timeline was overly optimistic and that advanced battery technology has not met its promise. Thus, the ZEV mandate has been extended and revised several times¹²¹ so that the current program allows manufacturers to meet most of the requirements with extremely low, rather than zero, emissions vehicles.¹²²

The program was also subject to legal challenge in 2003 on the grounds that the ZEV regulations impermissibly “related to fuel economy standards” and were thus preempted by the federal Energy Policy and Conservation Act.¹²³ More specifically, the ZEV program modifications allowed certain cars to qualify as very low emissions calculated as a function of their fuel economy ratings.¹²⁴ A federal district court struck the regulations down, and rather than appealing, CARB settled the case with various

¹¹⁸ For a review and comparison of LEV I, LEV II, and federal Tier 2 standards, see CAL. AIR RES. BD., UPDATED INFORMATIVE DIGEST: PUBLIC HEARING TO CONSIDER REQUIRING CERTAIN CALIFORNIA LIGHT- AND MEDIUM-DUTY VEHICLES TO BE SUBJECT TO FEDERAL TIER 2 EXHAUST STANDARDS, AND ADOPTING ADDITIONAL EXHAUST EMISSION STANDARDS FOR HEAVY-DUTY GASOLINE VEHICLES AND ENGINES 1–5 (2000), <http://arb.ca.gov/regact/mdv-hdge/uid.pdf>.

¹¹⁹ COMM. ON STATE PRACTICES, *supra* note 92, at 169.

¹²⁰ *See id.* at 169–70.

¹²¹ *See id.* at 169–74 for an explanation of the lengthy history of the ZEV mandate.

¹²² CAL. ENVTL. PROT. AGENCY AIR RES. BD., STATUS REPORT ON THE CALIFORNIA AIR RESOURCES BOARD'S ZERO EMISSION VEHICLE PROGRAM: ZEV TECHNOLOGY REVIEW 3 (2007).

¹²³ *Cent. Valley Chrysler-Plymouth v. Cal. Air Res. Bd.*, No. CV-F-02-5017, 2002 U.S. Dist. LEXIS 20403 (E.D. Cal. June 11, 2002).

¹²⁴ For a clear explanation of this provision of the 2001 ZEV regulations, see Brief for the United States as Amicus Curiae in Support of Affirmance at 6, *Cent. Valley Chrysler-Plymouth v. Kenny*, No. 02-16395 (9th Cir. Oct. 9, 2002).

auto manufacturers.¹²⁵ Though the ZEV regulations have failed to live up to their earlier promise, CARB argues that the regulations have spurred the development of hybrid and fuel cell vehicles and aided research on non-vehicle battery technology.¹²⁶

Overall, though the ZEV program has been disappointing, the LEV program—in addition to dramatically reducing California emissions—has had enormous influence in two separate respects: the evolution of federal standards and the expansion of the California standards beyond state borders.

b. The LEV program and horizontal federalism 1993–1998.—In the 1990s, the same northeastern states that are members of the Ozone Transport Commission took advantage of a provision enacted as part of the 1977 amendments to the CAA to adopt California emissions standards instead of following the federal standards. The provision, section 177, allows states to opt into the California standards so long as the standards “are identical to the California standards for which a waiver has been granted for such model year,” and so long as both “California and such state adopt [the] standards at least two years before commencement of [the] model year.”¹²⁷ The 1990 amendments to the CAA further clarified this provision by prohibiting opt-in states from limiting the sale of California cars and by making sure that nothing an opt-in state does has the effect of creating a “third vehicle.”¹²⁸

The OTC—the same northeastern state body that is the result of an iterative federalism scheme described below—in 1994 voted to recommend that the EPA mandate that the states within the OTC’s purview adopt California’s emissions standards rather than the federal standards in order to reduce area-wide ozone.¹²⁹ The California emissions standards recommendation was just one part of the OTC’s multi-pronged strategy to reduce regional ozone. However, the California emissions rule was not adopted unanimously by the OTC member states. Instead, OTC members from Virginia, Delaware, New Jersey, and New Hampshire voted against the recommendation.¹³⁰

Under the terms of the CAA, the EPA then issued a rule mandating the adoption of the California emissions standards in OTC member states,¹³¹

¹²⁵ Agreement of Counsel Concerning the 2001 California ZEV Litigation (Aug. 12, 2003), <http://www.arb.ca.gov/msprog/zevprog/zevlitigation/zevlitigation.pdf>.

¹²⁶ See CAL. ENVTL. PROT. AGENCY AIR RES. BD., *supra* note 122, at 9.

¹²⁷ 42 U.S.C. § 7507 (2006).

¹²⁸ *Id.*

¹²⁹ This recommendation and the subsequent regulatory follow up were challenged in *Virginia v. EPA*, 108 F.3d 1397, 1402 (D.C. Cir. 1997).

¹³⁰ *Id.*

¹³¹ Final Rule on Ozone Transport Commission; Low Emission Vehicle Program for the Northeast Ozone Transport Region, 60 Fed. Reg. 4712 (Jan. 24, 1995) (to be codified at 40 C.F.R. pt. 51).

based on a finding that the state implementation plans for the OTC states were inadequate both to meet the ozone NAAQS and to mitigate the interstate transport of ozone under section 126 of the CAA.¹³² The EPA rule provided an out to states not wanting to adopt the California standards by agreeing to negotiate a voluntary program with auto manufacturers to reduce emissions below federal emissions standards. Manufacturers would do so through an “LEV-equivalent” program “that would achieve emission reductions from new motor vehicles in the [Ozone Transport Region] equivalent to or greater than would be achieved by the OTC LEV program and that would advance motor vehicle emission control technology.”¹³³ The EPA rule was struck down in *Virginia v. EPA* in part on grounds that the EPA could not impose emissions standards more stringent than the 1994 to 1996 standards contained in the 1990 CAA amendments until model year 2004.¹³⁴ Nevertheless, the rule was re-adopted shortly after the court decision but made truly voluntary for OTC states, which could choose to opt into the voluntary program rather than the California LEV program for model years 1999 and 2000.¹³⁵ In order to survive legal challenge, the nation’s automobile manufacturers had to agree to the program. The auto manufacturers did so in order to avoid adopting certain aspects of the California program.¹³⁶ Not only did the auto manufacturers agree to have the OTC states opt into the voluntary program, but they also agreed to extend the program nationwide for the 2001 model year.¹³⁷

Substantively, the voluntary program, called the National LEV program, is virtually identical to California’s emissions standards except that the program contains no requirement for zero-emissions vehicles¹³⁸ and does not apply to medium-duty vehicles.¹³⁹ The California program also allows the use of certain gasoline not allowed by the EPA.¹⁴⁰

New York, Massachusetts, Maine, and Vermont chose not to opt into the National LEV program and instead adopted the California emissions

¹³² *Virginia*, 108 F.3d at 1403.

¹³³ Final Rule on Ozone Transport Commission; Low Emission Vehicle Program for the Northeast Ozone Transport Region, 60 Fed. Reg. at 4713 n.3.

¹³⁴ *Virginia*, 108 F.3d at 1413.

¹³⁵ See Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines: State Commitments to National Low Emission Vehicle Program, 63 Fed. Reg. 926, 926–31 (Jan. 7, 1998) (to be codified at 40 C.F.R. pt. 9).

¹³⁶ *Id.* at 927–28.

¹³⁷ EPA, Fact Sheet: Final Rule for National LEV (n.d.), <http://www.epa.gov/oms/regs/ld-hwy/lev-nlev/nlevfact.pdf>.

¹³⁸ Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines: State Commitments to National Low Emission Vehicle Program, 63 Fed. Reg. at 933.

¹³⁹ COMM. ON STATE PRACTICES, *supra* note 92, at 177.

¹⁴⁰ EPA, Fact Sheet Addendum: EPA Policy on Cross-Border Sales of 2000 MY “California” Vehicles (2000), <http://epa.gov/otaq/cert/cbs2000.pdf> (“California allows vehicle manufacturers to use phase II reformulated gasoline . . . while EPA continues to require the use of test fuel with different requirements . . .”).

standards effective for model year 1999 and thereafter. Connecticut, New Hampshire, New Jersey, Pennsylvania, Rhode Island, the District of Columbia, Delaware, Maryland, and Virginia opted into the National LEV program.¹⁴¹ The result is that approximately one-third of the country's automobile market as of 1999 was covered by standards nearly identical to California's low-emissions vehicle program. Beginning in 2001—when the National LEV program was extended beyond the OTC region to all remaining states—for the 2001 to 2004 period, the EPA succeeded in instituting lower national emissions standards than were legally allowable under the CAA through a voluntary agreement with the auto manufacturers. It is hard to imagine the federal government would have achieved such regulatory success absent California's successful experimentation.

c. Federal tier 2 standards, model years 2004–2009.—The reach of California's LEV program has not, however, been confined to the voluntary National LEV program. Instead, in 1999 the EPA adopted Tier 2 auto emissions standards to be effective for model year 2004 motor vehicles and thereafter. These standards are designed to harmonize federal and California standards in a way that allows manufacturers to use the same technologies to meet the standards, although the federal standards are slightly less stringent than the California standards.¹⁴²

The Tier 2 standards, like the LEV I and II standards, rely on fleet averages rather than per-car emissions standards. The Tier 2 standards divide automotive fleets into different “bins” based on varying emissions standards. These bins work in a fashion similar to California's LEV categories of TLEVs, LEVs, ULEVs, and so forth in setting separate standards per category and allowing manufacturers to produce whatever mix of vehicles they desire, so long as the total fleet meets steadily declining fleet averages over the 2004 to 2009 period.¹⁴³ Many of the federal bin levels overlap with California's LEV II categories, but some allow emissions greater than allowed under any California category.¹⁴⁴

Additionally, the federal fleet averages are measured by the amount of nitrogen oxide, not NMOGs.¹⁴⁵ This difference again reflects the nuanced approach each regulatory entity has taken in regulating emissions, exercising independent choices based on technology, pollution levels, and the automobile market. If the federal government had not adopted a nitrogen oxide fleet average standard and had instead adopted the California approach, light-duty diesel cars could not have been sold nationally. Indeed,

¹⁴¹ See *id.* at 1 n.1.

¹⁴² COMM. ON STATE PRACTICES, *supra* note 92, at 178–79.

¹⁴³ *Id.*; see also CAL. ENVTL. PROT. AGENCY AIR RES. BD., *supra* note 122, at 3 (discussing California's classification of vehicles into “gold,” “silver,” and “bronze” categories depending on degree of emissions).

¹⁴⁴ See COMM. ON STATE PRACTICES, *supra* note 92, at 179.

¹⁴⁵ For an explanation of NMOGs, see *supra* Part II.A.6.a.

they were not sold in California for several years.¹⁴⁶ California made a different choice because of its air quality problems, understanding that the state would then forgo a particular automobile type. California's regulators apparently also believed that the state's tougher standard would induce diesel manufacturers to develop cleaner diesel technology, an approach that appears to have worked. Mercedes now sells a California-certified, light-duty diesel automobile.¹⁴⁷ Thus California's successful experience led first to the National LEV program and ultimately to the adoption of the more stringent Tier II standards.¹⁴⁸

In addition to the NO_x/NMOG difference, California includes medium-weight trucks in the same categories as lightweight vehicles in its LEV II regulations, whereas the Tier II standards apply more lenient emissions standards to medium-weight trucks until the 2009 model year.¹⁴⁹ In short, California's standards influenced federal regulatory activity heavily, though the EPA did not adopt California's standards lockstep.

Before turning to California's latest iteration—greenhouse gas emissions standards for mobile sources—it is worth highlighting the extraordinary success the state and the federal government have had in dramatically reducing tail pipe emissions. To take nitrogen oxide emissions standards as one illustration of this point, since 1970 when California first established a nitrogen oxide emissions limit of 4.0 grams per mile, the process of iterative federalism has resulted in SLEV automobiles that now emit just 0.02 grams of nitrogen oxide per mile,¹⁵⁰ a decline of more than ninety-nine percent over the past four decades. The average fleet standard for cars nationwide in 2009 will be 0.14 grams per mile, again an extraordinary accomplishment.¹⁵¹

7. *Iteration 10: Greenhouse Gas Emissions Standards.*—In 2003, the state legislature directed California's Air Resources Board to develop greenhouse gas emissions standards for automobiles. The resulting regulations are remarkably similar in design to California's LEV program with

¹⁴⁶ E-mail from Tom Cackette, Cal. Air Res. Bd., to author (Sept. 28, 2007) (on file with author).

¹⁴⁷ Brian Potter, *Mercedes Introduces E320 BLUETEC to California*, WORLD CAR FANS, Oct. 16, 2007, <http://www.worldcarfans.com/9071016.002/mercedes-introduces-e320-bluetec-to-california>.

¹⁴⁸ For an evaluation of whether the EPA should adopt the Tier II standards based largely on the California and National LEV programs, see EPA, TIER 2 REPORT TO CONGRESS (1998).

¹⁴⁹ See Cal. Air Res. Bd., California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles (Sept. 5, 2003), http://www.arb.ca.gov/msprog/evap/orvr_levhdg02_clean_11-14.pdf (setting forth standards for passenger cars and light- and medium-duty trucks).

¹⁵⁰ This is the nitrogen oxide standard for super-low-emissions vehicles. See CLEAN AIR COUNCIL, LOW EMISSION VEHICLES: COMPARING THE FUTURE OF VEHICLE EMISSION STANDARDS: LEV II V. TIER 2, at 3 (n.d.), available at <http://www.cleanair.org/Transportation/cleanCars/lev2.pdf>. For a listing of vehicles and their correspondence to emissions standards, see Cal. Air Res. Bd., 2008 California Certified Vehicles, <http://www.arb.ca.gov/msprog/ccvl/2008ccvl.htm> (last visited June 30, 2009).

¹⁵¹ See COMM. ON STATE PRACTICES, *supra* note 92, at 182.

one important exception: for the first time, California will regulate the emissions of carbon dioxide, methane, and other gases that scientists almost uniformly believe are warming the earth.¹⁵² The state's regulations incorporate carbon dioxide-equivalent standards into the LEV II standards, which currently vary for passenger cars and small trucks/SUVs—one category—and large trucks/SUVs—another category. Thus, in addition to the declining NMOG fleet average standards established in the LEV II standards, auto manufacturers would have to meet declining carbon dioxide-equivalent fleet average standards from 2009 through 2016. The averages would result in reductions of carbon dioxide-equivalent emissions between 2009 and 2012 of twenty-two percent compared with the 2002 fleet and a thirty percent reduction from 2013 to 2016.¹⁵³ These standards are set forth in the table below:

*Table 4: Carbon Dioxide-Equivalent Emission Standards (grams per mile)*¹⁵⁴

<i>Tier</i>	<i>Year</i>	<i>PC/LDT1 (Passenger cars & small trucks/SUVs)</i>	<i>LDT2 (Large trucks/SUVs)</i>
Near-term	2009	323	439
	2010	301	420
	2011	267	390
	2012	233	361
Mid-term	2013	227	355
	2014	222	350
	2015	213	341
	2016	205	332

Through a rather remarkable and complex process, the California regulations will not be limited to the state's auto fleet. Instead, the Obama Administration has announced that it will use the California standards as the

¹⁵² For the most recent influential assessment of the probability that anthropogenic contributions of greenhouse gases are warming the earth, see INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS: SUMMARY FOR POLICYMAKERS (2007), available at http://ipcc-wg1.ucar.edu/wg1/docs/WG1AR4_SPM_PlenaryApproved.pdf. Automobiles contribute greenhouse gas emission as follows: operating the vehicle produces carbon dioxide, methane, and nitrogen oxide; carbon dioxide is emitted from running air conditioning systems; and hydrofluorocarbons can leak from the air conditioning system, be lost during recharge, or be released when vehicles are scrapped. Finally, the production of gasoline produces upstream emissions. CAL. AIR RES. BD., FACT SHEET: CLIMATE CHANGE EMISSION CONTROL REGULATIONS (2004), available at http://www.arb.ca.gov/cc/factsheets/cc_newfs.pdf.

¹⁵³ CAL. AIR RES. BD., *supra* note 152, at 2.

¹⁵⁴ *Id.*

basis for the country's first national greenhouse gas emissions standards.¹⁵⁵ When California adopted its regulations, its Air Resources Board faced a serious legal restraint: the federal Energy Policy and Conservation Act (EPCA) preempted the state from regulating fuel economy standards or issuing any "law or regulation relating to fuel economy standards" as long as the federal government has imposed such a standard.¹⁵⁶ The federal EPCA fuel economy standard is currently 27.5 miles per gallon based on a manufacturer's fleet, with a lower standard for light trucks.¹⁵⁷ Yet a car's carbon dioxide emissions are inversely proportional to its fuel efficiency.¹⁵⁸ Thus, California had to carefully craft its regulations so as not to regulate fuel economy directly, particularly because the state's ZEV regulations were invalidated on the grounds that they violated EPCA's preemption provision.¹⁵⁹ The state attempted to avoid legal difficulty by establishing carbon dioxide-equivalent standards rather than establishing miles per gallon standards. Nevertheless, the regulations faced a serious legal challenge under the EPCA on the ground that the regulations "relate to fuel economy" and are hence preempted. The regulations were also challenged under the CAA,¹⁶⁰ though many of the CAA arguments on which the auto manufacturers rely were rejected in *Massachusetts v. EPA*, which challenged the EPA's failure to issue greenhouse gas standards for mobile sources.¹⁶¹ The first court to consider auto industry challenges to the California regulations sustained them in their entirety.¹⁶²

California also faced another serious legal obstacle. As described above, California cannot implement its regulations without a waiver from the EPA under section 209 of the CAA. The EPA first denied the state's waiver request, and California responded by suing to overturn the waiver

¹⁵⁵ For the documents associated with the Obama announcement, see EPA, Transportation and Climate: Regulations and Standards, <http://www.epa.gov/otaq/climate/regulations.htm> (last visited July 14, 2009).

¹⁵⁶ 49 U.S.C. § 32919(a) (2006).

¹⁵⁷ Nat'l Highway Traffic Safety Admin., CAFE Overview—Frequently Asked Questions, <http://www.nhtsa.dot.gov/cars/rules/cape/overview.htm> (last visited June 30, 2009).

¹⁵⁸ See FuelEconomy.gov, How Can a Gallon of Gasoline Produce 20 Pounds of Carbon Dioxide?, http://www.fueleconomy.gov/feg/contentIncludes/co2_inc.htm (last visited June 30, 2009) (explaining how much carbon dioxide a single gallon of gas produces).

¹⁵⁹ See *supra* notes 123–26 and accompanying text.

¹⁶⁰ The California challenge is *Central Valley Chrysler-Jeep, Inc. v. Witherspoon*, No. CV F 04-6663, 2007 WL 135688 (E.D. Cal. Jan. 16, 2007).

¹⁶¹ 549 U.S. 497 (2007). The court in *Green Mountain Chrysler* relied heavily on *Massachusetts* in upholding Vermont's adoption of the California standards. See *Green Mountain Chrysler Plymouth Dodge Jeep v. Crombie*, 508 F. Supp. 2d 295, 307–10, 355 (D. Vt. 2007).

¹⁶² *Green Mountain Chrysler*, 508 F.Supp.2d 295. As part of its legal complaint, the auto manufacturers compared the CO₂-equivalent standards with the fuel economy increases that will result, demonstrating that the regulations will produce, by model year 2016, passenger automobile fleets that will average 43.2 miles per gallon rather than the 27.4 miles per gallon fleet average in 2009. Complaint at 24, *Green Mountain Chrysler*, 508 F.Supp.2d 295 (No. 2:05-CV-302).

denial.¹⁶³ The Obama Administration not only reversed the EPA waiver denial, but also succeeded in persuading auto manufacturers to drop their lawsuits against the California standards, got California to agree that the newly proposed federal standard will satisfy the state's standard, and extended the California standard to the entire national auto fleet for model years 2012–2016.¹⁶⁴ California has been granted its waiver to regulate emissions, and the regulations can go into effect for model year cars 2009 and later.¹⁶⁵

The California regulations that will be in effect prior to the enactment of national standards will not be limited to just the California fleet. Arizona, Connecticut, Florida, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington have indicated their intent to follow the California's regulations.¹⁶⁶ Colorado, Montana, and Utah are considering whether to follow them.¹⁶⁷ Furthermore, the standards have had international effect: Canada threatened to adopt them and then negotiated with its auto manufacturers to increase fuel economy standards.

B. *Lessons for Federalism*

The history of mobile source emissions and the underlying structure governing their regulation provide a number of lessons important to contemporary debates about environmental federalism. These lessons answer none of the debates absolutely but provide important evidence to deepen our understanding of the accuracy of a number of federalism claims.

1. *Influence of Federal Law on California Air Standards.*—California is frequently—and deservedly—singled out for its leadership on environmental issues. The state's role in setting mobile source emissions standards undoubtedly contributes significantly to the state's green reputation. With very few exceptions, California has led the way in pushing increasingly strict mobile source emissions standards—the only exception over the past forty years in which the federal government has regulated more stringently is with respect to carbon monoxide emissions standards from 1981–1993. During that period, the federal standard was less than

¹⁶³ See Press Release, EPA, *supra* note 7. The EPA provided its official explanation for the waiver denial on February 29, 2008. California State Motor Vehicle Pollution Control Standards; Notice of Decision Denying a Waiver of Clean Air Act Preemption for California's 2009 and Subsequent Model Year Greenhouse Gas Emission Standards for New Motor Vehicles, 73 Fed. Reg. 12,156, 12,168–69 (Mar. 6, 2008). California has sued to overturn the waiver denial. Petition for Review, California v. EPA (9th Cir. Jan. 2, 2008), available at http://ag.ca.gov/cms_attachments/press/pdfs/n1514_epapetition-1.pdf.

¹⁶⁴ See EPA, *supra* note 155.

¹⁶⁵ See EPA, Transportation and Climate: California Greenhouse Gas Waiver Request, <http://www.epa.gov/OMS/climate/ca-waiver.htm> (last visited July 14, 2009).

¹⁶⁶ See Pew Ctr. on Global Climate Change, *supra* note 7.

¹⁶⁷ See *id.*

half of the California standard.¹⁶⁸ California chose a higher carbon monoxide standard because at the time the automotive technology did not exist to meet both a lower carbon monoxide standard and the nitrogen oxide standard.¹⁶⁹

Nevertheless, California's leadership on mobile source emissions regulation has received at least a strong nudge—if not outright coercive force—from the federal government. California could not exert mobile source leadership absent federal law given the CAA's preemption provision. But my claim is broader than simply recognizing that California gets its authority to lead from the federal government. Instead, federal law has influenced California's leadership in two separate ways. First, the force of the federal NAAQS/SIP requirements, combined with citizen suit provisions, has sometimes prodded an otherwise reluctant state into acting. This prodding began from the outset in the early 1970s. Second, the special regulatory exceptionalism bestowed by the CAA on California may result in even greater environmental leadership from the state than would result absent the CAA exemption provision. In other words, if all fifty states were permitted independently to regulate mobile source emissions, it is unclear whether California would have regulated as vigorously and as innovatively as it has.

The influence of federal law on state leadership is not limited, however, to mobile source standards. Federal law has also exerted significant influence on the state's legislation to regulate mobile source greenhouse gas emissions. Twenty years ago, Elliott, Ackerman, and Millian traced the influence of state regulation of mobile source emissions on the adoption of national standards, concluding that “[w]hen faced with the threat of inconsistent and increasingly rigorous states laws, [the automotive companies used] their superior organizational capacities in Washington to preempt or control the environmentalists’ legislative victories at the state level.”¹⁷⁰ In extending Elliot et al.’s thesis, J.R. DeShazo and Jody Freeman have argued that the flurry of recent state legislation on climate change increases the likelihood that Congress will pass climate change legislation and that the form of the legislation will also be influenced by state activity.¹⁷¹ In short, state legislative activity has an important influence on federal environmental policymaking. My claim is the mirror image: federal law has played an important role in the development of state mobile source standards. Rather than weakening the standards, the scheme of iterative federalism has actually strengthened standards, as described below.

¹⁶⁸ See *supra* Table 2.

¹⁶⁹ Telephone Interview with Tom Cackette, *supra* note 90. The state faced a similar problem in the 1960s when CARB discovered that emissions controls for carbon dioxide and hydrocarbons increased nitrogen dioxide emissions. See KRIER & URSIN, *supra* note 56, at 192 n.g.

¹⁷⁰ Elliott, Ackerman & Millian, *supra* note 16, at 326.

¹⁷¹ See DeShazo & Freeman, *supra* note 9, at 1500.

a. Federal law as a lever and prod.—My first claim—that California’s leadership on mobile source regulation has been strengthened by the NAAQS and SIP requirements—is not generally acknowledged. Revesz, for example, argues that “federal nonattainment provisions [contained in the CAA] did not compel [California and the northeastern states that have adopted California standards] to take the lead in automobile emissions standards.”¹⁷² Yet California routinely states that it has taken various regulatory actions in order to demonstrate in its SIP that it has plans in place to meet federal air quality standards.¹⁷³ More tellingly, California has frequently dragged its feet in adopting SIP measures strong enough to make serious progress toward NAAQS compliance and has acted only with the threat of federal sanctions hanging over its head. The legal battles that ensued in the wake of the 1970 amendments to the CAA demonstrate this point rather emphatically.

Since California first started regulating automobiles, the control of mobile source emissions has been central to plans for cleaning up the various regions of the state with particularly bad air quality.¹⁷⁴ Initially, the focus was directed most intensely at the Los Angeles area, though the San Francisco Bay Area and the Central Valley have had pollution problems as well.¹⁷⁵ Thus, since the passage of the 1970 amendments to the CAA—which directed the EPA to establish NAAQS and required states to submit SIPs indicating how they would come into compliance with the NAAQS—

¹⁷² Revesz, *supra* note 40, at 592.

¹⁷³ See, e.g., CAL. AIR RES. BD., PRELIMINARY DRAFT STAFF REPORT, *supra* note 111, at 6 (“In order to meet the SIP commitments, staff considered the following strategies”); S. COAST AIR QUALITY MGMT. DIST., FINAL 2007 AIR QUALITY MANAGEMENT PLAN, at ES-2 (2007), available at http://www.aqmd.gov/aqmp/07aqmp/aqmp/Complete_Document.pdf (explaining that the plan is being prepared in order to promote compliance with the requirements set by the Clean Air Act).

¹⁷⁴ See KRIER & URSIN, *supra* note 56, at 209 (“By 1970, if not earlier, it was obvious to most observers that reduction of the air pollution problem in California to a manageable point was very heavily dependent on motor vehicle emission controls.”).

¹⁷⁵ The greater Los Angeles area has long held the dubious distinction of having the dirtiest air in the country. See Am. Lung Ass’n, State of the Air: 2008, <http://www.stateoftheair.org/2008/most-polluted/> (last visited July 1, 2009) (ranking Los Angeles air quality as worst in the country). In particular, the South Coast Air Basin, as the region is known, is designated a severe nonattainment zone for what is known as the eight-hour ozone standard. See EPA, Region 9: State Designations for the 1997 8-Hour Ozone Standard, <http://www.epa.gov/ozonedesignations/1997standards/regions/region9desig.htm> (last visited July 1, 2009). The basin is also out of attainment for particulate matter. EPA, 1997 PM_{2.5} Standards—Region 9 State Designations, <http://www.epa.gov/pmdesignations/1997standards/final/region9desig.htm> (last visited July 1, 2009). The San Francisco Bay Area also has had difficulty meeting the ozone standard and is now designated a marginal nonattainment area. See Bay Area Air Quality Mgmt. Dist., Ambient Air Quality Standards & Bay Area Attainment Status, http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm (last visited July 1, 2009) (“In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard.”). The state’s San Joaquin Valley is also designated a serious nonattainment area. Its air quality district has petitioned the EPA, through CARB, to reclassify the basin as an extreme nonattainment area. San Joaquin Valley Air Pollution Control Dist., Ambient Air Quality Standards & Valley Attainment Status, <http://www.valleyair.org/aqinfo/attainment.htm> (last visited July 1, 2009).

mobile source emissions controls have been a central component of the state's SIPs.

The EPA rejected the state's first SIP for the Los Angeles area, submitted in January 1972, because it failed to include plans sufficient to attain the NAAQS for ozone¹⁷⁶—called oxidants in the early iteration of the NAAQS.¹⁷⁷ The difficulty California faced in developing such an SIP was extraordinary: the NAAQS for oxidants adopted in 1970 required the state to reduce violations of the standard from 241 days to just one per year by 1975.¹⁷⁸ Moreover, the state faced serious external pressure as well: the EPA was sued by the Natural Resources Defense Council for granting California extensions to submit a transportation controls portion of the SIP without legal authority; it was also sued successfully by the cities of Riverside and San Bernardino for failing to promulgate air quality regulations.¹⁷⁹

The result of the insufficient SIP combined with the deadline lawsuits was that the EPA drafted a transportation controls plan for Los Angeles that recommended, among other things, gas rationing of approximately eighty-six percent for the months of May through October in order to get the basin in compliance with the ozone standard.¹⁸⁰ Needless to say, this plan resulted in a political brouhaha that led to its withdrawal. In round two, the EPA's plan was less direct about the need for a reduction in gasoline usage; but reading between the lines, with new and more sophisticated modeling the plan showed that in order for Los Angeles to meet the NAAQS, the city would have to ban gasoline driving altogether.¹⁸¹ The second plan was also withdrawn.

Through this process of EPA-written plans for Los Angeles, the state could have submitted its own plan. It failed to do so. Moreover, state and local officials played virtually no part in the process, telling EPA officials that the “problems [of coming into compliance and imposing transportation controls] were of such an overwhelming nature that initiatives would have to come—if at all—from the Federal Government.”¹⁸² But the state's resistance was not merely passive. Instead, after EPA issuance of a third plan setting forth transportation controls, California refused to enact regulations establishing, for example, an inspection and maintenance program for au-

¹⁷⁶ KRIER & URSIN, *supra* note 56, at 216.

¹⁷⁷ See ROBERT J. MARTINEAU, P. DAVID MARTINEAU, JR. & DAVID P. NOVELLO, *THE CLEAN AIR ACT HANDBOOK* 23 (2004).

¹⁷⁸ KRIER & URSIN, *supra* note 56, at 208. The 241 days of violations were of a less stringent California standard. See *id.*

¹⁷⁹ NRDC v. EPA, 475 F.2d 968 (D.C. Cir. 1973); City of Riverside v. Ruckelshaus, 4 Env't Rep. Cas. (BNA) 1728 (C.D. Cal. 1972).

¹⁸⁰ The gas rationing proposal and ensuing political chaos are recounted extensively in KRIER & URSIN, *supra* note 56, at 219–23.

¹⁸¹ *Id.* at 225–26.

¹⁸² Memorandum from J. Revis, Inst. of Pub. Admin., to G. Hawthorn, EPA 21 (Apr. 5, 1972), quoted in KRIER & URSIN, *supra* note 56, at 219.

tomobile emissions.¹⁸³ The state, CARB, and various other state and local agencies turned to the courts as an alternative, suing the EPA on the grounds that the CAA did not authorize the EPA to impose sanctions on the state for its failure to implement proposed portions of the EPA's plan to bring the state into compliance.¹⁸⁴ After an astonishing Ninth Circuit victory for the state, the court's decision was ultimately vacated by the Supreme Court as moot after the EPA withdrew a number of the required measures.¹⁸⁵ Subsequent legal developments along with amendments to the CAA clarifying the EPA's authority have invalidated the Ninth Circuit's position, but the lawsuit demonstrates that the state has not always exhibited leadership consistent with the green reputation it has earned.

California's difficulty in meeting the oxidant NAAQS—shared by New York and the District of Columbia, among others—led Congress in 1977 to extend the statutory deadlines for nonattainment areas to come into compliance to 1982.¹⁸⁶ However, California's recalcitrance did not end with the vacated lawsuit or the extension of the deadlines. Instead, for years in the 1980s and 1990s, several of the state's environmental groups battled with CARB and the South Coast Air Quality Management District (SCAQMD) to require the state to submit a SIP adequate to have SCAQMD come into compliance with the NAAQS for ozone and carbon monoxide.¹⁸⁷ After the 1977 amendments extended the deadline, the state filed an SIP requesting an extension from 1982 to 1987. The EPA denied the SIP because the state failed to include within it an auto maintenance and inspection program—so called “I&M programs.”¹⁸⁸ In 1982, California revised the SIP extensively and resubmitted it to the EPA, which again denied it on grounds that the schedule for implementation for the I&M program was inadequate. California then revised the SIP again, and this time the EPA approved it.¹⁸⁹

Environmental groups challenged the approval because the SIP contained no provisions demonstrating that the South Coast district would actually come into compliance with the NAAQS within the statutory deadlines. The Ninth Circuit held in favor of the environmental plaintiffs

¹⁸³ *Brown v. EPA*, 521 F.2d 827, 831 (9th Cir. 1975), *vacated*, 431 U.S. 99 (1977).

¹⁸⁴ *Id.* at 831. California's position also included a constitutional challenge under the Commerce Clause to the federal government's authority to sanction state officials for failing to implement federal regulations. The Ninth Circuit held that the CAA “does not authorize the imposition of sanctions for any failure of the State of California to comply with the directions contained in” various federal regulations. *Id.*

¹⁸⁵ *EPA v. Brown*, 431 U.S. 99 (1977).

¹⁸⁶ Clean Air Act Amendments of 1977, Pub. L. No. 95-95, 91 Stat. 685, *amended by* Safe Drinking Water Amendments of 1977, Pub. L. No. 95-190, § 14(a)(4), 91 Stat. 1393, 1399.

¹⁸⁷ The history of these battles is recounted in *Coalition for Clean Air v. Southern California Edison Co.*, 971 F.2d 219, 221–25 (9th Cir. 1992), and *Southern California Association of Governments v. Coalition for Clean Air*, 507 U.S. 950 (1993).

¹⁸⁸ *Coal. for Clean Air*, 971 F.2d at 222.

¹⁸⁹ *Id.*

and ordered the EPA to disapprove the SIP.¹⁹⁰ The EPA and plaintiffs then settled, with the EPA agreeing to prepare federal implementation plans (FIPs) for ozone and carbon monoxide for the South Coast Air Basin.¹⁹¹ When the EPA failed to do so, plaintiffs sued successfully again, winning on their claim that new amendments to the CAA adopted in 1990 extending the attainment deadlines did not absolve the EPA of its obligation to prepare an FIP.¹⁹²

The EPA then prepared to file an FIP and was on the verge of doing so when CARB submitted a new and comprehensive SIP in 1994. EPA approved the SIP in 1997—the first approved SIP for ozone for the South Coast district in the twenty-seven years since SIP requirements were first imposed. However, the legal battles were not over. The state's backsliding began again when the SCAQMD refused to implement a number of the measures contained in the SIP on the grounds that some measures were infeasible or inappropriate. The environmental plaintiffs from the earlier SIP litigation sued the district, winning an injunction that required the South Coast to implement the measures.¹⁹³ Ultimately, the parties settled, and CARB and the South Coast agreed to a new SIP.¹⁹⁴

The battles over South Coast air quality are by no means over. For example, the SCAQMD has engaged in a fairly public battle with CARB and the EPA over the degree to which CARB or the EPA should further tighten mobile source emissions controls—particularly for trucks, locomotives, and watercraft—in order to meet tighter federal standards for ozone and PM 2.5 (extremely tiny particulates). The district's most recent Air Quality Management Plan, which it has submitted to CARB as required in order to meet CAA nonattainment requirements, specifically urges CARB “to aggressively pursue reductions and strategies for on-road and off-road mobile sources”¹⁹⁵ These strategies include accelerating the introduction of zero-emissions vehicles and providing mandatory or incentive programs to get older and dirtier cars off the road.¹⁹⁶ The plan urges the EPA to take similar actions with respect to marine vessels and aircraft.¹⁹⁷

In recounting these long and tangled legal battles, I do not mean to suggest that the state would have exhibited no leadership on mobile source emissions controls absent federal law. To the contrary, the state moved first

¹⁹⁰ *Abramowitz v. EPA*, 832 F.2d 1071 (9th Cir. 1987).

¹⁹¹ *Coal. for Clean Air*, 971 F.2d at 223. For an analysis of the battle by states to prevent the EPA from imposing transportation controls, see Stewart, *supra* note 20.

¹⁹² *Coal. for Clean Air*, 971 F.2d at 221.

¹⁹³ *Coal. for Clean Air, Inc. v. S. Coast Air Quality Mgmt. Dist.*, No. CV97-6916-HLH, 1999 WL 33842864 (C.D. Cal. Aug. 27, 1999).

¹⁹⁴ S. Coast Air Quality Mgmt. Dist., Board Meeting Agenda No. 33 (Dec. 21, 2001), <http://www.aqmd.gov/hb/2001/011233a.html> (describing the settlement).

¹⁹⁵ S. COAST AIR QUALITY MGMT. DIST., *supra* note 173, at ES-17.

¹⁹⁶ *Id.* at ES-14.

¹⁹⁷ *Id.* at ES-17.

in enacting emissions controls in 1966 and has continued to exhibit impressive leadership in crafting ambitious, creative regulatory programs to reduce emissions dramatically. CARB and SCAQMD have achieved extraordinary pollution reductions in the face of enormous population increases in the South Coast basin. And the state—including the SCAQMD—has done so while facing a stark reality that the standards set by the federal government under the CAA have proven extraordinarily difficult to meet.

I do wish to suggest, however, that California's regulatory leadership has occurred in the shadow of a federal law that has mandated drastic reductions in air pollution, with a federal agency that has stepped in when California has failed to meet its statutory obligations, and with serious pressure from environmental groups possessed with citizen suit standing under the CAA to force the state into compliance.¹⁹⁸ Given this history, it is difficult to view California's actions on mobile source regulation as independent of federal law.

2. *Singling Out California as the Superregulator.*—Not only has the force of federal law influenced California's role as a mobile source emission leader, but California's special status under the CAA—under which it is the only state singled out for mobile source regulatory leadership—may also play an important role. By providing the state with its special status, the CAA may have helped produce more environmental innovation than would otherwise have occurred.¹⁹⁹

There are several reasons to believe that California's position as a superregulator may have enhanced regulatory innovation. First, giving the state unique authority may have the advantage of concentrating regulatory innovation in only one state and the federal government, as opposed to fifty states. For over a century, economists have developed theories and collected empirical evidence that the concentration of firms in one location produces "economies of scale external to the firm" known as "agglomeration economies."²⁰⁰ Geographic proximity, in other words, produces benefits that would not exist if firms were physically scattered. These benefits occur from, for example, the tremendous transfer of knowledge from one firm to another from frequent job changes, and professional and personal relationships among technology entrepreneurs, all facilitated by geographic proximity. The most compelling example of this phenomenon is Silicon Valley.²⁰¹ Ronald Gilson argues that the continuing success of Silicon Val-

¹⁹⁸ Cf. Robert H. Mnookin & Lewis Kornhauser, *Bargaining in the Shadow of the Law: The Case of Divorce*, 88 YALE L.J. 950 (1979).

¹⁹⁹ See Carlson, *supra* note 7, at 314–16.

²⁰⁰ Ronald J. Gilson, *The Legal Infrastructure of High Technology Industrial Districts: Silicon Valley, Route 128, and Covenants Not to Compete*, 74 N.Y.U. L. REV. 575, 580 (1999). Gilson's work on the advantages of Silicon Valley's location is partly based on work done in 1890 by Alfred Marshall. See *id.* (citing ALFRED MARSHALL, PRINCIPLES OF ECONOMICS 222–30 (8th ed. 1964) (1890)).

²⁰¹ *Id.* at 584.

ley is in part due to California's unwillingness to enforce covenants not to compete, which in turn, he argues, has added to the exchange of knowledge through job turnover in Silicon Valley.²⁰²

One can imagine that a similar geographic nexus could and may have already occurred by concentrating regulatory authority in California alone. Geographic concentration is not, of course, a foregone conclusion in regulating national products like automobiles, nor does a business involved in automotive emissions technology need to locate in the state doing the regulating.

Yet given that California leads the country in forcing the development of cleaner engines, there is some reason to believe that the state will also attract entrepreneurs seeking to develop the technology necessary to meet the state's mobile source regulations. Empirical evidence supports this premise. In Southern California alone, seventy-five advanced automobile technology centers exist that focus on improved automobile efficiency and design.²⁰³ Some of this concentration may have occurred as a result of California's regulatory leadership in forcing the development of clean vehicles through its privileged CAA status: the state may have become something of a magnet for the clean vehicle community. Indeed, in addition to the seventy-five Southern California automotive technology companies, California also houses a number of companies devoted to the development of hydrogen-powered vehicles.²⁰⁴ If the geographic concentration of fuel efficiency technology produces the sorts of external benefits that occurred in Silicon Valley, California's regulatory activity may be accelerating technological innovation even beyond what would occur if California adopted the same regulations but other states could regulate as well. Geographic concentration of mobile source technology development may be aided by the fact that California finances a significant amount of research through private contractors, including universities and research labs.²⁰⁵ By bestowing leadership responsibilities in California alone, Congress may facilitate the centralization and coordination of research on mobile sources in one state and the federal government as opposed to the more scattershot approach that would likely occur if numerous jurisdictions could regulate. This research can in turn be used by mobile source technology firms so that, once again, knowledge transfer may be facilitated by geographic proximity through professional and personal relationships, and job turnover. This

²⁰² See *id.* at 607–09.

²⁰³ See Allan C. Lloyd, Chairman, Cal. Air Res. Bd., Presentation to World Hydrogen Energy Conference on the Economic Benefits of ZEV Program (June 13, 2002) (on file with author).

²⁰⁴ See *id.*

²⁰⁵ For a list of research projects CARB has solicited over the past two decades, see Cal. Air Res. Bd., Air Pollution Research Reports/Studies, <http://www.arb.ca.gov/research/apr/past/mobile.htm#Zero%20Emission%20Vehicles> (last visited July 1, 2009). Topics include diesel emissions, emission monitoring, zero-emissions vehicles, and off-road vehicles. *Id.*

knowledge transfer may also benefit from the legal framework Gilson identified.

An ancillary effect of geographic concentration is the potential for more ambitious environmental regulation. If innovative automotive design and engine technology firms spring up in California in order to respond to regulatory mandates requiring, for example, tougher emissions standards, those firms become a political constituency for ongoing environmental regulation. Similar behavior has occurred with strict gasoline standards, something ARCO Gasoline has favored because of its ownership of an advanced refinery in California.²⁰⁶ Hazardous waste clean-up firms—which developed in response to federal superfund legislation—the ethanol industry, and the high-sulfur coal industry have also lobbied for stronger regulation at times.²⁰⁷ The presence of these firms may help to counter the influence of opponents of strong regulation, such as auto manufacturers.

Concentrating regulatory power in California may also spur the creation of bureaucratic expertise and innovation. California's air quality agencies have gradually developed impressive staffing capabilities with expertise and a commitment to environmental leadership. Its mobile source staff is particularly well regarded, described by New York's environmental commissioner as "more competently staffed than the EPA."²⁰⁸ Such skill and commitment have been used to design regulatory schemes to push industry to meet tougher standards.²⁰⁹ Though the agency staff's expertise might develop absent the special exemption status, the special congressional mandate in the CAA ensures that California will develop such expertise.

Furthermore, environmental interest groups can use California's special status as a mechanism to provoke the state legislature and the CARB to take strong leadership on air quality issues. The state's landmark legislation regulating greenhouse gas emissions from automobiles provides a nice illustration. If California were only one of fifty states to possess the power to regulate greenhouse gas emissions, the state might decide to regulate greenhouse gas emissions without the special status. However, the argument in favor of greenhouse gas emissions regulation becomes much stronger when the state is the *only* state to possess such authority—if California doesn't act, no one else will, particularly in the face of federal inaction. The greenhouse gas bill passed the California Assembly and Senate with only a thin margin and with fierce opposition from auto manufactur-

²⁰⁶ See Matthew L. Wald, *California's Pied Piper of Clean Air*, N.Y. TIMES, Sept. 13, 1992, at F1.

²⁰⁷ See Revesz, *supra* note 40, at 574–76.

²⁰⁸ Wald, *supra* note 206.

²⁰⁹ See John P. Dwyer, *The Practice of Federalism Under the Clean Air Act*, 54 MD. L. REV. 1183, 1224 (1995) (“[F]ederal funding and federal environmental legislation have promoted the development and growth of state environmental bureaucracies and expertise. . . . As they grow in size and sophistication, the state agencies in turn become centers of environmental policy-making, which set their own goals and priorities.”).

ers.²¹⁰ Without the pressing sense that only California could act, the bill might have failed.

Finally, as with federal law and the OTC, California's exercise of successful environmental leadership—aided and abetted by federal law—may reinforce and strengthen voter preferences for strong environmental leadership. The state touts its environmental leadership repeatedly and can point to examples of its success, especially with its fight for cleaner air. The accomplishments of state regulators in Southern California are significant, especially to anyone who experienced the region's air quality in the 1960s and 1970s. Successful environmental initiatives reinforce preferences in favor of future environmental leadership, and the role of federal law in bolstering California's leadership cannot be understated.²¹¹

3. *Empirical Evidence About State Policymaking.*—Central to Revesz's preference for decentralized environmental policymaking is the idea that a working competitive market exists among states in their desire for mobile capital. If such competition exists, states will—according to a model developed by Oates and Schwab upon which Revesz bases much of his argument—set tax rates and environmental standards at socially optimal levels.²¹² Oates and Schwab explain the bottom line of their predictive model as follows: “For instances of relatively homogenous communities *where the benefits and costs of public programs are clearly understood . . .* the analysis indicates that outcomes will tend to be roughly efficient.”²¹³

As Peter Swire persuasively argues in a cogent analysis of Revesz's central thesis, the Oates and Schwab model rests on an “assumption of perfect measurement.”²¹⁴ Swire explains that “[c]ompetition is generally efficient in the Oates and Schwab world because state officials know just how far to raise or lower environmental standards to maximize social welfare.”²¹⁵ If state policymakers rely on invalid assumptions, “even the best public officials will make mistakes. They may relax environmental laws in situations where stronger laws would increase social welfare. Conversely, they may strengthen environmental laws where the resulting costs to the economy are greater than the benefits.”²¹⁶

²¹⁰ See Pew Ctr. on Global Climate Change, State and Local Net Greenhouse Gas Emissions Reduction Programs, <http://www.pewclimate.org/states.cfm?ID=51> (last visited July 1, 2009).

²¹¹ Cf. Rabe, Román & Dobelis, *supra* note 11, at 19 (suggesting that state climate change policy has turned some states into “climate change ‘players,’” who then “publicize themselves as environmentally virtuous and thus improve their reputations with some potentially important audiences” and turn climate change leadership into a “self-reinforcing cycle”). Rabe, Román, and Dobelis offer an interesting account of why states may compete to lead on climate change legislation.

²¹² See Revesz, *supra* note 17, at 539.

²¹³ Oates & Schwab, *supra* note 32, at 350 (emphasis added).

²¹⁴ Swire, *supra* note 21, at 96.

²¹⁵ *Id.*

²¹⁶ *Id.*

California's experience with ZEV and LEV vehicles provides compelling evidence of the mistaken assumptions on which state environmental decisions are made and the way in which policymakers often fail to understand the costs and benefits of their decisions. In the case of ZEV vehicles, state officials badly—and repeatedly—overestimated the likelihood that auto manufacturers could develop zero-emissions vehicles in a cost-effective fashion. They underestimated the costs and overestimated the benefits. The state has had to roll back its ZEV requirements several times after auto manufacturers invested huge sums of money—\$6 billion by GM alone—yet failed to meet the state's mandate.²¹⁷ Yet the state has erred in the other direction as well. Regulators did not believe auto manufacturers could meet LEV program requirements with conventional gas engines and existing catalytic technology. Not only did auto manufacturers prove the state's air board wrong, they also achieved more dramatic improvements on a shorter timeframe than regulators believed possible.²¹⁸

Neither example suggests that Revesz is wrong in his preference for local decisionmaking. Nor do they counsel in favor of decentralization. The state did not “race to the bottom” when faced with its regulatory decision about LEVs. In this situation—a shift away from conventional catalytic technology and toward alternative fuel engines—the costs appeared high and the benefits uncertain. On the other hand, California had pressure from federal law to meet the NAAQS and may have pushed toward stronger regulation due to that legal pressure.

With respect to ZEV vehicles, the state followed a regulatory strategy that appears to have cost far more and produced far fewer environmental benefits than predicted. But the California iterative federalism scheme seems to guard against the worst excesses of an entirely national regulatory approach and against an entirely decentralized one. California experimented with both LEVs and ZEVs and provided an important and valuable experiential base for the federal government. The federal government then took the best of California's regulatory efforts—the LEV program—and rejected the worst—the ZEV program. Indeed, it is difficult to imagine that the federal government would have taken the risks that California took given the power of the auto industry in Congress.

4. *California and Climate Change Leadership.*—Federal law has played a role in helping to create, or perhaps reinforce, the conditions for mobile source emissions leadership in California. It has facilitated regulatory expertise in the state, provided California with incentives and requirements to get regulators to move farther faster, allowed for the dispersion of California's emissions standards across other states, spawned an industry of automotive innovation concentrated geographically in California, and rein-

²¹⁷ See *supra* notes 119–22 and accompanying text.

²¹⁸ See *supra* notes 115–17 and accompanying text.

forced and strengthened voter support for environmental leadership. Consequently, California was better positioned to take the lead in enacting the first significant state climate change initiative, AB 1493, in 2003.

However, federal law by no means deserves all the credit. Indeed, California's leadership on climate change should make that clear. Although the state gets its authority to enact mobile source legislation from federal law, California has received no additional support from the federal government. In fact, to date the EPA has denied the state's waiver to implement its greenhouse gas emissions regulations. Moreover, the state has subsequently enacted far-reaching climate change legislation. California has an extremely ambitious greenhouse gas emissions cap that will require it to do far more than implement the AB 1493 regulations. The state is leading the way in developing a low-carbon fuel standard²¹⁹ and is requiring its utilities to ensure that all sources of electricity, including out-of-state sources, meet a greenhouse gas emissions standard.²²⁰ Furthermore, this climate change leadership has taken place on an issue—global warming—that the state has an economic incentive to ignore. Although California already emits significantly less carbon per capita than most of the rest of the U.S.,²²¹ it cannot solve the problem alone. And yet the state is attempting to contribute to the solution of a problem that will affect other regions of the world much more dramatically than California—although the state itself will certainly experience deleterious effects as the result of global warming as well.²²²

The question of why California has chosen to legislate on climate change is a complex one that I do not attempt to answer here.²²³ I mean to suggest only that federal law has played a role in bolstering the state's environmental leadership and has heavily influenced the particular manner in which the state has chosen to regulate mobile source greenhouse gas emissions.

5. *Iterative Federalism and National Product Markets.*—Critics of the nationalization of environmental regulation nevertheless typically support federal law in the regulation of products like automobiles, for which there is a national market and for which efficiencies of scale may make a difference in production costs.²²⁴ The legislative history of the CAA pre-

²¹⁹ Cal. Exec. Order No. S-01-07 (Jan. 18, 2007), available at <http://gov.ca.gov/executive-order/5172/>.

²²⁰ CAL. PUB. UTIL. CODE § 8340 (West 2007).

²²¹ Steven Mufson, *In Energy Conservation, Calif. Sees Light*, WASH. POST, Feb. 17, 2007, at A01.

²²² For an analysis of the effects of climate change on California, see DAN CAYAN ET AL., CAL. CLIMATE CHANGE CTR., SCENARIOS OF CLIMATE CHANGE IN CALIFORNIA: AN OVERVIEW (2006), available at <http://www.energy.ca.gov/2005publications/CEC-500-2005-186/CEC-500-2005-186-SF.PDF>.

²²³ For theories about why some states have enacted climate change legislation, see Engel & Salecka, *supra* note 9, at 190–94; Rabe, Román & Dobelis, *supra* note 11, at 12–41.

²²⁴ See, e.g., Revesz, *supra* note 17, at 544 (“Uniformity [of standards for products] can be desirable for products with important economies of scale in production. In such cases, disparate regulation would

emption provision indicates that Congress was swayed by the position of the Automobile Manufacturers Association that multiple state standards would be disastrous for the industry.²²⁵

The economic argument in favor of national preemptive legislation for product markets is that states can engage in cost externalization without being forced to internalize within jurisdictional boundaries the costs of their regulatory activity.²²⁶ This concept is particularly true, preemption advocates suggest, where manufacturing firms reside outside of the regulating jurisdiction. As Rick Hills has observed, “Cars are not manufactured in California, so California’s politicians can safely urge tough standards, knowing that the costs will be borne by out-of-state businesses, their employees and their shareholders.”²²⁷ In addition, national product manufacturers enjoy economies of scale in producing the same products for consumers in all fifty states.²²⁸

The arguments in favor of federal preemption for national product markets seem to have great sway with Congress and among business groups.²²⁹ Yet there are persuasive reasons to at least doubt the most extreme versions of those views: that California can externalize all of the costs of its regulations or that all fifty states will simultaneously regulate auto emissions. Jonathan Macey and Henry Butler argue that California in fact internalizes many of the costs of emissions regulations through higher car prices,²³⁰ a position bolstered by lobbying claims made by auto manufacturers whenever stricter regulations are proposed.²³¹ Whether consumers pay the total cost of new emissions standards technology is a difficult question, but the best estimates hold that emissions control technology as of 2003

break up the national market for the product and be costly in terms of foregone economies of scale.”); see also Murray L. Weidenbaum, *The New Regulation and the American Common Market*, in REGULATION, FEDERALISM, AND INTERSTATE COMMERCE 83, 86 (A. Dan Tarlock ed., 1981) (discussing problems with “the advent of the new breed of regulators [that have] increased the possibility of being caught in a cross fire of regulations promulgated by different levels of government agencies”); Solveig Singleton, *Federalism Heresies for the Internet Age*, *Competitive Enter. Inst.*, Jan. 29, 2004, <http://www.cei.org/gencon/016,03838.cfm> (“The case for the link between thriving markets and uniform law is stronger than federalism scholars allow.”).

²²⁵ See KRIER & URSIN, *supra* note 56, at 181–82 (recounting history).

²²⁶ See Elliott, Ackerman & Millian, *supra* note 16, at 329.

²²⁷ Hills, *supra* note 25, at 23 n.74.

²²⁸ See Revesz, *supra* note 17, at 544.

²²⁹ Hills catalogues some of the areas in which Congress has preempted state standards, including pension regulation, electronic identity, predatory lending, tort law, and oil spill liability. See Hills, *supra* note 25, at 19.

²³⁰ See BUTLER & MACEY, *supra* note 21, at 21–22.

²³¹ Most recently, auto manufacturers have argued that California consumers will pay \$3,000 more per vehicle as a result of the state’s greenhouse gas emissions standards, an amount that will be only partially offset by lower fuel costs. See N.C. Climate Action Plan Advisory Group, Briefing: State Clean Car (“Pavley”) Compliance Costs (Apr. 10, 2007), <http://www.ncclimatechange.us/ewebeditpro/items/O120F11585.pdf>.

adds about \$1,000 to the sticker price of a car.²³² Although not all of these costs are passed onto consumers immediately following regulatory change, Robert Crandall estimates that two years after the adoption of new emissions standards approximately two-thirds of the cost of compliance is passed on to the consumer.²³³

Moreover, the argument that industry will face fifty separate emissions standards absent federal legislation seems overstated at best: only a few states in the country have market shares large enough to impose separate regulations with confidence that manufacturers will continue to serve their markets. California, Texas, and New York may be large enough to regulate, but Delaware and Montana are not.

Nevertheless, national preemption has resonated even with proponents of strong environmental protection like Edmund Muskie, who supported the initial preemption legislation in 1967.²³⁴ The scheme of iterative federalism embodied in the Clean Air Act seems to recognize the merits of each side. By limiting the number of emissions regulators to two, the scheme reflects the concern that multiple sets of standards cause auto manufacturers difficulty and may reduce manufacturing economies of scale. By allowing California to regulate, Congress recognized the localized problems the state faced and the strength of the state's commitment to environmental protection. Congress also seemed to recognize the merits of state policy experimentation, singling out California to regulate and offering a particularly interesting means to achieve most of what preemption proponents favor while allowing some of the benefits of devolution. The preemption provision manages to endorse the industry position while retaining some of the benefits of state devolution in a quite creative way, granting the state with the largest market share of automobiles in the country the ability to set more stringent standards and thus serve as a single laboratory of democracy.²³⁵

C. Cap-and-Trade Schemes

While California was the first mover in setting automobile standards, it is not necessarily always the case that states act first in iterative federalism schemes. With respect to cap-and-trade schemes, Congress acted first. In doing so, it set the stage for four subsequent schemes, including the Re-

²³² See DANIEL SPERLING ET AL., ANALYSIS OF AUTO INDUSTRY AND CONSUMER RESPONSE TO REGULATIONS AND TECHNOLOGICAL CHANGE, AND CUSTOMIZATION OF CONSUMER RESPONSE MODELS IN SUPPORT OF AB 1493 RULEMAKING 10 (2004), available at http://pubs.its.ucdavis.edu/download_pdf.php?id=179.

²³³ *Id.* at 14.

²³⁴ See KRIER & URSIN, *supra* note 56, at 181.

²³⁵ The automobile industry nevertheless fought the California preemption provision vigorously and succeeded in getting Representative John Dingell of Michigan to remove the exception for California from a House committee version of the 1967 amendments to the Clean Air Act. After concerted and united efforts by the California congressional delegation, the California provision was restored on the floor of the House. See *id.* at 181–82.

gional Greenhouse Gas Initiative. RGGI establishes the first cap-and-trade program for carbon dioxide in the United States.²³⁶ RGGI has ten member states from the Northeast and mid-Atlantic regions and commits those states to capping carbon dioxide emissions from power plants at current levels from 2009 to 2015, followed by gradual declines in emissions so that by 2019 emissions will be ten percent lower than 2009 emissions.²³⁷

RGGI is not in any way supported or encouraged by federal law. It would be a mistake, however, to view RGGI as regulatory action adopted independent of the federal government or occurring in a regulatory vacuum. RGGI would not have occurred, I argue, but for federal law. It is the fifth iteration of domestic cap-and-trade programs, begun with the establishment of the Acid Rain Program under the CAA amendments of 1990.²³⁸ Each of the iterations has involved northeastern states, and with the exception of RGGI, has been aimed at tackling cross-border pollution problems where the northeastern states are the downwind recipients of pollution generated in other regions of the country.²³⁹ Furthermore, each of the iterations other than RGGI is a direct result of the federal CAA. Because RGGI builds on its predecessors, the parameters of its cap-and-trade program look remarkably similar to prior iterations.

The first cap-and-trade scheme was the key component of the federal Acid Rain Program to reduce sulfur dioxide.²⁴⁰ The acid rain cap-and-trade program was followed by two versions of a cap-and-trade program for ozone adopted by a regional body comprised of many of RGGI's member states called the Ozone Transport Commission (OTC). In turn, the OTC cap-and-trade programs were followed by the federal government's expansion of the OTC ozone cap-and-trade program to a much broader array of states. Currently, the OTC program has been expanded to include additional pollutants under the Clean Air Interstate Rule, although the CAIR, as it is known, was recently struck down by the D.C. Circuit and its legal future is uncertain.²⁴¹ RGGI's cap-and-trade program for carbon dioxide is now the most recent iteration.

²³⁶ Pew Ctr. on Global Climate Change, Regional Greenhouse Gas Initiative (RGGI), http://www.pewclimate.org/what_s_being_done/in_the_states/rggi/ (last visited July 1, 2009).

²³⁷ RGGI, INC., REGIONAL GREENHOUSE GAS INITIATIVE EXECUTIVE SUMMARY 1 (2009), http://www.rggi.org/docs/RGGI_Executive%20Summary_4.22.09.pdf. The ten member states include Connecticut, Delaware, Maryland, Massachusetts, Maine, New Jersey, New Hampshire, New York, Rhode Island, and Vermont. *Id.*

²³⁸ 42 U.S.C. §§ 7651–61f (2006).

²³⁹ There is general consensus that the federal government has a strong role to play in controlling interstate externalities, though some are quite critical of the manner in which the Clean Air Act has addressed interstate air pollution. *See, e.g.*, Richard L. Revesz, *Federalism and Interstate Environmental Externalities*, 144 U. PA. L. REV. 2341, 2344 (1996) (“[T]he Clean Air Act . . . has been unsuccessful at forcing the internalization of interstate externalities. Its core provisions cannot be justified by the need to control interstate externalities, and may have exacerbated the problem.”).

²⁴⁰ 42 U.S.C. §§ 7651–61f.

²⁴¹ *North Carolina v. EPA*, 531 F.3d 896, 907–08 (D.C. Cir. 2008).

1. *Iteration 1: The Acid Rain Program.*—The first cap-and-trade iteration began with the adoption of the Acid Rain Program, contained in Title IV of the CAA.²⁴² Title IV's provisions strongly influenced subsequent iterations of cap-and-trade programs, including RGGI.²⁴³

Acid rain is caused principally by sulfur dioxide emissions from electric utilities, which interact with water and various chemical compounds in the atmosphere to create acidic compounds.²⁴⁴ These compounds combine with latent atmospheric humidity to produce acid rain, which damages ecosystems and forests, corrodes buildings and automobiles, and causes harm to human health through the creation of fine particulate matter.²⁴⁵

The regulation of acid rain proved to be politically difficult because of the discontinuity between state actors. The states that were principally responsible for emitting the compounds that create acid rain were not the states that experienced its deleterious effects. Utilities in the Midwest and Southeast generate much of the sulfur dioxide that ultimately causes acid rain pollution in the Northeast and in Canada. As early as 1980, Congress authorized the study of the problem when it enacted the National Acid Precipitation Act and established a task force to engage in a ten-year study of the problem.²⁴⁶ The harm caused by acid rain in the Northeast also led several states in the region to begin working together in the 1980s to find a solution to the problem.²⁴⁷ In addition to states proposing national

²⁴² For a sophisticated analysis of the Acid Rain Program, see A. DENNY ELLERMAN ET AL., *MARKETS FOR CLEAN AIR: THE U.S. ACID RAIN PROGRAM* (2000). For a detailed description of the program, see Jonathan Remy Nash & Richard L. Revesz, *Markets and Geography: Designing Marketable Permit Schemes to Control Local and Regional Pollutants*, 28 *ECOLOGY L.Q.* 569, 582–86 (2001).

²⁴³ Wisconsin adopted a sulfur dioxide program prior to the enactment of the federal Acid Rain Program that included a cap on overall emissions. At least one group of commentators suggests that the federal program was modeled after Wisconsin law. See Norman C. Anderson & Spencer Black, *The Past and Future of Environmental Protection Law in Wisconsin*, 2 *WIS. ENVTL. L.J.* 239, 255 (1995). However, Professors J.R. DeShazo and Jody Freeman posit, instead, that the Acid Rain Program was spurred at least in part by industry demands for consistent national regulation at a time when a number of states had adopted different methods of regulating sulfur dioxide. See DeShazo & Freeman, *supra* note 9, at 1514.

²⁴⁴ See Nash & Revesz, *supra* note 242, at 582–83; EPA, *What Is Acid Rain?*, <http://www.epa.gov/acidrain/what/index.html> (last visited July 2, 2009). Over two-thirds of sulfur dioxide is emitted by electric utilities. *Id.*

²⁴⁵ See EPA, *Effects of Acid Rain*, <http://www.epa.gov/acidrain/effects/index.html> (last visited July 2, 2009).

²⁴⁶ 42 U.S.C. § 7651(c)(f)(1)(C) (2006); see also Russell Korobkin, Note, *Sulfur Dioxide and the Constitution: Legal Doctrine and Responses to the Clean Air Act Amendments of 1990*, 13 *STAN. ENVTL. L.J.* 349, 353 (1994).

²⁴⁷ The northeastern states were by no means alone in their efforts to reduce sulfur dioxide emissions. Canada exerted significant pressure on the U.S. government throughout the 1980s, leading to the signing of a memorandum of intent between the two countries to attempt to combat the problem. See Marshall E. Wilcher, *The Acid Rain Debate in North America*, 6 *ENVIRONMENTALIST* 280, 289–90 (1986).

legislation²⁴⁸ and enacting their own legislation to regulate sulfur dioxide,²⁴⁹ several northeastern states and environmental groups sued the EPA to force the promulgation of NAAQS standards to deal with acid rain.²⁵⁰ Though the states' lawsuits were unsuccessful, Congress ultimately enacted the Acid Rain Program in 1990 after years of legal and political wrangling. The program was implemented in two stages in 1995 and 2000.

The program requires a ratcheting down of permissible pollution. Sulfur dioxide emissions were capped at 8.95 million tons by 2000, a cap that was gradually implemented beginning in 1995. The ultimate target, to be achieved by 2000, was to reduce annual emissions to approximately ten million tons below 1980 levels.²⁵¹ Electric utilities were granted sulfur dioxide allowances based largely on prior fuel use and emissions history.²⁵² Each allowance is equivalent to one ton of sulfur dioxide. Allowances are fully tradable to anyone who wishes to participate, and the market is national without geographic limitation.²⁵³ At the end of each year, sources must hold allowances equivalent to the amount of their emissions, which are carefully monitored and tracked by the EPA. Sources that reduce their emissions below their allowances may trade, sell, or bank the excess, while sources that exceed their emissions allowances are subject to hefty financial penalties.²⁵⁴

Virtually all analyses of the Acid Rain Program conclude that it has been a remarkable success both environmentally and economically. Emissions reductions during Phase I of the program surpassed the statutory guidelines, resulting in reductions of about four million tons below what would have been emitted absent the 1990 amendments.²⁵⁵ Surface water acidity has declined in those areas of the country most severely affected by acid deposition.²⁵⁶ Finally, emissions reductions have been achieved at sub-

²⁴⁸ See Robert Hanley, *Turning Off Acid Rain at Its Source*, N.Y. TIMES, Dec. 11, 1983, at E9. In a harbinger of things to come with the RGGI group, Pennsylvania parted ways with other northeastern states by resisting large emissions cuts because of the large emissions of its in-state power plants. *Id.*

²⁴⁹ See DeShazo & Freeman, *supra* note 9, at 1514–15 (describing state legislation to regulate sulfur dioxide).

²⁵⁰ See *Envtl. Def. Fund v. Thomas*, 870 F.2d 892 (2d Cir. 1989); *New York v. EPA*, 852 F.2d 574 (D.C. Cir. 1988).

²⁵¹ See ELLERMAN ET AL., *supra* note 242, at 7; EPA, CAP AND TRADE: ACID RAIN PROGRAM BASICS (n.d.), available at <http://www.epa.gov/airmarkets/cap-trade/docs/arbasics.pdf>.

²⁵² ELLERMAN ET AL., *supra* note 242, at 7.

²⁵³ Nash & Revesz, *supra* note 242, at 586.

²⁵⁴ ELLERMAN ET AL., *supra* note 242, at 7.

²⁵⁵ See *id.* at 111; ENVTL. DEF., FROM OBSTACLE TO OPPORTUNITY: HOW ACID RAIN EMISSIONS TRADING IS DELIVERING CLEANER AIR 1 (2000), available at http://www.edf.org/documents/645_SO2.pdf.

²⁵⁶ Jeffrey S. Kahl et al., *Have U.S. Surface Waters Responded to the 1990 Clean Air Act Amendments?*, 38 ENVTL. SCI. & TECH. 484A, 486A (2004). Although some observers are concerned that the Acid Rain Program may create acid rain “hot spots,” to date such concerns appear largely unsupported. See Nash & Revesz, *supra* note 242, at 587; see also Dallas Burtraw & Erin Mansur, *The Effects of*

stantial cost savings of hundreds of millions of dollars annually when compared with traditional regulatory schemes that regulate individual pollution sources and prescribe the technology for meeting those limits.²⁵⁷

2. *Iterations 2 and 3: The Ozone Transport Commission.*—Acid rain is not, of course, the only cross-border pollution problem. Ozone pollution, caused by the interaction of sunlight and heat with nitrogen oxides and volatile organic compounds (VOCs), creates numerous public health problems and damages crops, trees, and other foliage.²⁵⁸ Though many areas of the country plagued by high levels of ozone pollution have made enormous reductions, these areas have struggled to meet the national standards for ozone.²⁵⁹ During the 1980s, many northeastern states were among those having persistent difficulty meeting national ozone standards. This difficulty was partly attributed to the movement of ozone pollution from upwind states to downwind states.²⁶⁰

The OTC was enacted as part of the CAA amendments of 1990. It was designed to encourage northeastern states—Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont—and the District of Columbia and surrounding communities²⁶¹ to combat ozone pollution on a regional basis.²⁶² As chronicled above, these same states had already started to work cooperatively in the 1980s to coordinate efforts to combat acid rain. By the time the OTC was established, many environmental officials from these states already had cooperative working relationships.²⁶³

The legislation establishing the OTC is remarkable for its brevity. OTC states included within the transport region must: (a) comply with ve-

Trading and Banking in the SO₂ Allowance Market 2 (Res. for the Future, Discussion Paper No. 99-25, 1999), available at <http://www.rff.org/rff/Documents/RFF-DP-99-25.pdf> (“[T]he geographic consequences are not consistent with the fears of program critics.”).

²⁵⁷ ELLERMAN ET AL., *supra* note 242, at 292.

²⁵⁸ See EPA, NO_x BUDGET TRADING PROGRAM: 2005 PROGRAM COMPLIANCE AND ENVIRONMENTAL RESULTS 5 (2006), available at <http://www.epa.gov/AIRMARKET/progress/docs/2005-NBP-Compliance-Report.pdf>.

²⁵⁹ For example, the South Coast Air Quality Management District, which includes the greater Los Angeles area, saw Stage 1 smog alerts (the most severe grade) decline from a high of 121 in 1977 to only one between 1999 and 2008. S. Coast Air Quality Mgmt. Dist., Historic Ozone Air Quality Trends, <http://www.aqmd.gov/smog/o3trend.html> (last visited July 2, 2009) [hereinafter S. Coast Air Quality Mgmt. Dist., Historic Ozone Air Quality Trends]. Yet, the South Coast district still exceeded the one-hour ozone standard thirty-five times in 2006 and exceeded the eight-hour standard eighty-six times. See S. Coast Air Quality Mgmt. Dist., Southland Smog Season on Par with Recent Years, <http://www.aqmd.gov/news1/2006/smogseason2006.html> (last visited July 2, 2009).

²⁶⁰ ANDREW AULISI ET AL., WORLD RES. INST., GREENHOUSE GAS EMISSIONS TRADING IN THE U.S. STATES: OBSERVATIONS AND LESSONS FROM THE OTC NO_x BUDGET PROGRAM 3 (2005), available at http://pdf.wri.org/nox_ghg.pdf.

²⁶¹ 42 U.S.C. § 7511c(a) (2006).

²⁶² See Ozone Transp. Comm’n, <http://www.otcair.org> (last visited July 2, 2009).

²⁶³ AULISI ET AL., *supra* note 260, at 9.

hicle inspection programs established in the CAA for large metropolitan regions, and (b) implement reasonably available control technology for all sources of volatile organic compounds (a precursor to the formation of ground level ozone).²⁶⁴ In addition, if any OTC state petitions the Commission, and a majority of the commissioners vote to proceed, the OTC may develop additional recommendations for the control of ozone. The EPA Administrator can then approve or disapprove the OTC recommendations.²⁶⁵ The EPA is also required to provide air quality monitoring and modeling in order to determine how sources in one area of the transport region contribute to ozone pollution in the so-called “nonattainment” areas of the region.²⁶⁶

The OTC thus establishes a formal, albeit skeletal, mechanism for the northeastern states to cooperate in the control of ozone. The mechanism also provides a role for the EPA in approving or disapproving any commission recommendations and requires EPA data generation on cross-boundary ozone pollution. Out of this barebones legislative structure, a quite remarkable regulatory scheme has developed.

In 1994, four years after its inception, the OTC entered into a memorandum of understanding (MOU) with all of the OTC states except Virginia—only part of which, the metropolitan area surrounding Washington, D.C., was included in the original legislation.²⁶⁷ Under the terms of the MOU, each of the states agreed to three separate phases to reduce oxides of nitrogen (NO_x), a precursor to the formation of ozone and an important contributor to the creation of fine particles (less than 2.5 microns).²⁶⁸ In Phase I, each state agreed to require major sources of nitrogen oxide to install reasonably available control technology to reduce such emissions. For Phases II and III, the OTC states agreed to develop regulations to reduce region-wide nitrogen oxide emissions by 1999 and 2003, respectively.²⁶⁹

In order to implement Phases II and III, the OTC states, working with the EPA and various stakeholder groups, began to develop a model rule in 1994. The rule—to be adopted by each state—would implement an “integrated interstate emissions trading program” to reduce emissions.²⁷⁰ The final model rule was published in 1996, and by 1998 nine states had adopted

²⁶⁴ 42 U.S.C. § 7511c(b)(1)(A)(B).

²⁶⁵ *Id.* § 7511c(c)(1)–(4).

²⁶⁶ *Id.* § 7511c(d).

²⁶⁷ Virginia had moved into ozone attainment and thus its participation was no longer necessary.

²⁶⁸ AULISI ET AL., *supra* note 260, at 3. Fine particle pollution is increasingly recognized as a major contributor to respiratory illness and premature death. *See* EPA, Particulate Matter (PM) Basics, <http://www.epa.gov/airscience/quick-finder/particulate-matter.htm> (last visited July 2, 2009).

²⁶⁹ OZONE TRANSP. COMM’N, EPA, NO_x BUDGET PROGRAM: 1999–2002 PROGRESS REPORT 4–5 (2003), available at <http://www.epa.gov/airmarkets/progsregs/nox/docs/otcreport.pdf>.

²⁷⁰ *Id.*

their own versions.²⁷¹ The emissions trading program—known as the OTC NO_x Budget Program—began in the spring of 1999.²⁷²

One of the most noteworthy features of the OTC NO_x Budget Program is that it operates with the coordination of the federal government, but with separate operating statutes or regulations from each of the participating states. As with the Acid Rain Program, each major source within the region—generally speaking, large electrical generating facilities and industrial facilities—is allocated a set number of “allowances,” which permits the source to generate one ton of nitrogen oxide per allowance.²⁷³ If a major source emits more nitrogen oxide than authorized under its particular set of allowances, it is fined for the excess emissions. The OTC established an overall emissions limit for the entire affected region and then allocated a number of allowances to each state. Apportionment was based on heat input of each source within a state.²⁷⁴ Each state was then allowed the flexibility to determine how the allowances would be allocated among the various sources within its boundaries. For example, several states set allocations for 1999 and held those allocations constant for three years, whereas others modified allocations periodically.²⁷⁵ New York and New Jersey included opt-in provisions within their regulations, allowing nonregulated sources to join the program and receive allowances.²⁷⁶ No other states allowed opt-ins. Four states—Massachusetts, New Hampshire, New Jersey, and New York—included set-aside provisions to provide allowances to particularly “green” sources, including renewable energy sources.²⁷⁷ Presumably, as with opt-in sources, these sources will emit less nitrogen oxide and can then sell excess allowances to sources that need more.

The EPA’s role in the emissions trading program is principally that of a manager and coordinator of data, a significant task in a trading program. The EPA, via a contractor, helped set up a data collection system and maintained accounts for all of the almost 1,200 sources in the region to monitor the sources for compliance.²⁷⁸

Even more important in the establishment of the NO_x Budget Trading Program, though, is the role played by federal law. A majority of the OTC states had been working cooperatively for a number of years in an attempt to attack regional ozone pollution through a group known as the Northeast

²⁷¹ Maine and Vermont did not participate because of the small number of major nitrogen oxide sources within their borders. AULISI ET AL., *supra* note 260, at 9.

²⁷² *Id.*

²⁷³ OZONE TRANSP. COMM’N, *supra* note 269, at 3.

²⁷⁴ AULISI ET AL., *supra* note 260, at 19.

²⁷⁵ *Id.*

²⁷⁶ *Id.* at 18. Typically those nonregulated sources that opt into such a program do so because they can easily decrease emissions below their allowance amount and then sell the excess.

²⁷⁷ *Id.*

²⁷⁸ *Id.* at 9–10; OZONE TRANSP. COMM’N, *supra* note 269, at 3.

States for Coordinated Air Use Management (NESCAUM).²⁷⁹ The group had some success prior to the establishment of the OTC, especially in jointly supporting state action to regulate summertime gasoline volatility.²⁸⁰ The EPA also worked to encourage regional cooperation through the establishment of a Regional Ozone Transport Group to combat northeastern ozone pollution.²⁸¹ Despite these activities, the northeast states sought federal legislation to authorize regional cooperation because “lack of support by EPA and lack of authority to institute needed regional controls (both in attainment and nonattainment areas) have prevented this effort from being more successful.”²⁸²

Though it is impossible to know whether the OTC states would have acted in concert absent the requirement that they comply with the CAA, the mandate that these states comply with the NAAQS ozone standard and the difficulty they historically had in doing so played a key role in establishing the cap-and-trade program. States that fail to comply with the NAAQS standards face the threat of serious penalties, including the threat of highway funding cutoffs.²⁸³ Failure to produce an adequate SIP can lead to the implementation of a federal plan.²⁸⁴ Furthermore, the EPA has demonstrated its willingness to impose control measures on nonattainment areas and to reject inadequate SIPs.

According to the World Resources Institute, the OTC’s NO_x Trading Program has been a success by virtually all measures. Each year of the program from 1999 to 2002 saw double-digit declines in nitrogen oxide emissions.²⁸⁵ Moreover, emissions fell during peak ozone season and on particularly hot days. Hot dates produce prime conditions for smog formation due both to the high temperatures themselves and to increased electricity generation.²⁸⁶ The emissions trading program also achieved almost perfect compliance rates in part because very good monitoring of nitrogen oxide emissions is required to make the allowances allocated to each source operable.²⁸⁷ The institute also concluded that there was very little “leak-

²⁷⁹ For a description of the organization, see Ne. States for Coordinated Air Use Mgmt., Overview, <http://www.nescaum.org/about-us/overview> (last visited July 2, 2009).

²⁸⁰ See S. REP. NO. 101-228 (1989), *reprinted in* 1990 U.S.C.A.N. 3385, 3437.

²⁸¹ *Id.*

²⁸² *Id.*

²⁸³ 42 U.S.C. § 7509(b)(1)(A) (2006).

²⁸⁴ *Id.* § 7410(c)(1).

²⁸⁵ AULISI ET AL., *supra* note 260, at 11. Annual reductions were twenty percent in 1999, eleven percent in 2000, twelve percent in 2001, and eleven percent in 2002. Though these emissions reductions are impressive, it is unclear to what degree nitrogen oxide emissions would have declined by similar amounts had each state individually regulated sources using more traditional command and control measures.

²⁸⁶ *Id.* at 12.

²⁸⁷ *Id.*

age”—emissions migrating from a regulated area to a nonregulated area—as a result of the program.²⁸⁸

Although the nitrogen oxide trading program was set to enter Phase III in 2002, which would have continued the trading program with a smaller overall emissions cap, the program has since been incorporated into a larger emissions trading program, Iteration 4 of cap-and-trade programs, called the NO_x Budget Trading Program, which involves more states.

3. *Iteration 4: NO_x Budget Trading Program/Clean Air Interstate Rule.*—Though the OTC achieved significant success in reducing nitrogen oxide emissions, the northeast states continued to suffer significant cross-border pollution not from fellow OTC states, but from upwind states in the Midwest and Southeast.²⁸⁹ This more widespread regional problem led the EPA to establish the Ozone Transport Assessment Group (OTAG) in 1995, which included, in addition to the northeastern states, “all states east of and including North and South Dakota, Nebraska, Kansas, Oklahoma and Texas.”²⁹⁰ OTAG’s purpose was to come up with a regional solution to the problem of ozone transport, though it differed significantly from the OTC because it had no legislative authorization under the CAA.²⁹¹

OTAG did not ultimately produce a regional solution to the problem of cross-border ozone pollution. The group did, however, produce studies that confirmed that twenty-three states were “contributing significantly” to ozone nonattainment in downwind states.²⁹² Based on OTAG’s work, the EPA issued a rule, called the NO_x SIP Call, that required twenty-two states to revise their state implementation plans to reduce ozone emissions that were contributing to nonattainment in downwind states. Around the time the NO_x SIP Call was issued, eight of the twelve OTC states, unconvinced that the EPA rule was sufficient to solve their ozone problems, petitioned the agency under section 126 of the CAA to force regulation of particularly large cross-border stationary sources of ozone.²⁹³ Given the significant overlap in the issues, the EPA consolidated the Section 126 petitions with the NO_x SIP Call rulemaking.²⁹⁴

²⁸⁸ *Id.* at 13–14. The authors measured leakage in part by measuring changes in electricity supply and demand in the region, finding that net imports of electricity changed little in the pre- and post-trading program periods.

²⁸⁹ *West Virginia v. EPA*, 362 F.3d 861, 865 (D.C. Cir. 2004).

²⁹⁰ CONG. BUDGET OFFICE, FEDERALISM AND ENVIRONMENTAL PROTECTION: CASE STUDIES FOR DRINKING WATER AND GROUND-LEVEL OZONE 44 (1997), available at <http://www.cbo.gov/ftpdocs/2xx/doc250/drinkwat.pdf>.

²⁹¹ *Id.*

²⁹² *West Virginia*, 362 F.3d at 865.

²⁹³ Section 126 of the CAA allows “[a]ny State or political subdivision” to petition the EPA Administrator for a finding that a major or new source of air pollution is violating 42 U.S.C. § 7410(a)(2)(D)(ii). For a discussion of the EPA’s ineffectiveness in addressing the problem of cross-border pollution prior to the OTAG/OTC programs, see Revesz, *supra* note 239.

²⁹⁴ *West Virginia*, 362 F.3d at 866.

Under the rule, the affected states were assigned an emissions “budget,” an overall nitrogen oxide limit that each state could not exceed, in order to limit downwind emissions.²⁹⁵ States were required to reduce excess nitrogen oxide emissions by instituting “highly cost-effective controls”—those that reduce nitrogen oxide emissions at a cost of \$2,000 per ton or less.²⁹⁶ The EPA rule did not dictate how states should achieve their specified NO_x reductions. The rule did, however, propose a NO_x Budget Trading Program modeled after the OTC NO_x Trading Program. The NO_x Budget Trading Program allows affected states to opt into a cap-and-trade program that is nearly identical in its parameters to the OTC NO_x Trading Program in order to meet the emissions budgets set forth in the NO_x SIP Call. All eligible states have opted to participate, with eleven states joining the nine participating OTC states as part of the NO_x Budget Trading Program.²⁹⁷

The program, like its OTC predecessor, caps overall emissions rates based on the sum of the individual state budgets set forth in the NO_x SIP Call. As with the OTC program and the Acid Rain Program, affected sources are allocated emissions allowances that permit them to emit one ton of nitrogen oxide per allowance. Sources can sell excess credits or bank them for future years, although the EPA limits the overall excess credits that can be used in any given ozone season. The EPA uses the same monitoring system to ensure compliance as it used for the OTC cap-and-trade program. Similarly, sources that exceed their allowance limits are penalized, though unlike the Acid Rain Program, the penalties imposed initially require the source to surrender three allowances from the following year’s account for every one ton over the allocated amount.²⁹⁸

To date, the NO_x Budget Trading Program appears to have been extremely successful. For the 2007 ozone season, NO_x emissions were five percent below the emission cap and overall, ground level ozone has fallen ten percent between 2002 and 2007. Ozone NO_x emissions have declined in every participating state. This decline has occurred despite an increase in overall heat input, which tracks total power generation.²⁹⁹

In March 2005, the EPA promulgated the Clean Air Interstate Rule (CAIR), which was to cover nitrogen oxide and sulfur dioxide. Affected states, which include most of the NO_x Budget Trading Program states,

²⁹⁵ Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone, 63 Fed. Reg. 57,356 (Oct. 27, 1998) (to be codified at 40 C.F.R. pt. 51).

²⁹⁶ See *Michigan v. EPA*, 213 F.3d 663, 669 (D.C. Cir. 2000) (upholding in large measure the NO_x SIP Call).

²⁹⁷ The participating non-OTC states include Alabama, Illinois, Indiana, Kentucky, Michigan, North Carolina, Ohio, South Carolina, Tennessee, Virginia, and West Virginia. See EPA, *supra* note 258, at 13.

²⁹⁸ *Id.* at 10.

²⁹⁹ EPA, NO_x BUDGET TRADING PROGRAM: COMPLIANCE AND ENVIRONMENTAL RESULTS: 2007, at 2 (2008), available at <http://www.epa.gov/airmarkt/progress/docs/2007-NBP-Report.pdf>.

could opt into a cap-and-trade program to allow sources within those states that are subject to the Acid Rain Program to use their allowances from the Acid Rain Program to comply with CAIR. Nitrogen oxide emissions would be addressed in a manner nearly identical to the NO_x Budget Trading Program but will include more states.³⁰⁰ As noted above, CAIR's legal status is now unclear in light of *North Carolina v. EPA*, in which the D.C. Circuit struck down the rule. The EPA has filed a petition for rehearing and will continue the NO_x Budget Trading Program in lieu of CAIR if its appeals are denied.³⁰¹

4. *Iteration 5: RGGI.*—The Regional Greenhouse Gas Initiative and its pioneering cap-and-trade program for carbon dioxide differ in one important respect from the previous four cap-and-trade iterations: RGGI has adopted its memorandum of understanding, committing member states to cap-and-trade participation, without any involvement from the federal government. Federal law does not compel or in any way encourage the RGGI states to reduce carbon dioxide emissions, and the EPA will play no role in monitoring compliance by affected sources.³⁰² Yet it seems obvious that RGGI is the direct offspring of previous iterations, all of which are in turn related to one another. Federal law was vital to the creation of each previous iteration. Whether the RGGI states would have committed to a cap-and-trade program absent their previous experience with cap-and-trade systems is unclear. However, any program that would have developed without this extensive history would have looked different—the influence of previous iterations on the RGGI program *is* obvious.

The RGGI cap-and-trade system quite closely resembles the OTC NO_x Budget Trading Program: a memorandum of understanding commits member states to participation in the cap-and-trade program and establishes the overall cap; member states must then enact their own enabling legislation or regulations implementing the program based on the model rule; member states are allocated a set amounts of allowances; the allowances are equal to one ton of the regulated pollutant; states are given flexibility to distribute allowances subject to their own political processes; and so forth.³⁰³ The RGGI cap-and-trade program is called the “CO₂ Budget Trading Program”³⁰⁴ like its OTC nitrogen oxide counterpart, the NO_x Budget Trading Program.

³⁰⁰ For a description of CAIR, see EPA, Clean Air Interstate Rule—Basic Information, <http://www.epa.gov/CAIR/basic.html> (last visited July 2, 2009).

³⁰¹ EPA, *supra* note 299, at 3.

³⁰² The participating states will apparently establish a regional body to help implement the program and to monitor sources for compliance. See Pew Ctr. on Global Climate Change, Q & A: Regional Greenhouse Gas Initiative, <http://www.pewclimate.org/rggi/qanda> (last visited July 2, 2009).

³⁰³ See Reg'l Greenhouse Gas Initiative, Model Rule (Jan. 5, 2007), http://www.rggi.org/docs/model_rule_corrected_1_5_07.pdf; Pew Ctr. on Global Climate Change, *supra* note 302.

³⁰⁴ See Reg'l Greenhouse Gas Initiative, *supra* note 303, at 10.

The CO₂ Budget Trading Program differs from other cap-and-trade schemes to reduce conventional pollutants in several respects. For example, the RGGI model rule includes extensive provisions allowing affected sources to use carbon offsets from outside the regulated sectors in order to comply with their emissions reduction obligations. RGGI also provides additional flexibility to regulated sources in the event that carbon dioxide allowances exceed a certain price.³⁰⁵ This allowance is in large measure because, unlike nitrogen oxide and other common pollutants, carbon dioxide emissions are not geographically sensitive. Instead, reducing carbon dioxide anywhere in the world lowers the amount of overall carbon dioxide in the atmosphere. Thus, allowing offsets provides regulated sources with an opportunity to find the cheapest carbon dioxide reductions in lieu of reducing their own emissions at higher cost. The system of offsets established under RGGI was developed, in part, in response to European Union problems in the implementation of its cap-and-trade-program for greenhouse gas emissions.³⁰⁶

The allocation scheme of emissions allowances under RGGI also differs from the OTC scheme in that the majority of CO₂ allowances are being distributed through auctions.³⁰⁷ Four auctions have taken place to date.³⁰⁸ This auctioning was again not influenced heavily by the OTC and other domestic cap-and-trade programs but by problems in the allocation system adopted by the European Union in establishing its carbon dioxide cap-and-trade system to comply with the Kyoto Protocol.³⁰⁹

Because RGGI is just beginning operations in 2009, there are not yet data to measure its effectiveness.

D. Federalism and RGGI

1. *Future Influence on Greenhouse Gas Emissions Legislation.*— Though RGGI is the most recent iteration of cap-and-trade schemes, there is already evidence that the CO₂ Budget Trading Program will spawn new iterations, both horizontally and vertically. Horizontally, California has already indicated its intention to look to RGGI for guidance in complying with its ambitious greenhouse gas legislation requiring the state to reduce emissions to 1990 levels by 2020.³¹⁰ The legislation is relatively general in

³⁰⁵ See Pew Ctr. on Global Climate Change, *supra* note 302.

³⁰⁶ See Hannah Fairfield, *When Carbon Is Currency*, N.Y. TIMES, May 6, 2007, §3, at 36.

³⁰⁷ Reg'1 Greenhouse Gas Initiative, CO₂ Auctions, <http://www.rggi.org/co2-auctions> (last visited July 2, 2009).

³⁰⁸ Reg'1 Greenhouse Gas Initiative, Auction Results, <http://www.rggi.org/co2-auctions/results> (last visited July 2, 2009).

³⁰⁹ Fairfield, *supra* note 306.

³¹⁰ California's legislation is called the "Global Warming Solutions Act" and is known colloquially by its bill number, AB 32. The Act is codified as CAL. HEALTH & SAFETY CODE §§ 38500 *et. seq.* (West 2008).

directing CARB to implement the emissions cap. The bill directs CARB, in adopting direct emissions reductions, to “consider all relevant information pertaining to greenhouse gas emissions reduction programs in other states, localities, and nations, *including the northeastern states of the United States, Canada, and the European Union.*”³¹¹

In response to the legislation and at the direction of Governor Arnold Schwarzenegger, CARB appointed a Market Advisory Committee to make recommendations for the design of a cap-and-trade system for California.³¹² Throughout its report, the committee has shown that the RGGI cap-and-trade system has influenced its thinking. The report, for example, suggests that “[e]xperiences with . . . the Northeast NO_x Budget Program . . . and RGGI . . . suggest that a regional planning process can produce successful programs that span multiple states or jurisdictions while achieving important environmental goals.”³¹³

In furtherance of a regional approach, the Western Climate Initiative announced in August 2007 that its members—Arizona, British Columbia, California, Manitoba, New Mexico, Oregon, and Washington—have agreed to a fifteen percent reduction of greenhouse gas emissions from 2005 levels by 2020.³¹⁴ Member states and provinces are committed to using “regional multi-sector market-based mechanisms” to achieve the cap.³¹⁵ California’s Market Advisory Committee report also states explicitly that in making its recommendations, the committee learned “key lessons . . . from five . . . programs,” including the Acid Rain Program, the NO_x Budget Program, and the RGGI program. RGGI, for example, provides a “good model” for applying “very strong selection criteria for any offsets considered” in a California market-based scheme.³¹⁶ RGGI’s steadily declining cap in overall carbon dioxide emissions is also singled out for praise.³¹⁷ The air board has now adopted a scoping plan setting forth the strategies it will use to meet its emissions cap. As expected, CARB has endorsed the adoption of a cap-and-trade system.³¹⁸

It is also possible that RGGI will have a significant influence on any federal legislation establishing a cap-and-trade system for carbon emis-

³¹¹ CAL. HEALTH & SAFETY CODE § 38561(c) (West 2008) (emphasis added).

³¹² MKT. ADVISORY COMM. TO THE CAL. AIR RES. BD., RECOMMENDATIONS FOR DESIGNING A GREENHOUSE GAS CAP-AND-TRADE SYSTEM FOR CALIFORNIA 4 (2007), available at http://www.climatechange.ca.gov/events/2007-06-12_mac_meeting/2007-06-01_MAC_DRAFT_REPORT.PDF.

³¹³ *Id.* at 17.

³¹⁴ W. CLIMATE INITIATIVE, STATEMENT OF REGIONAL GOAL 1 (2007), <http://www.westernclimateinitiative.org/component/remository/func-startdown/91/>.

³¹⁵ *Id.* at 2.

³¹⁶ See MKT. ADVISORY COMM. TO THE CAL. AIR RES. BD., *supra* note 312, at 15.

³¹⁷ See *id.* at 17.

³¹⁸ Cal. Air Res. Bd., AB 32 Scoping Plan, <http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm> (last visited July 2, 2009).

sions.³¹⁹ Congress is currently considering numerous proposals to cut carbon emissions, almost all of which have as their regulatory centerpiece a cap-and-trade system.³²⁰ Though most of the congressional proposals include economy-wide caps on all greenhouse gas emissions rather than simply carbon dioxide emitted by power plants, as RGGI does, a federal system almost certainly will build upon lessons learned not only from RGGI but also from the cap-and-trade iterations that preceded RGGI, as well as the European Union system. RGGI's influence is likely to be particularly strong if Congress delays enacting federal legislation given the country's current economic woes. Under such a scenario, California's experience will be influential, especially because the state is working toward adopting an economy-wide scheme rather than focusing only on the power sector.

2. *Interstate Externalities and Political Failings.*—Advocates for state devolution and a strong federal role agree that federal involvement in environmental regulation is appropriate under certain circumstances. The most compelling reason for federal involvement is the existence of interstate externalities. When states lack the incentive to reduce pollution that enters other states, federal regulation is necessary to correct this market failure.³²¹ The establishment of the OTC was a direct response to the problem of interstate externalities: ozone traveled between states, and the existing federal regime did not adequately respond.³²² Indeed, one of the critiques of centralized federal regulation of clean air has been that many of the rationales for federal control—for example, that states will race to the bottom in relaxing environmental standards—are not justifiable. In addition, critics contend, federal law does a poor job addressing problems such as the control of interstate externalities for which federal involvement is justified.³²³ Prior to the establishment of OTAG and the OTC NO_x Budget Trading Program,³²⁴ the EPA had done a particularly poor job regulating cross-border pollution other than acid rain. The EPA had models that only measured cross-border pollution within fifty kilometers of the source and refused to use downwind state models that had longer ranges. Furthermore,

³¹⁹ See, e.g., Joseph Kruger & William A. Pizer, *Regional Greenhouse Gas Initiative: Prelude to a National Program?*, RESOURCES, Winter 2005, at 4.

³²⁰ See, e.g., RAY KOPP & BILLY PIZER, RES. FOR THE FUTURE, FIVE RECENT SENATE BILLS PROPOSE MANDATORY GREENHOUSE GAS CAPS: SIDE-BY-SIDE COMPARISON AND ANALYSIS (2007), available at http://www.rff.org/rff/News/Features/upload/26848_1.pdf (analyzing major Senate proposals, all of which either “mandate or recommend a market-based cap-and-trade permit system”); Pew Ctr. on Global Climate Change, Senate Greenhouse Gas Cap-and-Trade Proposals (Aug. 2, 2007), http://www.pewclimate.org/docUploads/Economy-wide%20bills%20110th%20Senate%20-%20August%202007_0.pdf.

³²¹ See BUTLER & MACEY, *supra* note 21, at 17; Revesz, *supra* note 17, at 540–41; Swire, *supra* note 21, at 99–100.

³²² See *infra* notes 328–34 and accompanying text.

³²³ The most sustained treatment of this position is Revesz, *supra* note 239.

³²⁴ See *supra* notes 290–99 and accompanying text.

the EPA had never found in favor of a state using a CAA section 126 petition to argue that a major source was violating provisions of the Act that prohibit emissions that “significantly contribute to non-attainment” in another state.³²⁵

Though there is general consensus that the problem of interstate externalities is particularly well suited to federal intervention, the politics of such intervention can make legislative success quite difficult. In the case of cross-border air pollution problems like acid rain and ozone, one geographic region of the country—largely the Northeast—suffers pollution from others—the South and Midwest.³²⁶ The South and Midwest and their representatives in Congress have little incentive to control cross-border pollution they don’t actually experience. Further, the public choice problems likely to arise as a result of the power of coal and utility interests that typically oppose more stringent regulation compound the geographical factionalism that often plagues Congress.³²⁷ Consequently, it took ten years, unsuccessful lawsuits, and years of study before Congress began to regulate acid rain seriously.

The OTC states took an entirely different tack with ozone pollution. The OTC NO_x Budget Program succeeded in getting the region of the country most plagued by cross-border pollution engaged in developing a regional solution. Even more impressively, the OTC cap-and-trade system then became a model for the EPA in getting upwind states to opt into a broader cap-and-trade system (the NO_x SIP Call). Unlike many of the northeastern states, these upwind states were otherwise in compliance with the NAAQS and thus had little incentive to participate absent regulatory action by the EPA. In establishing the program, the EPA acted in favor of northeastern states that had filed section 126 petitions against upwind states and then provided upwind states with the option of participating in the expanded cap-and-trade program as a means of compliance.³²⁸

³²⁵ See Revesz, *supra* note 239, at 2362–69. Revesz also criticizes the federal Acid Rain Program, though his critique was written before extensive analysis of the program demonstrated its overall effectiveness. See *id.* at 2359 (calling the Acid Rain Program “incomplete”).

³²⁶ Cf. Larry D. Kramer, *Putting the Politics Back into the Political Safeguards of Federalism*, 100 COLUM. L. REV. 215, 223 (2000) (agreeing that congressional representation “may well enhance the power of geographically-defined interests”); Herbert Wechsler, *The Political Safeguards of Federalism: The Role of States in the Composition and Selection of the National Government*, 54 COLUM. L. REV. 543, 547 (1954) (suggesting that national lawmakers, because they represent geographic districts, protect local geographic interests).

³²⁷ See DANIEL A. FARBER & PHILIP B. FRICKEY, *LAW AND PUBLIC CHOICE* (1991) for an excellent review of public choice theory and its history and influence.

³²⁸ See *supra* notes 293–94 and accompanying text. Professor Revesz, who has been critical of the EPA’s efforts to address cross-border pollution, would likely not find the OTC/NO_x SIP Call solution completely satisfying. For one, the program works within the confines of the NAAQS set by the EPA, which Revesz believes are unnecessary and potentially economically inefficient. See Revesz, *supra* note 15, at 1226. Secondly, cross-border pollution that violates more stringent *state* standards is not addressed by these programs.

It is possible that solutions such as the OTC NO_x Budget Trading Program and the NO_x SIP Call could have occurred in the absence of federal legislation and intervention had states been capable of resolving the interstate externality problems through Coasian bargaining.³²⁹ However, states could not resolve these problems on their own—high transaction costs, problems of free riders and holdouts, and potentially the lack of clarity in the CAA about legal liability for cross-border pollution all led to a stalemate.³³⁰ As Revesz has noted, pre-1990 provisions in the CAA dealing with cross-border pollution, which encouraged and relied exclusively on interstate cooperation, were “wholly ineffective.”³³¹

There are numerous factors that have reduced interstate ozone transport. The establishment of the OTC, the threat of EPA sanctions for failure to comply, the coordination of the EPA, and the subsequent use of CAA provisions have all played a role. Even more interesting, however, is that in helping to solve the bargaining problems related to one pollutant, nitrogen oxide, this system of federal-state regulatory interaction appears to have induced bargaining and cooperation among the northeastern states to regulate carbon dioxide through RGGI *without* federal intervention.

Carbon dioxide emissions obviously differ in an important respect from nitrogen oxide emissions in that carbon dioxide does not pollute the ambient air but rather gets trapped in the atmosphere.³³² Thus, emissions from a power plant in New Hampshire do not cause localized damage to air quality in Maine. At some level, states involved in RGGI are not bargaining over classic interstate externalities in a manner precisely analogous to nitrogen oxide emissions and thus may reach agreement more easily. There are, for example, no weak downwind states that may lack bargaining power.³³³ Nevertheless, the problems of transaction costs in agreeing to reduce carbon dioxide emissions, holdouts, and free riders all remain—and indeed appear to be higher.³³⁴ While state regulation of carbon dioxide remains something of a puzzle, the regime of iterative federalism in the case of RGGI appears to have assisted in making state bargaining possible.

³²⁹ For a discussion of the problem of high transaction costs that are likely to prevent Coasian bargaining among states and localities, see Jacques LeBoeuf, *The Economics of Federalism and the Proper Scope of the Federal Commerce Power*, 31 SAN DIEGO L. REV. 555, 573–74 (1994); Mancur Olson, Jr., *The Principle of “Fiscal Equivalence”: The Division of Responsibilities Among Different Levels of Government*, 59 AM. ECON. REV. 479 (1969); Revesz, *supra* note 239, at 2375 n.123; Stewart, *supra* note 20, at 1216.

³³⁰ See LeBoeuf, *supra* note 329, at 574 n.79; Revesz, *supra* note 239, at 2375 n.123.

³³¹ Revesz, *supra* note 239, at 2375 n.123.

³³² This is one of the reasons the dissenters in *Massachusetts v. EPA* would not have found standing. See 549 U.S. 497, 559 (2007) (Scalia, J., dissenting).

³³³ See Stewart, *supra* note 20, at 1216.

³³⁴ See Rabe, Román & Dobelis, *supra* note 11, at 7 (describing lack of incentives for states to act to mitigate climate change).

3. *Influence of Federal Law in Shaping State Environmental Leaders.*—It may seem unremarkable—and quite appropriate—that RGGI’s design was influenced heavily by previous cap-and-trade iterations and that future cap-and-trade programs for carbon emissions, including California’s and any federal scheme, will look to past programs in designing their schemes. However, as noted earlier, literature on state climate initiatives to date has not acknowledged the role federal law has played in influencing both the likelihood of state regulation and its substantive parameters. Moreover, in the broader debate about the appropriate locus for environmental regulatory power, scholars tend to underestimate the degree to which state legislative leadership on environmental issues may be influenced not just by traditionally acknowledged factors such as voter preference and localized environmental problems, but also by federal law.³³⁵

Again, I mean to contribute to the debate about environmental federalism in precisely the opposite manner from—but in closely related spirit to—efforts to explain the role states have and can play in the adoption of federal law.³³⁶ As Elliott et al. posited, federal environmental legislation often comes about not independently, but at the behest of industry in response to a flurry of state legislative pro-environmental activity.³³⁷ My point, again, is the flip side: state environmental legislation does not always develop independently, and in the case of RGGI, federal law has had an important influence on both the form and substance of the state legislation.

In the case of RGGI’s cap-and-trade regime, federal law provided a successful experiential base for designing the system.³³⁸ Federal law created and fostered the regional body that ultimately adopted the OTC NO_x Budget Trading Program. The federal government provided extensive resources in monitoring regulated sources for compliance, a large task made easier for the federal government by its previous experience with the Acid Rain Program. Furthermore, the regulatory requirements of the federal Clean Air Act—in setting NAAQS for ozone, requiring state implementation plans, and penalizing or threatening to penalize nonattainment states—influenced the OTC states in adopting the cap-and-trade scheme, because one of the motivations for its establishment was the difficulty many OTC states were having in complying with the ozone NAAQS. Failure to comply with the NAAQS creates real risk for states of penalties or the imposi-

³³⁵ See, e.g., Revesz, *supra* note 40, at 636–41 (providing explanation for state environmental activity without discussing role of federal law).

³³⁶ See, e.g., KRIER & URSIN, *supra* note 56, at 181–82 (describing the history of the Clean Air Act provision preempting all states but California from adopting motor vehicle emissions standards); Elliott, Ackerman & Millian, *supra* note 16, at 327 (noting that environmental issues often become federalized at the behest of industry groups who seek to avoid active and potentially disparate state regulatory activity).

³³⁷ See Elliott, Ackerman & Millian, *supra* note 16, at 327; see also Revesz, *supra* note 40, at 585–86.

³³⁸ See the discussion of the Acid Rain Program at the text accompanying notes 242–57, *supra*.

tion of a federal implementation plan. More generally, the federal government created regulatory capacity and experience in a particular regional body that could then shift gears from one pollutant—ozone—to another—carbon dioxide—with relative ease.

Moreover, federal law and the federal government may reinforce or strengthen voter preferences within a particular state or region for environmental change. The northeastern states take pride in their efforts first to help combat acid rain and then to work regionally to reduce ozone pollution.³³⁹ Successful environmental leadership—aided by federal law—may have salutary effects on voters' preferences for environmental regulatory activity. My point is not to suggest that federal law creates the differential voter preferences for environmental regulation we see across the country. Instead, I argue that federal law can have preference-strengthening effects generally unacknowledged in the environmental literature.³⁴⁰

III. ITERATIVE FEDERALISM AND SUBSTANTIVE OUTCOMES

Federal law has played a key role in shaping two of the leading state responses to climate change: RGGI and AB 1493. However, federal law is also responsible for producing significant substantive achievements in reducing air pollution and getting states closer to meeting NAAQS.

At the heart of federalism debates regarding regulatory power is a focus on which level of government will achieve environmental and economically optimal outcomes. Much of the response to Revesz's initial argument expressing a presumption in favor of devolution attempted to show that states produced too little environmental regulation. Revesz's response has helped confirm that many states regulate more strictly than the federal government.³⁴¹

³³⁹ See, e.g., Press Release, Ozone Transp. Comm'n, OTC Announces Full Implementation of NOx Trading Program (May 16, 2003), available at <http://www.otcair.org/press.asp?fview=Press#> (touting environmental accomplishments); N.Y. State Dep't of Env'tl. Conservation, Acid Rain Questions & Answers, <http://www.dec.ny.gov/chemical/8418.html> (last visited July 2, 2009) (recounting New York leadership on acid rain regulation).

³⁴⁰ See, e.g., Revesz, *supra* note 40, at 636–41 (evaluating reasons for state environmental leadership and positing that state voter preference—measured by Congressional League of Conservation voting ratings of representatives—is a strong predictor of pro-environmental state legislative enactment). Indeed, there is a debate over whether voter preferences have a strong influence in determining how political leaders actually vote. See, e.g., Steven D. Levitt, *How Do Senators Vote? Disentangling the Role of Voter Preferences, Party Affiliation, and Senator Ideology*, 86 AM. ECON. REV. 425 (1996); see also Jonathan H. Adler, *When Is Two a Crowd? The Impact of Federal Action on State Environmental Regulation*, 31 HARV. ENVTL. L. REV. 67, 91–92 (2007) (positing that federal reports have increased the salience of climate change as a policy issue and that federal inaction on the topic has “created an opportunity for states”); DeShazo & Freeman, *supra* note 171, at 1519 (“There are a variety of alternative explanations for why states are acting [to combat climate change], the most plausible of which is that governors and state legislators are simply responding to the preferences of their electorates.”).

³⁴¹ This argument animates much of Revesz's *Public Choice* article. See Revesz, *supra* note 40.

Though each position has its merits, the debate about optimal levels of environmental outcomes is quite difficult to resolve given its dependence on models predicting optimal outcomes among states competing for residents and business with an appropriate mix of governmental services. Proponents of centralization persuasively argue that such competition is imperfect at best and thus states will sometimes produce too little environmental regulation. Devolution proponents quite effectively demonstrate some of the clear inefficiencies of federal law and point to empirical evidence demonstrating that many states regulate more stringently than the federal government.

Furthermore, whether efficiency should be the only measure of the efficacy of environmental policy is a contestable position.³⁴² The EPA sets NAAQS based not on efficiency concerns but instead on whether the standards “are requisite to protect public health” with “an adequate margin of safety.”³⁴³ Courts have made abundantly clear that the costs of achieving the NAAQS are not to be taken into account in the setting of standards.³⁴⁴ By the measure used in the NAAQS—standards based on protection of public health—the models of iterative federalism on which I have focused appear to be a resounding success.

California’s automobile emissions standards are now achieving levels of pollution reduction inconceivable even twenty years ago without a substantial change in engine technology.³⁴⁵ Southern California experienced 102 Stage 1 smog alerts from ozone pollution in 1976. In 2006, the basin experienced none.³⁴⁶ Yet Southern California and the Central Valley of the state remain out of compliance with the NAAQS for ozone and particulate matter. For example, Southern California exceeded the federal one-hour ozone standard thirty-five times in 2006 compared with 208 in 1977.³⁴⁷ Thus, even with enormous strides in automotive emissions technology, the state still has difficulty in meeting federal air standards for two pollutants at which mobile source emission regulations are aimed. Without California’s

³⁴² Revesz specifically addressed this question, arguing that, if a race to the bottom exists that federal standards attempt to cure, then the race will merely shift to other regulatory or fiscal areas. See Revesz, *supra* note 40, at 556. For counterarguments, see Esty, *supra* note 17, at 638; Joshua D. Sarnoff, *The Continuing Imperative (but Only from a National Perspective) for Federal Environmental Protection*, 7 DUKE ENVTL. L. & POL’Y F. 225 (1997).

³⁴³ 42 U.S.C. §7409(b)(1) (2006).

³⁴⁴ This principle was set forth most recently by the Supreme Court in *Whitman v. American Trucking Associations, Inc.*, 531 U.S. 457 (2001), which upheld the EPA’s revision of the ozone and particulate matter NAAQS. See also *Lead Indus. Ass’n v. EPA*, 647 F.2d 1130, 1148 (D.C. Cir. 1980) (“[E]conomic considerations play no part in the promulgation of ambient air quality standards under Section 109 [of the CAA].”).

³⁴⁵ See *supra* note 47 and accompanying text.

³⁴⁶ See S. Coast Air Quality Mgmt. Dist., *Historic Ozone Air Quality Trends*, *supra* note 259.

³⁴⁷ *Id.*

tough standards, the state would be even further from NAAQS compliance than it remains today.

In the case of the NAAQS for carbon monoxide, stringent emissions standards have brought virtually the entire country into compliance. In 1971, more than ninety percent of monitoring stations around the country exceeded the NAAQS for carbon monoxide.³⁴⁸ In 1991, forty-two areas of the country were designated nonattainment.³⁴⁹ As of 2006, all forty-two areas had come into attainment, though one area had slipped into nonattainment.³⁵⁰

The pollution reductions of the OTC NO_x Budget Trading Program—with double digit reductions in ozone each year the program operated, near perfect compliance, and no evidence of leakage—have moved the northeastern states closer into compliance with the ozone NAAQS.³⁵¹ The expansion of the OTC program to additional states and additional pollutants promises further reductions.

CONCLUSION

One of the lessons of iterative federalism is that policymakers and scholars need not view devolution or centralization as the only regulatory possibilities in our federal scheme. Instead, these schemes recognize that all states are not created equally. Rather than viewing states as monolithic or homogenous, iterative federalism has identified certain states as unique. The uniqueness may occur because of particularized pollution problems but also because states differ in their regulatory, economic, and political capacities for environmental leadership. To put the case most dramatically, California is not Wyoming. California's economy and population dwarf the populations and economies of most other states. As a result, California has market capacity, wealth, and regulatory sophistication that are more similar to an industrialized country than to many states. And the Southwest does not suffer the regional ozone pollution that the Northeast does, just as the Midwest may have lacked the political and regulatory capacity to enact the sort of cap-and-trade program developed by the OTC.

These iterative federalism schemes raise interesting possibilities for other pollution problems and for regulatory experimentation outside the environmental arena. Federal preemption, for example, has occurred in numerous substantive areas in recent years—including securities regulation, pension benefits, predatory lending, cigarette labeling and advertising, tort

³⁴⁸ BD. ON ENVTL. STUDIES & TOXICOLOGY ET AL., NAT'L RES. COUNCIL OF THE NAT'L ACADS., *MANAGING CARBON MONOXIDE POLLUTION IN METEOROLOGICAL AND TOPOGRAPHICAL PROBLEM AREAS 17* (2003), available at http://books.nap.edu/openbook.php?record_id=10689&page=R1.

³⁴⁹ EPA, CARBON MONOXIDE AIR QUALITY DATA UPDATE: 2005–2006 DESIGN VALUES 1 (2007), http://epa.gov/airtrends/pdfs/dv_co_2004_2006.pdf.

³⁵⁰ *Id.*

³⁵¹ See *supra* notes 285–88 and accompanying text.

law, and liability for oil spills,³⁵² often at the behest of industry.³⁵³ Though the case for uniform national standards in product markets has some intuitive appeal, one can imagine iterative federalism schemes in various substantive areas in which a particular state or states might be singled out to play a regulatory leadership role while preempting other states from regulating in order to avoid the chaos of fifty separate regulatory schemes. In the environmental arena, for example, all fifty states are preempted from setting energy efficiency standards for many appliances. As I have argued elsewhere, why not provide superregulator status for California and let the state experiment with tighter standards?³⁵⁴ Similarly, regional problems like the management and transport of waste, water pollution, and traffic and land use might benefit from the regional approach embodied in the OTC, with strong state involvement bolstered by significant technical and leadership support from the federal government. In short, iterative federalism ought to expand our regulatory horizons.

³⁵² See Richard Fallon, *The "Conservative Path" of the Rehnquist Court's Federalism Decisions*, 69 U. CHI. L. REV. 429, 463 n.222 (2002); Hills, *supra* note 25, at 19.

³⁵³ See Hills, *supra* note 25, at 19.

³⁵⁴ Ann E. Carlson, *Energy Efficiency and Federalism*, 107 MICH. L. REV. FIRST IMPRESSIONS 63 (2008), <http://www.michiganlawreview.org/firstimpressions/vol107/carlson.pdf>.

