

COAL-FIRED POWER IN A RESTRUCTURED ELECTRICITY MARKET

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The last decade has seen a series of fierce, protracted battles over the regulation of air pollution from coal-fired power plants in the United States. These battles have been (and are being) waged by electric utilities, environmental groups, and the last two presidential administrations, among others, before courts, agencies and Congress. They involve the regulation of at least five different pollutants, by at least as many different provisions of the Clean Air Act. This same decade has also seen fundamental changes in the way electricity markets are regulated in the United States. The concurrence of these events is no accident. In fact, the restructuring of electricity markets—the incremental movement away from close economic regulation of licensed monopoly suppliers and toward market competition—has stoked fears that price competition in the electricity industry will bring increased reliance on cheap, dirty, coal-fired power. These fears have been exacerbated by the transition from the Clinton Administration’s relatively aggressive approach to regulating pollution from coal combustion to the Bush Administration’s less aggressive approach. In this essay I will attempt first to explain these doctrinal and policy battles over the application of the Clean Air Act to coal-fired power plants, and to place them in their historical, legal and political context. Second, I will argue that the restructuring of electricity markets does not necessarily imply increased reliance on coal-fired power, and that the combination of restructured markets and a second Bush Administration does not portend quite the air pollution disaster that some fear.

I. COAL-FIRED POWER AND POLLUTION

Coal-fired power generation has always been a high-profile source of air pollution. Coal combustion produces an impressive list of potentially harmful pollutants. Particulate matter (fine dust) is a

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source of respiratory problems, heart and lung disease, and haze.¹ Particulates from coal combustion can also contain mercury, a toxic metal that can enter the food chain through deposition of combustion particulates into waterways.² Sulfur dioxide (“SO₂”) mixes with moisture in the upper atmosphere to form sulfuric acid, which falls as acid rain, damaging vegetation and changing the pH of aquatic environments.³ Nitrogen oxides (“NO_x”) are a precursor to both acid rain and ground-level ozone (smog), which triggers respiratory problems in some humans.⁴ Carbon dioxide (“CO₂”), another byproduct of coal combustion, is the earth’s most plentiful greenhouse gas, and human contributions of carbon dioxide into the atmosphere are widely believed to be hastening global warming.⁵

The link between coal combustion and some of these pollution problems has long been understood. Coal combustion powered the industrial revolution, and the combination of domestic and industrial use of coal to produce heat and power created evident air pollution problems in many industrial cities.⁶ The lethal “London Fog,” or “black fog,” of 1952 killed approximately 4,000 Londoners,⁷ and

1. Environmental Protection Agency, *Particulate Matter, Chief Causes of Concern*, at <http://www.epa.gov/air/urbanair/pm/chf.html> (last modified Dec. 20, 2004).

2. Environmental Protection Agency, *Mercury Emissions and Electric Utilities*, at http://www.epa.gov/ttn/oarpg/t3/fact_sheets/hg17th.pdf (Feb. 24, 1998).

3. Environmental Protection Agency, *Sulfur Dioxide, Chief Causes of Concern*, at <http://www.epa.gov/air/urbanair/so2/chf1.html> (last modified Dec. 20, 2004).

4. Environmental Protection Agency, NO_x - How Nitrogen Oxides Affect the Way We Live and Breathe, available at <http://www.epa.gov/air/urbanair/nox/index.html> (last updated Feb. 18, 2005).

5. Intergovernmental Panel on Climate Change, *Climate Change 2001: The Scientific Basis*, at http://www.grida.no/climate/ipcc_tar/wg1/index.htm (arguing that while there remains a healthy debate about the effects of global warming and the proper regulatory response, if any, there is something approaching consensus in the scientific community about the conclusion that human activity is hastening the rate of warming, in part through coal combustion. For a good summary of the science of global warming, see Chapter 4, at http://www.grida.no/climate/ipcc_tar/wg1/127.htm).

6. See BARBARA FREESE, COAL: A HUMAN HISTORY 148-56 (2003) (stating that this was particularly true where dirtier burning bituminous coal and lignite were used).

The 1902 [coal] strike served to emphasize how the nation had divided into clean anthracite cities like New York, Philadelphia, and Boston, and dirty bituminous ones, like Pittsburgh, Chicago, St. Louis, Cincinnati, and Birmingham. In New York City, as the strike induced shortage caused anthracite prices to rise, more and more coal users turned to bituminous, violating city laws and alarming residents. * * * Pure atmospheres were something most bituminous cities had not seen, and would not see, for a very long time.

Id. at 148-49.

7. The fog was the product of a temperature inversion that trapped pollutants from fossil fuel combustion (including coal) near the ground for several days. FREESE, *supra* note 6, at 167-68.

prompted a Parliamentary ban on the combustion of soft coal within the city limits in 1956.⁸ Despite episodes like this one, coal became the fuel of choice for electric power generation in much of the industrialized world, including the United States, and remains so in nations where coal is plentiful.⁹

The United States Congress responded to concerns about the effects of pollution from coal-fired plants when it drafted the Clean Air Act of 1970,¹⁰ noting specifically the effects of particulates, sulfur dioxide, and nitrogen oxides on human health.¹¹ That statute placed all three pollutants on the list of conventional air pollutants for which EPA promulgates national ambient air quality standards (“NAAQS”).¹² Since the Act’s passage, more and more air quality control regions¹³ in the United States have come into attainment¹⁴ with the NAAQS for particulates, ozone and sulfur dioxide,¹⁵ as ground level concentrations of these pollutants have declined stead-

8. *Id.*

9. Energy Information Administration, International World Energy Outlook, 2004, at <http://www.eia.doe.gov/oiaf/ieo/electricity.html> (last modified May 24, 2004) (stating that coal is projected to continue to retain the largest market share of electricity generation, but its importance is expected to be moderated somewhat by a rise in natural gas use).

10. Clean Air Act of 1970, 42 U.S.C. §§ 7401-49 (2000).

11. *See e.g.*, Section 109 of the Clean Air Act, 42 U.S.C. § 7409 (2000) (obligating EPA to establish NAAQS for sulfur dioxide and nitrogen oxides). 42 U.S.C. § 7409(a) requires NAAQS for all pollutants “for which air quality criteria have been issued prior to” December 31, 1970, a group that included sulfur dioxide; and 42 U.S.C. § 7409(c), added in 1977, requires NAAQS for nitrogen oxides. *See also* remarks of Rep. Quillen in floor debate over the 1970 Act, 91 Cong. House Debates 1970; CAA70 Leg. Hist. 8.

12. 42 U.S.C. § 7409(b) (2000) (stating that NAAQS represent the maximum concentrations of these conventional pollutants in the outdoor air that EPA has determined will protect public health with an adequate margin of safety.) 42 U.S.C. § 7409(c) (mandating a NAAQS for nitrogen oxides.)

13. 42 U.S.C § 7407 (2000) (defining the geographic units by which compliance with NAAQS are measured.) Section 107 of the Act defines and describes the creation of air quality control regions. *Id.*

14. 42 U.S.C. § 7407(d)(1)(A)(i) (2000). The Clean Air Act classifies all air quality control regions as either “attainment” or “non-attainment” areas for each conventional pollutant, depending upon whether the region is meeting the federal standard.

15. Environmental Protection Agency, *Nonattainment Areas Map - Criteria Air Pollutants*, at <http://www.epa.gov/air/data/nonat.html?us~USA~United%20States> (last modified Dec. 16, 2004) (stating that as of this writing, a mere 13 counties in the United States are “nonattainment” (i.e., out of compliance with) for the sulfur dioxide standard, while 57 counties (mostly in the west) are nonattainment for particulate matter and more than 400 counties are nonattainment for the ozone standard.). This represents considerable improvement since the 1970s and 80s, particularly with respect to sulfur dioxide and particulates.

ily.¹⁶ However, long term transport of sulfur dioxide (and to a lesser extent, nitrogen oxides) in the upper atmosphere remained a problem, and concern over the effects of acid rain grew after the passage of the Clean Air Act,¹⁷ culminating in the creation of the “acid rain program” through amendments to the Act in 1990.¹⁸ The acid rain program imposed upon coal-fired power plants a graduated reduction of emissions of acid rain precursors of more than 50 percent. That reduction was to be achieved through a tradeable permit program under which plants may buy and sell sulfur dioxide and nitrogen oxides emissions rights.¹⁹ In spite of these emissions reductions, power plants, especially those that are coal-fired, produce 65 percent of the sulfur dioxide emissions in the United States,²⁰ and 22 percent of nitrogen oxides emissions.²¹

By contrast, EPA does not regulate carbon dioxide emissions under the Clean Air Act, though the United States has participated in international initiatives that could lead to emissions limits in the United States in the future.²² Unlike most other air pollutants of concern, most of carbon dioxide’s harmful effects are not caused by human inhalation or ingestion of the pollutant. Rather, carbon dioxide is the most common of several greenhouse gases—gases that tend to trap heat from the sun in the atmosphere—that are thought to contribute to global warming.²³ Coal-fired power plants are the source of

16. See *infra* notes 40-44 and accompanying text for a description of these emissions reductions since 1970.

17. See, e.g., National Acid Precitation Assessment Program, Report to Congress (1990) (finding that a debate among scientists and policymakers through the 1980s produced a scientific consensus supporting the notions that sulfur dioxide contributes to acid rain, and that acid rain acidifies lakes and damages vegetation).

18. For a discussion of the 1990 amendments and the acid rain program, see *infra* notes 54-57 and accompanying text.

19. 42 U.S.C. §§ 7651-51o (2000) (outlining program in which acid rain allowances – each representing the right to emit one ton of sulfur dioxide in a calendar year – are bought and sold on several public commodities exchanges). For a description of the program, including a description of market activity in the allowance market, see Environmental Protection Agency, *Acid Rain Program*, at <http://www.epa.gov/airmarkets/arp/> (last modified Apr. 14, 2004).

20. Environmental Protection Agency, *SO₂: What is it? Where Does it Come From?*, at <http://www.epa.gov/air/urbanair/so2/what1.html> (last modified Dec. 20, 2004).

21. Environmental Protection Agency, *NOx: What is it? Where Does it Come From?*, at <http://www.epa.gov/air/urbanair/nox/what.html> (last modified Feb. 18, 2005). Power plants are the second leading producer category, after automobiles, which accounts for 55 percent. *Id.*

22. For a discussion of regulatory initiatives in the United States and under the Kyoto Protocol on Global Warming, see *infra* notes 121-130 and accompanying text.

23. The principal greenhouse gases are carbon dioxide, nitrous oxide, methane, and various fluorocarbons. Their presence in the atmosphere helps trap heat near the earth’s surface by in-

more than 80 percent of carbon dioxide emissions in the United States.²⁴

Coal-fired power plants are also a major source of mercury emissions.²⁵ While environmental regulators have long understood the dangers of mercury in the food chain, they have only recently begun to focus on the effects of mercury emissions from coal-fired power plants.²⁶ Airborne mercury eventually falls to the ground, where it is deposited into surface waters directly or carried there through runoff. Once there, mercury enters into the food chain where it collects in the fatty tissue of fish.²⁷ Its toxic effects on humans, especially to sensitive populations, are potentially severe, even fatal.²⁸

II. COAL COMBUSTION POLLUTION AND ELECTRICITY REGULATION

Irrespective of its pollution byproducts, coal remains the fuel source for roughly 50 percent of total net power generation in the United States, and an even higher percentage of power generated from utility-owned power plants.²⁹ The remainder consists of nuclear power, natural gas, hydroelectric power and other sources. Figure 1 illustrates one reason for coal's popularity as a fuel for electric generation: its price has remained remarkably stable and low, compared

hibiting the radiation of heat from the sun back into space. See Intergovernmental Panel on Climate Change, *supra* note 5.

24. Environmental Protection Agency, *Global Warming- Emissions*, at <http://yosemite.epa.gov/oar/globalwarming.nsf/content/emissionsindividual.html> (last modified Jan. 7, 2000).

25. Environmental Protection Agency, *Frequently Asked Question About Mercury*, at <http://www.epa.gov/mercury/faq.htm> (last modified Jan. 19, 2005) (stating that coal-fired power plants represent 40 percent of mercury emissions in the United States.)

26. See Notice of Regulatory Findings, 65 Fed. Reg. 79,825-01 (Dec. 20, 2000) (announcing first EPA findings of dangers of mercury emissions from coal-fired power plants).

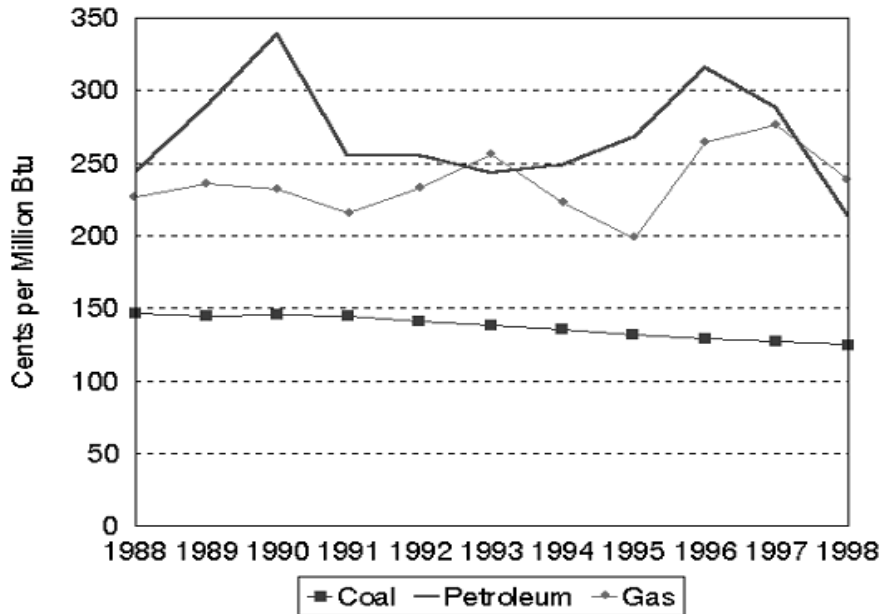
27. Environmental Protection Agency, *Frequently Asked Question About Mercury*, at <http://www.epa.gov/mercury/faq.htm> (last modified Jan. 19, 2005) (stating that as part of this process, microorganisms convert it to methylmercury, a highly toxic form of mercury).

28. Environmental Protection Agency, *Frequently Asked Question About Mercury*, at <http://www.epa.gov/mercury/faq.htm#4> (last modified Jan. 19, 2005) (stating “[t]he effects of mercury exposure can be very severe, subtle, or may not occur at all, depending on the factors above. Mercury can affect the nervous system. Because fetuses, infants, and children are still developing, they are particularly sensitive to the effects of methylmercury on the nervous system. People are mainly exposed to methylmercury, an organic compound, when they eat fish and shellfish that contain methylmercury.”).

29. Energy Information Administration, *Electric Power Monthly*, available at <http://tonto.eia.doe.gov/ftproot/electricity/epm/02260410.pdf> (Oct. 2004).

to other electric generating fuels.³⁰ Environmental groups have long argued, however, that these prices do not reflect the external or social costs of burning coal, which (if fully internalized by firms) would make other sources of electricity more price competitive with coal.³¹ Historically, American law has limited air pollution from coal-fired power plants in two ways: directly, through the Clean Air Act; and indirectly, by insulating other sources of power from having to compete with coal-fired power on price.

FIGURE 1: Utility Delivered Fuel Prices for Fossil Fuels, 1990s



SOURCE: U.S. Energy Information Administration³²

30. Coal is plentiful in the United States, unlike oil. It is easy to store, unlike natural gas. And it can be transported from its extraction point to its point of use by rail, without nearly as much additional processing as is required for oil and natural gas.

31. See Todd L. Cherry & Jason Shogren, *The Social Cost of Coal: A Tale of Market Failure and Market Solution* (Sept. 30, 2002), available at <http://www.business.appstate.edu/departments/economics/papers/wp0105.pdf> (discussing the non-economic costs of coal and comparing these to the economic expenses).

32. Energy Information Administration, *Electric Power Annual 2002*, available at <http://tonto.eia.doe.gov/FTP/ROOT/electricity/034802.pdf> (Dec. 2003).

A. *The Clean Air Act and Coal-Fired Power Pollution Prior to Restructuring*

One aim of the Clean Air Act was to force plant owners to internalize some of the external costs of coal combustion by requiring new plants to install pollution controls to limit their emissions.³³ While the Act has significantly reduced emissions of some pollutants into the atmosphere, it has not so much resolved the problem of pollution from coal-fired power plants as it has provided a structured backdrop for a three decade-long conflict over the issue.

The Act requires new³⁴ stationary sources³⁵ of pollution, like power plants, to secure a permit from state regulators³⁶ before emitting conventional pollutants, like sulfur dioxide, particulates and nitrogen oxides into the air. The permit must contain emissions limitations for these pollutants that reflect the level of pollution control that is achievable given currently available technology,³⁷ meaning that the emissions limits must be relatively more stringent than levels of pollution control achieved by most other similar sources. It is up to the state permit writer to determine the precise emissions limitation that reflects this technology-based standard at any given point in time,³⁸ subject to the requirement that the limitation not be less than certain backstop levels established by EPA.³⁹ Thus, as new permits

33. 42 U.S.C. § 7410(j) (2000).

34. The issue of when a source of pollution is a “new” source is discussed at length, *infra*, at section III. *See also supra* note 87.

35. The Act distinguishes stationary sources, like factories or power plants, from mobile sources, like cars and trucks. The term “stationary source” is defined in Section 111(a)(3) of the Act, 42 U.S.C. § 7411(a)(3) (2000).

36. EPA delegates permitting authority under the Clean Air Act to the states. 42 U.S.C. § 7410(a)(2)(c) (2000) (“Each [state implementation plan] shall include . . . a program to provide for the . . . regulation of the modification and construction of any stationary source within the areas covered by the plan as necessary to assure that national ambient air quality standards are achieved, including a permit program . . .”); and 42 U.S.C. § 7411(d) (2000) (requiring state permitting of major new sources).

37. These so-called “technology based standards” differ depending upon whether the plant is located in an attainment or nonattainment area for the pollution in question. In attainment areas, the emissions limitation must reflect the “best available control technology,” 42 U.S.C. § 7475(a)(4) (2000). In nonattainment areas, the limitation must reflect the “lowest achievable emissions rate,” 42 U.S.C. § 7503(a)(2) (2000).

38. That is, what is “best available” or “lowest achievable” changes over time. Permit writers have access to information about emissions limits contained in permits issued to similar facilities, and may use that information as well as other information about pollution control technology to determine the level of emission control that meets the statutory standard in question.

39. These backstop limitations are found in EPA’s “new source performance standards,” which are minimum emissions limitations for new sources within particular industrial categories. Section 111 of the Act directs EPA to issue these standards, 42 U.S.C. § 7411 (2000).

are issued and old permits expire and are renewed, and as pollution control technology grows more efficient and effective, the statutory technology-based standard—the level of pollution control that is available, achievable, and better than the industry norm—grows more stringent over time.

This Clean Air Act permitting regime has resulted in significant reductions in pollution levels and in emissions of conventional pollutants like sulfur dioxide, particulates and nitrogen oxides, over time. Even without controlling for economic and population growth, emissions of sulfur dioxide in 2003 were just over half of what they were in 1970,⁴⁰ while particulate⁴¹ emissions in 2003 were approximately one tenth of their 1970 levels.⁴² Reductions in nitrogen oxides emissions have been much more gradual, but only because steep reductions in stationary source emissions of nitrogen oxides were offset by increases in emissions from automobiles.⁴³ Despite this progress, critics contend that coal combustion continues to do harm by emitting pollution that slips through the cracks of the Clean Air Act regulatory regime.⁴⁴ These cracks in the system, say critics, concern a combination of three problems: exemptions for old coal-fired power plants; interstate transport of pollutants; and EPA's failure to regulate (or regu-

40. According to EPA, emissions of sulfur dioxide have declined from 31.2 million tons per year in 1970 to 15.8 million tons per year in 2003, Environmental Protection Agency, *National Air Pollution Emission Estimates for Conventional Pollutants*, available at <http://www.epa.gov/airtrends/econ-emissions.html> (last modified Feb. 14, 2005).

41. These data are based on particles of 10 microns in size, also known as "PM10." EPA's particulate matter NAAQS dates back to the 1970s. The agency promulgated a fine particle standard covering particles 2.5 microns in size ("PM2.5"), in the 1990s. EPA does not have historical emissions data for PM2.5. See Environmental Protection Agency, *Summary of EPA's Strategy for Implementing New Ozone and Particulate Matter Air Quality Standards*, available at <http://www.epa.gov/ttn/oarpg/naaqsf/impfac.html> (July 17, 1997).

42. Emissions of particulates have declined from 12.2 million tons per year in 1970 to 2.3 million tons per year in 2003. See Environmental Protection Agency, *National Air Pollution Emission Estimates for Conventional Pollutants*, *supra* note 40.

43. Emissions of nitrogen oxides have declined from 26.9 million tons per year in 1970 to 20.5 million tons per year in 2003. See *Id.*

44. See Public Interest Research Group, *Defending Our Air: An Overview*, at <http://cleanairnow.org/cleanairnow.asp?id2=9757&id3=cleanairnow&> (last visited Mar. 10, 2005); NRDC, Press Release, *NRDC Blasts Bush Plan to Increase Reliance on Coal; Group Says Increased Coal Burning Will Accelerate Global Warming*, at <http://www.nrdc.org/media/pressReleases/010702a.asp> (July 2, 2001). See also David Aftandilian, *Dying For Power: Clear Skies and Dirty Coal Plants*, *Conscious Choice*, at <http://www.consciouschoice.com/note/note1506.html> (June 2002) (calling coal-fired power plants a continuing "threat to public health").

late adequately) some important pollutants in coal combustion emissions.⁴⁵

Since the Act's tough permitting provisions apply only to "new" sources of air pollution, coal fired power plants that were in existence at the time the permitting requirements took effect— "grandfathered" plants—fall outside the scope of their coverage. Why did Congress exempt existing sources from these requirements? One possible explanation is political: Members of Congress sought to avoid imposing a costly pollution control burden on existing, identifiable plants, and the voters who work at and own those plants.⁴⁶ Alternatively, Congress may have reasoned that pollution controls can be installed more efficiently when plants are constructed, rather than later through retrofitting.⁴⁷ However, Congress does not seem to have intended for grandfathered plants to be grandfathered indefinitely, since the Act calls for application of a "new source" permitting standards to "stationary source[s] the construction *or modification* of which is commenced after" the effective date of the Act's new source permitting requirements.⁴⁸ Congress may have intended that this provision operate gradually to widen the scope of coverage of the new source permitting provisions as old plants were replaced or modified, so that over time the number of exempted plants would dwindle to zero.

In any case, older coal-fired power plants, many of them in the Midwest, continued to pollute at essentially unregulated rates long after the passage of the Act, depositing acid rain and other pollution on downwind states.⁴⁹ The Clean Air Act contemplates the problem of

45. See, e.g., Patrick Parenteau, *Anything Industry Wants: Environmental Policy under Bush II*, 14 DUKE ENVTL. L. & POL'Y F. 363, 368 (2004).

46. See Robert W. Hahn, *The Politics and Religion of Clean Air*, 13 Regulation, available at <https://www.cato.org/pubs/regulation/reg13n1-hahn.html> (last visited Mar. 2, 2005). See also R. Shep Melnick, *Strange Bedfellows Make Normal Politics: An Essay*, 9 DUKE ENVTL. L. & POL'Y F. 75, 90-91 (1998).

47. See Dennis D. Hirsch Globalization, *Information Technology, and Environmental Regulation: An Initial Inquiry*, 20 VA. ENVTL. L.J. 57, 69-70 (2001) ("In coming to the decision not to require existing plants to retrofit, Congress reasoned that pollution controls can be installed more efficiently when plants are constructed, rather than later.").

48. 42 U.S.C. § 7411(a)(2) (2000) (emphasis added). For a fuller discussion of the application of new source standards to "modified" older sources, see *infra* section III.

49. David B. Spence, *Politics Versus Law in Regulatory Permitting* (forthcoming, 2005) (stating that a review of the permit emissions limits for coal-fired power plants over the last two decades reveals that the NOx and particulate matter emissions limitations imposed on plants whose permits do not reflect federal new source standards are, on average, several orders of magnitude higher than those reflecting new source standards).

the transport of pollution across state boundaries, and requires states to prohibit emissions that “contribute significantly” to NAAQS violations in other states.⁵⁰ For a state to permit such emissions is a violation of the Act enforceable by EPA or by citizen suit,⁵¹ and downwind states may petition EPA under section 126 of the Act for a finding that this prohibition has been violated.⁵² Northeastern states have attempted to use these provisions to complain about emissions from largely unregulated Midwestern power plants, but prior to the 1990s these provisions were narrowly read by EPA and the courts, and were therefore relatively ineffective remedies for downwind states.⁵³ Furthermore, these provisions offered no help with the problem of acid rain, which does much of its damage without triggering violations of NAAQS.⁵⁴ Downwind states received some help with the acid rain problem from Congress in the form of the Clean Air Act amendments of 1990, which mandated a sharp, staged decrease in sulfur dioxide emissions from coal-fired power plants, including existing sources left unregulated by the Act’s new source permitting require-

50. This prohibition is found in Section 110 of the Act, which requires states to develop plans for achieving and maintaining compliance with NAAQS (known as “state implementation plans,” or “SIPs”). 42 U.S.C. § 7410(a)(2)(D) (2000):

Each implementation plan . . . shall . . . contain adequate provisions . . . prohibiting, consistent with the provisions of this subchapter, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will . . . contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard . . .

51. *See* 42 U.S.C. § 7426 (2000).

52. Section 126 grants the petitioning power to “any State or political subdivision,” who “may petition the Administrator for a finding that any major source or group of stationary sources emits or would emit any air pollutant in violation of the prohibition of [Section 110’s prohibition against causing NAAQS violations in other states].” 42 U.S.C. § 7426(b) (2000). This section also makes clear that the possession of a valid permit by upwind sources is no shield to liability under this section:

Notwithstanding any permit which may have been granted by the State in which the source is located. . . it shall be a violation of this section . . . for any major proposed new (or modified) source with respect to which a finding has been made under subsection (b) [of this section] to be constructed or to operate in violation of the prohibition of section 110 (a)(2)(D)(ii) [of this title] . . .

42 U.S.C. § 7426(c) (2000).

53. Courts established difficult to meet thresholds for making the finding required under Section 126(b). *See, e.g., Connecticut v. EPA*, 696 F.2d 147 (2d Cir. 1982) (requiring that the upwind source be responsible for at least 5 percent of emissions in the downwind community).

54. Acid rain precursors SO₂ and NO_x can travel long distances and return to the ground in dry form, thereby contributing to violations of SO₂ and ozone NAAQS, respectively. But when they fall in liquid form, the damage they do to lakes and vegetation does not contribute to a NAAQS violation, and therefore cannot be addressed by the process described in sections 110 and 126.

ments.⁵⁵ The acid rain program has dramatically reduced total sulfur dioxide emissions from coal-fired power plants,⁵⁶ by imposing a nationwide cap on emissions, and permitting individual sources to buy and sell emissions allowances (tradeable permits).⁵⁷ The acid rain program, however, does little to solve other pollution problems posed by unregulated coal-fired power plants, including those associated with emissions of particulates, nitrogen oxides, carbon dioxide and mercury. Not surprisingly then, the creation of the program did little to quell the frustration of downwind states and environmentalists with pollution from coal-fired power plants. To the contrary, the legal battles over transboundary pollution between northeastern states and environmental groups on the one hand, and upwind coal-fired power plants on the other, heated up in the 1990s.⁵⁸

Throughout the 1990s, many communities struggled to comply with the national standard for ozone. While the lion's share of the problem was attributable to local automobile emissions, the problem was exacerbated in the eastern United States by the downwind (mostly eastward) transport of ozone and its precursors.⁵⁹ In response to pressure from northeastern states⁶⁰ and Congress,⁶¹ EPA began to study the problem of ozone transport with an eye toward imposing further limits on the emission of ozone precursors in the eastern half of the United States. Meanwhile, EPA had begun to change the way

55. See 42 U.S.C. §§ 7651-7651a (2000) (Title IV of the Clean Air Act).

56. See 42 U.S.C. § 7651 (2000) (The acid rain program will reduce sulfur dioxide emissions from covered plants by more than 50 percent).

57. See 42 U.S.C. § 7651b(a)-(b) (2000) (describing the system of allocating annual SO₂ emissions allowances, and the trading system). See also <http://www.epa.gov/airmarkets/arp/> (summarizing data on the operation of the trading program to date) (last visited Apr. 15, 2005).

58. See *State of Connecticut v. Browner*, No. 98-1376 (S.D.N.Y., filed Feb. 25, 1998) (Connecticut, Massachusetts, Maine, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont first submitted petitions to EPA under Section 126 of the Act seeking a finding that upwind states were violating the provisions of Section 110, which in turn prohibited states from allowing local emissions that caused NAAQS violations in another, downwind state. When action on the 126 petitions was not promptly forthcoming from EPA, the eight states filed a court action seeking the same remedy in federal district court. That suit was subsequently settled).

59. See generally Environmental Protection Agency, *Regional Transport of Ozone: New Rule on Nitrogen Oxide Emissions* (1998), available at http://www.epa.gov/ttn/naaqs/ozone/rto/about_1.html.

60. See *supra* note 58.

61. In its 1990 amendments to the Act, Congress had added Section 184, which added to the statute a regulatory structure within which EPA could study and address the problem of ozone transport. Specifically, section 184 created an ozone transport region in the eastern United States, and authorized the creation of an ozone transport commission to study the problem. 42 U.S.C. § 7511c (2000).

it enforced the Clean Air Act's new source review provisions. Prior to the mid-1990s, EPA had permitted owners of coal-fired power plants to engage in a wide variety of maintenance, repair, and replacement activities at their plants without triggering the stringent permitting standards that apply to "new or modified" sources.⁶² By the mid-1990s, EPA was beginning to rethink its relatively lenient approach to this issue, which became known as "new source review."⁶³

Meanwhile, environmental scientists were developing a new appreciation for the risks posed by two other byproducts of coal combustion: mercury and carbon dioxide. The Clean Air Act reserves its most stringent technology-based permitting standards⁶⁴ for emissions of toxic pollutants, like mercury. By the mid-1990s, however, EPA had not yet regulated mercury emissions from coal-fired power plants, despite growing a concern that the accumulation of mercury in the food chain might be responsible for an increased incidence of birth defects and neurological damage in humans. Similarly, even though most climatologists had concluded by the mid-1990s that greenhouse gas emissions were contributing the global warming,⁶⁵ EPA had declined to use its regulatory authority under the Clean Air Act to regulate those emissions; however, throughout the first Clinton Administration, the United States participated actively in negotia-

62. For a discussion of this chronology, see *infra* section II.A.

63. See *infra* sections II.A. and II.B.2 for a fuller description of this issue, its legal basis, and the changing interpretation of the relevant Clean Air Act provisions during the 1990s.

64. For toxic pollutants, the Section 112 of the Clean Air Act requires the imposition of emissions standards reflecting the "maximum achievable control technology," or "MACT." 42 U.S.C. § 7412d (2000). The Act defines MACT as:

Emission standards promulgated under this subsection *for existing sources* in a category or subcategory may be less stringent than standards for new sources in the same category or subcategory but shall not be less stringent, and may be more stringent than – (A) the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information), excluding those sources that have, within 18 months before the emission standard is proposed or within 30 months before such standard is promulgated, whichever is later, first achieved a level of emission rate or emission reduction which complies, or would comply if the source is not subject to such standard, with the lowest achievable emission rate . . . or (B) the average emission limitation achieved by the best performing 5 sources (for which the Administrator has or could reasonably obtain emissions information) in the category or subcategory for categories or subcategories with fewer than 30 sources.

Clean Air Act 112(d)(3), 42 U.S.C. § 7412(d)(3) (2000) (emphasis added). Note that for toxic pollutants, unlike conventional pollutants like SO₂ and NO_x, the Act's stringent permitting standards apply to new and existing sources of emissions.

65. See *infra* notes 115-124 and accompanying text for a fuller discussion of the scientific debate over the causes and consequences of global warming in the mid-1990s.

tions on this issue with other nations, under United Nations auspices.⁶⁶

It was against this legal and political backdrop that the multifront war over pollution from coal combustion intensified during the second half of the 1990s, fed by growing fears over the effects of restructuring in the electric utility industry on coal-fired power.

B. *Restructuring and Coal Combustion*

1. The Concern

Why did the prospect of restructuring the utility industry intensify the fight over pollution from coal combustion? Because restructuring threatened to disrupt a regime—traditional rate regulation—that can act as a kind of check on pollution from coal combustion. Traditionally, under the Federal Power Act⁶⁷ and analogous state laws,⁶⁸ the Federal Energy Regulatory Commission (“FERC”) and state public service commissions have approved the rates at which power could be sold on the wholesale and retail markets, respectively. For most of the 20th century, electric utilities were vertically integrated companies, generating power (and buying some power on wholesale markets), transmitting it over their own transmission and distribution system, and selling it directly to their retail customers. By way of administratively-established rates, traditional regulation guaranteed that licensed monopoly electric service providers would earn a “fair” return on their prudently made investments.⁶⁹ In return, electric utilities

66. After the Rio Summit in 1992, the United Nations Environment Programme administered the United Nations Framework Convention on Climate Change, which eventually produced the Kyoto Protocol on climate change. *See infra* notes 115-124 and accompanying text.

67. 16 U.S.C. §§ 791-823c (2000). The Federal Power Act requires that wholesale power purchase rates be “just and reasonable,” a requirement that the FERC has traditionally enforced through rate cases. 16 U.S.C. § 824d(a):

All rates and charges made, demanded, or received by any public utility for or in connection with the transmission or sale of electric energy subject to the jurisdiction of the Commission, and all rules and regulations affecting or pertaining to such rates or charges shall be just and reasonable, and any such rate or charge that is not just and reasonable is hereby declared to be unlawful.

68. *See* 66 PA. CONS. STAT. §§ 1301-12 (2000). Many state codes contain the same “just and reasonable” language as the Federal Power Act, along with guidelines for the state public utilities commission to conduct ratemaking proceedings. The Pennsylvania Code is fairly typical in this regard.

69. In rate cases, utility commissions typically make rate decisions using the following equation: $R = Br + O$, where R represents the company’s total revenue requirements, B represents the rate base, r represents the permissible rate of return on investment, and O represents permissible operating expenses. Assets that are used and useful to the company’s task of supplying electric service are includable within rate base, and are those on which the company is

agreed to meet a variety of service obligations to the general public, including the obligation to serve all eligible customers and the provision of a reliable source of supply.⁷⁰

Some analysts argue that traditional rate regulation favors alternatives to coal-fired power, in certain indirect ways. For example, many public service commissions encourage electric utilities to diversify their generation portfolios as a way to ensure service reliability.⁷¹ While coal plants may produce the cheapest power, exclusive reliance on coal-fired generation leaves utilities vulnerable to interruptions in the supply of coal-fired power,⁷² reducing the diversity (and presumably, therefore, the reliability) of the utility's generation portfolio. Investment in more costly generation sources using more expensive fuels poses no market risk under traditional regulation: As long as the public service commission does not deem such investments to be "imprudent," they will be included in the company's rate base.⁷³ Since such investments help utilities achieve the goal of maintaining a diversified generation portfolio, they are unlikely to be excluded from rate base merely because they produce more expensive power.⁷⁴ In

guaranteed a fair return. Most states treat any prudently made investment in such assets as properly includable in rate base.

70. See, e.g., 66 PA. CONS. STAT. §§ 1501-02 (2000) (These obligations include the duty to provide reliable service to all qualified customers, rules against discrimination in the provision of the service, and more.).

71. See, e.g., CAL. PUB. UTIL. CODE § 454.5(b)(9)(B)(11) (2005) (requiring utility power purchase plans to reflect "diversity of fuel supply"); N.H. REV. STAT. ANN. § 362-A:1 ("It is found to be in the public interest to provide for small scale and diversified sources of supplemental electrical power to lessen the state's dependence upon other sources which may, from time to time, be uncertain."); Iowa Utilities Board, *Reliability: Emerging Competition in the Electric Power Industry A Staff Analysis* (Docket No. NOI-95-1, Mar. 1999), at http://www.state.ia.us/government/com/util/docs/Restructuring/reliability_rpt.pdf (last accessed Apr. 18, 2005) ("A traditional "diversified generation portfolio" smoothes out any variations in load profiles, fuel prices (as long as these fuel prices are not directly correlated), and available capacity of transmission interconnections.").

72. While interruptions in the supply of coal seem unlikely, the political risk of interruptions – or significant increases in cost due to regulation – might be less unlikely.

73. Generation investments deemed by the public service commission to be "imprudent" can be, and sometimes are, excluded from the rate base, thereby reducing utilities' revenues correspondingly. The prudent investment standard was articulated in Justice Brandeis' seminal dissent in *Southwestern Bell Telephone Co. v. Public Service Comm'n*, 262 U.S. 276 (1923). For an illustrative discussion of the question of whether a very expensive plant investment was prudently made, and therefore includable within the rate base, see *Duquesne Light Co. v. Barasch*, 488 U.S. 299 (1988).

74. Throughout the 1980s and 1990s, state utilities' commissions and courts permitted companies to include expensive nuclear plants within rate base, sometimes on fuel diversification grounds.

this way, traditional rate regulation can insulate more expensive fuels from price competition from coal.

Moreover, states and state public service commissions have used their leverage over utilities to favor alternatives to coal in another way, namely, by compelling utilities to invest in conservation and cleaner sources of power. Since the energy crises of the 1970s, state and federal governments have encouraged conservation and renewable power sources using a combination of federal and state statutes,⁷⁵ and public service commission orders.⁷⁶ By the mid-1990s, many states had created some form of renewable portfolio standards,⁷⁷ integrated resource planning program,⁷⁸ or other measure encouraging the use of fuel sources other than large fossil-fueled central stations. The restructuring of the electricity industry that began in the mid-1990s threatened to change these incentives. In 1994 and 1995, California and a few other states with relatively high electric rates began the process of opening electric markets to competition and customer choice.⁷⁹ At the federal level, FERC's Order 888⁸⁰ encouraged utilities to unbundle electricity generation from transmission and distribution services by requiring owners of transmission lines to provide transmission service to third party wholesalers of electricity, thereby enabling wholesale buyers to purchase power from sellers other than owners of the transmission lines through which they received electric-

75. See 16 U.S.C. §§ 2601-03 (2000). At the federal level, the Public Utilities Regulatory Policies Act of 1978 established a number of financial incentives for the development of "alternative" sources of power, including more efficient sources and renewables, like solar, wind, hydro, geothermal, and biomass power.

76. While the FERC has done little to encourage cleaner sources of power, state commissions have done quite a bit in this area. [Summary of PSC orders]

77. See Brent M. Haddad & Paul Jefferiss Renew, *Forging Consensus on National Renewables Policy*, 12 *ELECTRICITY L.J.* __ (1999) (describing renewable portfolio standards requiring retail sellers of power to secure a specified percentage of that power from renewable sources).

78. See Ralph C. Cavanagh, *Least Cost Planning Imperatives for Electric Utilities and Their Regulators*, 10 *HARV. ENVTL. REV.* 299 (1986) (describing integrated resources planning programs offering utilities a variety of financial incentives to consider the environmental costs of generation and to employ cleaner generation sources).

79. California's restructuring was commenced by California Assembly Bill 1890, enacted into law in 1996, available at http://www.leginfo.ca.gov/pub/95-96/bill/asm/ab_1851-1900/ab_1890_bill_960924_chaptered.html (last accessed Apr. 18, 2005); New York and Pennsylvania followed suit later that year: New York's Public Service Commission issued its Opinion and Order Regarding Competitive Opportunity for Electric Service, Opinion No. 96-12, Case 94-E-0952, (May 20, 1996); and Pennsylvania's legislature passed its Electricity Generation Customer Choice and Competition Act, 66 PA. CONS. STAT. § 2801 (2000).

80. Order 888: Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities. 75 FERC 61,080 (Apr. 24, 1996).

ity. The state programs in California, New York, Texas and elsewhere had the same effect at the retail level, requiring owners of the distribution system to distribute power to retail buyers who could now purchase electricity from the seller of their choice.⁸¹

The obvious implication of these changes—indeed, their primary goal—was to force wholesale and retail sellers of electricity to compete with one another for customers.⁸² Many worried, however, that with no guaranteed rate of return on investment, generation owners would no longer have an incentive to invest in cleaner, more expensive sources of power, and that retail sellers competing for retail customers would compete only on price, increasing the demand for cheap, dirty, coal-fired power. These 1996 remarks of an energy industry consultant illustrate a widespread concern at the time about the environmental effects of restructuring:

the lowest-cost producers of power, by far, are the older, Midwest power plants that have the fewest environmental controls. These plants, which are also incidentally upwind of the Northeast and Midwest population centers of the eastern half of the United States, with no further governmental intervention, will benefit from the greatest consumer demand and will significantly increase production in turn increasing emissions. If a purely free market selling price is the only issue, rather than utilizing clean burning nuclear or gas power or building a new clean generator, customers across the country will favor the cheapest power (typically a coal-based generator) instead of local production - even if the local producer offers cleaner energy.⁸³

This was (and remains) a widely held view of restructuring, among environmental interests⁸⁴ and academics⁸⁵ alike.

81. See California Assembly Bill 1890, *supra* note 79, New York PSC, Opinion and Order Regarding Competitive Opportunity for Electric Service, *supra* note 79; and Texas SB 7, now TEX. UTIL. CODE ANN. §§ 39.001-39.050 (2004).

82. FERC's order 888 opened up wholesale market to competition by forcing owners of transmission lines to offer transmission service at nondiscriminatory terms. This made it much easier for wholesale buyers and wholesale sellers to transact business, since delivery of power was no longer an impediment to these transactions. Likewise, state restructuring programs treated the distribution grid in just the same way, permitting retail buyers to purchase power from new sellers, sellers who were previously prohibited from competing in the former incumbent utility's service area.

83. William G. Rosenberg, *Restructuring the Electric Utility Industry and Its Effect on the Environment*, 14 PACE ENVTL. L. REV. 69, 73 (1996).

84. See, e.g., U.S. Public Interest Research Group Education Fund, *Up in Smoke: Congress' Failure to Control Emissions from Coal Power Plants* (1999) at 1-2:

Deregulation of the wholesale power market helped increase the demand for power from existing coal-fired facilities, while simultaneously discouraging the construction of new, cleaner power plants. Retail deregulation is likely to compound this effect unless accompanied by strong environmental standards.

2. Regulatory Tug of War: Clinton v. Bush

The Clinton EPA seemed to embrace the view that restructuring posed a danger of increased emissions from coal-fired power plants,⁸⁶ and it increased the regulatory pressure on coal-fired power by undertaking a series of regulatory initiatives, all of which occurred during the Clinton Administration's second term, and most of which were subsequently weakened or reversed by the Bush Administration. These included more aggressive enforcement of the Clean Air Act's new source review provisions, increased regulatory attention to ozone

available at http://www.ewg.org/reports_content/upinsmoke/upinsmoke.pdf. See also Union of Concerned Scientists, "Backgrounder" on Electricity Restructuring, at http://www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=92 (describing a shift toward coal-fired power as a "likely result of some deregulation proposals").

85. See, e.g., Shi-Ling Hsu, *Reducing Emissions from the Electricity Generation Industry: Can We Finally Do It?*, 14 TUL. ENVTL. L.J. 427 (2001):

Additional emissions reductions may be even more difficult to achieve in a deregulated U.S. energy environment. A market-driven energy environment will probably lower energy costs in the long run, but will probably offer little or no incentives for electricity generation firms to reduce or eliminate emissions. In particular, market conditions may push the renewable energy industries to the brink of extinction.

14 TUL. ENVTL. L.J. at 428 (citations omitted). See also David Mallery, *Clean Energy and the Kyoto Protocol: Applying Environmental Controls to Grandfathered Power Facilities*, 10 COLO. J. INT'L ENVTL. L. & POL'Y 469 (1999) ("Recent deregulation of the electric utility industry significantly favors [grandfathered coal-fired power plants]"); Kirsten Engel, *The Dorman Commerce Clause Threat to Market-Based Environmental Regulation: The Case of Electricity Deregulation*, 26 ECOLOGY L. Q. 243 (1999) ("Deregulation creates incentives to use cheaper, yet more polluting, coal . . ."); Rudy Perkins, Note, *Electricity Deregulation, Environmental Externalities and the Limitations of Price*, 39 B.C. L. REV. 993 (1998) ("Without environmental adders, carbon emissions taxes or other penalties on CO[2] output, cost advantages for coal could maintain or increase its use, thereby increasing global warming."); Justin M. Nesbit, Note, *Commerce Clause Implications of Massachusetts Attempt to Limit the Importation of "Dirty" Power in the Looming Competitive Retail Market for Electricity Generation*, 38 B.C. L. REV. 811 (1997) (lamenting increased pollution in the northeast due to coal's "cost-competitive advantage"). Indeed, these concerns led the FERC to prepare an environmental impact statement ("EIS") in conjunction with Order 888, analyzing the environmental effects of restructuring. When it finalized Order 888, it summarized the key findings of the EIS as follows:

The FEIS finds that the relative future competitiveness of coal and natural gas generation is the key variable affecting the impact of the Final Rule. If competitive conditions favor natural gas, the Rule is likely to lead to environmental benefits. Both EPA and the Commission staff believe this projected scenario is the more likely one. If competitive conditions favor coal, the Rule may lead to small negative environmental impacts.

61 Fed. Reg. 21,540, 21,542 (May 10, 1996).

86. See Annual Report of the Council on Environmental Quality, 1996, at <http://ceq.eh.doe.gov/reports/1996/part1.pdf> (reflecting the concern in EPA's dispute with FERC over the latter's analysis of the environmental impacts of restructuring in the EIS accompanying the FERC's restructuring rule, Order 888. This disagreement was referred to the Council on Environmental Quality in May of 1996, which reported that it was able to resolve the disagreements through negotiation). See Michael, Kantro, *Shall it Be Said that My Dusk Was in Truth My Dawn?*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 533 (2000) (summarizing and analyzing the EPA-FERC dispute on air pollution effects of restructuring).

pollution and ozone transport, a proposal to regulate mercury emissions from coal-fired power plants, and taking the initial steps toward regulation of carbon dioxide emissions from such plants.

New source review. Reasoning that old plants exempted from new source permitting standards would thrive under competition, the Clinton EPA stepped up its efforts to bring those plants within the ambit of new source review. The language of the Clean Air Act authorizes EPA to apply new source review to any plant that had been “modified,”⁸⁷ that is, any plant that has undergone a “physical change” resulting in an increase in emissions.⁸⁸ The statutory language seems to impose stricter, new source permitting standards on any old sources whose emissions increased as a result of *any* physical change, including repair or maintenance work. However, in 1978, EPA promulgated a rule defining the term “physical change” to exclude “routine maintenance, repair and replacement,”⁸⁹ apparently signaling its intention to exempt repairs that increase emissions from new source review. Despite this rule, EPA did bring a few new source review enforcement actions against owners of coal-fired power plants in the decade and a half following the 1978 regulation, arguing that the work done at those plants went beyond “maintenance, repair and replacement.” These cases produced federal court opinions that tended to support the view that the statute’s new source review provisions ought not to exempt old coal-fired power plants from new source standards indefinitely,⁹⁰ and ought to trigger those standards whenever any physical change in the plant increases emissions, regardless of the nature of the work.⁹¹

87. See Clean Air Act, 42 U.S.C. § 111(a) (2000) (defining a “new source” (to which new source permitting standards apply) to include sources which have been constructed or “modified”).

88. See Clean Air Act, 42 U.S.C. § 7411(a)(4) (2000) (defining modification to include: any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted).

89. 40 CFR 51.166(b)(2)(iii)(a). This section was subsequently repealed.

90. See *Alabama Power v. Costle*, 204 U.S. App. D.C. 51, 200 (D.C. Cir. 1980) (“the provisions concerning modifications indicate that this is not to constitute a perpetual immunity from all standards under the [new source review] program”).

91. See *Wis. Elec. Power Co. v. Reilly*, 893 F.2d 901, 908 (7th Cir. 1990) (“any physical change means precisely that”). There was also considerable EPA-generated confusion over when a physical change actually increases emissions. EPA sometimes made this determination by comparing the pre-change *actual* emissions (which could be far below the plant’s potential emissions) with the post-change *potential* emissions (which could be far greater than the plant’s actual emissions). See *Id.* at 918 (The Wisconsin Electric court disapproving of EPA’s application of the “potential to emit” test).

The Clinton Administration used these precedents to dramatically step up its enforcement of new source review, contending that *past* repairs at many coal-fired power plants triggered new source permitting standards.⁹² The Administration initiated several judicial enforcement actions⁹³ against approximately 30 such plants, and took administrative action against the Tennessee Valley Authority with respect to 9 additional coal-fired plants.⁹⁴ Most of these cases were still pending⁹⁵ by the time the Bush Administration took power in early

92. The Clinton EPA's retroactive application of a new interpretation of the statutory language raises possible due process issues. *See* Gen. Elec. Corp v. EPA, 53 F.3d 1324, 1328, 1333 (D.C. Cir. 1995) (holding that because "due process requires that parties receive fair notice before being deprived of property," EPA could not penalize General Electric for asserted regulatory violations when General Electric lacked "fair warning of [EPA's] interpretation of the regulations"); *see also* Shell Offshore Inc. v. Babbitt, 238 F.3d 622 (5th Cir. 2001) (concluding that because the Interior Department's change in the way it calculated offshore oil leases constituted a change in a longstanding interpretation of the Department's existing rules, the new policy required notice and comment). The boundaries of this prior notice rule are unclear, however. General Electric is in accord with some prior case law. *See, e.g.,* Energy West Mining Co., 17 FMSHRC 1313, 1317 (Aug. 1995) (due process requires that a regulation give "fair warning of the conduct it prohibits or requires.") (quoting *Gates & Fox Co. v. Occupational Safety & Health Review Comm'n*, 790 F.2d 154, 156 (D.C. Cir. 1986)). *See also* *Phelps Dodge Corp. v. Federal Mine Safety & Health Review Comm'n*, 681 F.2d 1189, 1193 (9th Cir. 1982) (a regulation cannot be construed "'to mean what an agency intended but did not adequately express.'") (quoting *Diamond Roofing Co. v. Occupational Safety & Health Review Comm'n*, 528 F.2d 645, 649 (5th Cir. 1976)). However, one can argue that despite EPA's 1978 regulatory exemption, the statute itself is clear about what constitutes a modification, and that plant owners therefore did have fair notice of what the statute means. Furthermore, it is not clear how the GE decision and these lower court opinions fit the Supreme Court's *Chenery* rule, which seems to give agencies latitude to apply new interpretations retroactively without prior warning. *SEC v. Chenery Corp.*, 332 U.S. 194 (1947). While *Chenery* involved policies developed through adjudication rather than interpretive rulemaking, some commentators see the *Chenery* rule trumping the General Electric rule even in the latter context, as long as the agency is not applying "quasi-criminal" sanctions for violating the new interpretation. *See, e.g.,* Harold J. Krent, *Reviewing Agency Action for Inconsistency with Prior Rules and Regulations*, 72 CHI.-KENT. L. REV. 1187, 1222 (1997); Albert C. Lin, *Refining Fair Notice Doctrine: What is Required of Civil Regulations*, 55 BAYLOR L. REV. 991 (2003).

93. The judicial enforcement actions were filed against American Electric Power Co. (S.D. Ohio), Ohio Edison and First Energy (S.D. Ohio), Cinergy Corp. (S.D. Ind.), Southern Indiana Gas & Electric Co. (S.D. Ill.), Illinois Power Co. (S.D. Ind.), Southern Company affiliates including Alabama Power Co. and Georgia Power Co. (N.D. Ga.), Duke Power, and 7) Tampa Electric Co. (M.D. Fla.).

94. *In re Tennessee Valley Authority*, No. 00-6 (Env'tl. App. Bd. Sept. 15., 2000), available at <http://www.epa.gov/eab/disk11/tva.pdf>.

95. One of the judicial enforcement actions was settled, with the defendant agreeing to make a variety of pollution control upgrades. *See* *United States v. Tampa Elec. Co.*, No. 99-2524, CIV-T-23F (M.D. Fla., filed Nov. 3, 1999). With respect to the other judicial enforcement actions, the Bush Justice Department concluded that continuing these actions was "consistent with the Clean Air Act and its regulations." *See* U.S. Justice Dept. Office of Legal Policy, New

2001. After the transition, the Bush Administration immediately signaled its concerns about the Clinton new source review policy by calling for a review of the policy as part of the Cheney Task Force's National Energy Policy ("NEP").⁹⁶ The NEP contended that aggressive application of new source review to old coal-fired power plants was confusing and unwieldy and could jeopardize energy security. The Bush Administration ultimately replaced the Clinton Administration's new source review policy with a new, less aggressive policy in 2002, one that permits plant owners to perform many physical plant changes without triggering new source review.⁹⁷ However, the Administration coupled its gentler approach to new source review with a legislative proposal to reduce emissions from old coal-fired power plants, called the Clear Skies bill.⁹⁸ Meanwhile, the Justice Department nevertheless continues to prosecute some of the pending Clinton-era new source review enforcement actions,⁹⁹ and has even filed a few additional enforcement suits.¹⁰⁰ Several state attorneys general and environmental groups have initiated parallel negotiations with, and suits against, coal-fired power plants seeking to apply new source standards to older plants. These negotiations and suits are continuing as of this writing.¹⁰¹ State attorneys general also challenged the Ad-

Source Review: An Analysis of the Consistency of Enforcement Actions With the Clean Air Act and Implementing Regulations.

96. White House, *Report of the National Energy Policy Group* (May 2001), at ch. 3 and app. 1, at <http://www.whitehouse.gov/energy/National-Energy-Policy.pdf>.

97. Environmental Protection Agency, New Source Review Reform Rule, 67 Fed. Reg. 80,186 (Dec. 31, 2002). Whereas the old policy would treat any physical change that increased emissions as a "modification" triggering new source standards, the new policy would deem projects that represent capital spending of less than 20 percent of plant value to outside the scope of new source review.

98. This proposal took the form of the proposed Clear Skies Act, described *infra* at notes 128-129 and accompanying text.

99. See, e.g., Press Release, U.S. Dept. of Justice, U.S. Files Motion to Lift Stay in Alabama Power Litigation (Feb. 17, 2004).

100. The Justice Department has filed an additional new source review enforcement suit against a power plant whose plant upgrades triggered new source review under the Bush Administration standards. See Press Release, U.S. Files Suit Against Eastern Kentucky Power Cooperative (Jan. 28, 2004), at http://www.usdoj.gov/opa/pr/2004/January/04_enrd_052.htm. See also BNA, *EPA to File New Lawsuits for Violations Of New Source Review*, *EPA Chief Says*, 35 *Env't. Rep.* 158 (Jan. 23, 2004).

101. See *States, Enviros Seek End Run Around Bush NSR Policy*, *Greenwire* (July 29, 2004) (describing these suits against a wide variety of plant owners across several states). Many of these suits adopt essentially the position advanced by the court in the Wisconsin Electric case, *supra* note 91, that EPA cannot use regulation to change the plain meaning of a statutory term. They argue that since the Clean Air Act defines a "modification" to include "any physical change," the Bush Administration's attempts to establish a size threshold for physical changes runs contrary to the statute.

ministration's new source review rule in court, and the U.S. Court of Appeals for the District of Columbia Circuit has stayed the rule.¹⁰²

Ground-level ozone. As with new source review, the Bush Administration also inherited a series of other Clinton Administration policies addressing other pollution problems associated with coal-fired power plants. After concluding that the existing ozone standard (NAAQS) was insufficient to protect human health, the Clinton Administration promulgated a new, more stringent ozone standard in 1997,¹⁰³ which further exacerbated the ozone compliance problem for the states. The Clinton EPA also issued a rule¹⁰⁴ in 1998 requiring 22 states in the eastern half of the country to further reduce their emissions of ozone precursors, specifically mandating that electric generating units share a significant portion of the burden of those reductions.¹⁰⁵ The rule required states to submit specific plans for achieving these reductions, which the states have done. The Bush EPA did not revoke or substantially change either of these two rules, and has not deviated much from the plans laid out by the Clinton EPA for ozone pollution. However, as of this writing Congress is considering relieving downwind communities of the obligation to comply with NAAQS (including the standard for ozone) until upwind states have done so first.¹⁰⁶

Mercury. The same cannot be said for EPA's treatment of mercury pollution from coal-fired power plants. During the 1990s, EPA was engaged in an ongoing struggle with environmental groups and others over the problem of mercury pollution from coal-fired power plants. The 1990 Amendments to the Clean Air Act expanded EPA's

102. *West Virginia v. EPA*, 362 F.3d 861 (2004). See also BNA, *Appeals Court Blocks EPA Implementation of Rule on Routine Maintenance Exemptions*, 35 Env't. Rep. 5 (Jan. 2, 2004).

103. See National Ambient Air Quality Standards for Ozone; Final Rule, 62 Fed. Reg. 2 (July 18, 1997) (The existing standard was expressed in terms of a one-hour average limit. That standard was replaced by an 8-hour standard at a level of 0.08 parts per million (ppm), which was generally considered to be a more stringent standard).

104. This rule is known as the "NOx SIP Call," because it required states to submit revised "state implementation plans," or "SIPs" to describe how they planned to implement these additional restrictions on emissions of ozone precursors. 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).

105. 63 Fed. Reg. 57,356 (Oct. 27, 1998) (setting forth that 22 covered states were required to have submitted plans for implementing the new requirements by May of 2004. and showing that the rule will cover NOx emissions from coal-fired electric generating units).

106. See Michael Janofsky, *Clean Air Change is Built Into Bill*, N.Y. TIMES, Apr. 15, 2005, at A1.

power to regulate emissions of toxic pollutants, including mercury,¹⁰⁷ and specifically directed EPA to study the risks associated with toxic emissions from coal-fired power plants.¹⁰⁸ Environmental groups sued the agency in the early 1990s for failing to complete these tasks adequately.¹⁰⁹ Pursuant to the settlement of these suits, EPA's 1998 report to Congress on emissions of toxic emissions¹¹⁰ from coal-fired power plants concluded that regulating these emissions was both "appropriate and necessary."¹¹¹ That conclusion, in turn, led to a December 2000 proposal by the Clinton EPA to regulate mercury emissions¹¹² from coal-fired power plants as a toxic pollutant, using the Act's most stringent technology-based standard.¹¹³ The proposal would have required power plants to install mercury pollution controls representing the level of pollution control achieved by the best

107. 42 U.S.C. § 7412(b)(2000).

108. See 42 U.S.C. § 7412(n)(1)(2000) (requiring that "the Administrator shall perform a study of the hazards to public health reasonably anticipated to occur as a result of emissions by electric utility steam generating units of [toxic] pollutants . . . [and] a study of mercury emissions from electric utility steam generating units, municipal waste combustion units, and other sources . . .").

109. Specifically, the Sierra Club sued EPA for missing the statutory deadline for submitting its mercury report to Congress; the NRDC sued EPA for failing to include coal-fired power plants on its list of sources to be regulated under Section 112 of the Act. The suits were settled in 1994. For a short chronology of the dispute between EPA and environmental groups over regulation of mercury emissions from power plants, respectively, see Environmental Protection Agency, *Controlling Power Plant Emissions: Decision Process and Chronology*, at http://www.epa.gov/mercury/control_emissions/decision.htm (last accessed Apr. 18, 2005), and Sierra Club, *Mercury and the Bush Administration: Making Matters Worse*, at <http://www.northstar.sierraclub.org/campaigns/air/mercury/national.html> (last accessed Apr. 18, 2005).

110. See Environmental Protection Agency, *Mercury Study: Report to Congress* (EPA-452/R-97-003, Dec. 1997) (evidencing an EPA study of the effects of mercury required by section 112(n)(1)(B) of the Act submitted to Congress on this issue in the late 1990s); Environmental Protection Agency, *Study of Hazardous Air Pollutant Emissions from Electric Steam Generating Units: Final Report to Congress* (EPA-453/R-98-004a, Feb. 1998) (evidencing a second EPA study focusing specifically on power plant emissions, required by section 112(n)(1)(A) also submitted to Congress on this issue in the late 1990s).

111. *Environmental Protection Agency, Mercury Study*, *supra* note 109.

112. Environmental Protection Agency, *Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units*, 65 Fed. Reg. 79825, 79826 (Dec. 20, 2000) (stating "The Administrator shall perform a study of the hazards to public health reasonably anticipated to occur as a result of emissions by electric utility steam generating units of [toxic] pollutants . . . [and] a study of mercury emissions from electric utility steam generating units, municipal waste combustion units, and other sources . . .").

113. Section 112 of the Act directs the EPA to regulate a long list of toxic emissions by industrial source category. EPA had not yet initiated regulations for coal-fired power plants under this section. The December 2000 notice committed EPA to doing so, triggering the imposition of strict MACT standards to such emissions. See *infra* note 64 for an explanation of MACT standards.

performing 12 percent of plants of similar plant type and fuel type.¹¹⁴ However, the Bush Administration quickly disavowed the Clinton EPA's proposed approach, eventually replacing it with a less stringent "cap and trade" system in early 2005.¹¹⁵

Carbon dioxide. The transition between the Clinton and Bush approaches to carbon dioxide emissions traveled along a similarly rocky path. The Clinton Administration endorsed the prevailing view among climatologists that observable increases in the earth's temperature in recent history were due in part to human activity, specifically emissions of carbon dioxide and other greenhouse gases.¹¹⁶ Despite considerably less agreement among experts over the likely consequences of these effects and whether and how to address them,¹¹⁷ the Clinton Administration agreed with a majority of the world's industrialized nations that concerted action to reduce greenhouse gas emissions was necessary, and signed the Kyoto Protocol in 1997.¹¹⁸ The agreement sought to address the problem of greenhouse

114. See 65 Fed. Reg. 79,825, 79,830 (Dec. 20, 2000) (stating there is no way to know precisely what emissions level this standard would have represented); 65 Fed. Reg. 79,831 (Dec. 20, 2000) (stating EPA speculation about the pollution control methods that might have been required: "Potential strategies for controlling mercury and other HAP emissions include the use of: precombustion controls (e.g., fuel switching, coal switching, coal cleaning); combustion modification methods used to control NOX emissions; flue gas cleaning technologies that can be used to control emissions of criteria pollutants and HAP; and nontraditional controls such as demand side management and energy conservation).

115. See Environmental Protection Agency, *Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units; Proposed Rule*, 69 Fed. Reg. 4,652 (Jan. 30, 2004) (proposing reversal of the Clinton EPA's earlier finding that regulating mercury emissions from coal-fired power plants under Section 112 was appropriate and necessary); 69 Fed. Reg. 4,652, 4,686 ("There is considerable interest in an approach to mercury regulation for power plants that would incorporate economic incentives such as emissions trading. Such an approach can reduce the cost of pollution controls by allowing for least-cost solutions among a universe of facilities that face different control costs."). EPA finalized its proposed rule on March 15, 2005. A copy of the final rule can be found at http://www.epa.gov/air/mercuryrule/pdfs/camr_final_preamble.pdf.

116. The scientific community had not reached a consensus on this point, but a strong majority of climatologists shared this view. The Intergovernmental Panel on Climate Change and the National Academy of Sciences reached this conclusion in the late 1990s.

117. See IPCC's Climate Change 2001: Working Group I: The Scientific Basis, ch. 10, at http://www.grida.no/climate/ipcc_tar/wg1/339.html (last assessed Feb. 27, 2005) (giving a fairly technical discussion of the uncertainty involved in making these projections).

118. Kyoto Protocol of the United Nations Framework Agreement on Climate Change, available at <http://unfccc.int/resource/docs/convkp/kpeng.html> (last accessed Mar. 2, 2005); see also http://unfccc.int/files/essential_background/convention/status_of_ratification/application/pdf/ratlist.pdf. (showing that the U.S. also signed the earlier United Nations Framework Agreement on Climate Change ("UNFCCC") endorsing the general objective of reducing global warming).

gas emissions by obligating the nations of the developed world to reduce their emissions of carbon dioxide.¹¹⁹ Because of strong opposition to the agreement in the U.S. Senate at the time it was signed, and subsequently from the Bush White House, the United States has not ratified the agreement. When it became apparent that the agreement would not be ratified, the Clinton Administration took some initial steps toward regulating carbon dioxide under the Clean Air Act regime, by issuing a formal legal opinion concluding that the Clean Air Act authorizes EPA to limit emissions of carbon dioxide, even though direct exposure to that pollutant poses no hazard to humans.¹²⁰

For its part, the Bush Administration rejected both the Clinton Administration's conclusion that EPA could regulate carbon dioxide emissions under the Clean Air Act¹²¹ and the Kyoto approach to global warming. The Administration initially took issue with the premise that emissions of greenhouse gases cause global warming, eventually softening that position after a White House study of the problem undermined the Administration's original position.¹²² Kyoto's American opponents remain steadfast in their opposition, however, charging that the agreement does too little¹²³ at too great a

119. The actual emission limitations imposed on the developed world are specified in Annex B to the agreement, and represent reductions of 5 to 8 percent below each nation's historical (1990) emissions levels. Kyoto Protocol To The United Nations Framework Convention On Climate Change, available at <http://unfccc.int/resource/docs/convkp/kpeng.html>.

120. See Memorandum, EPA's Authority to Regulate Pollutants Emitted by Electric Power Generation Sources (1998), from Jonathan Z. Cannon to Carol M. Browner, at <http://www.law.umaryland.edu/faculty/bpercival/casebook/documents/EPACO2memo1.pdf>.

121. See Memorandum, EPA's Authority to Impose Mandatory Controls to Address Global Climate

Change under the Clean Air Act, from Robert E. Fabricant to Marianne L. Horinko (Aug. 28, 2003), at <http://www.eesi.org/publications/Fact%20Sheets/co2petitiongememo8-28.pdf>. Several states sued EPA to try to force it to regulate carbon dioxide emissions under the act. *Commonwealth of Massachusetts v. EPA*, No. 03-1361 (D.C. Cir. Oct. 23, 2003). More recently, eight states have brought nuisance claims against owners of coal-fired power plants, charging that their carbon dioxide emissions constitute a public nuisance. BNA, *Eight States File Public Nuisance Suit Against Utilities for Carbon Dioxide Gases*, 35 ENV'T. REP. 1565 (July 23, 2004).

122. See Juliet Eilper, *Administration Shifts on Global Warming*, WASH. PT., Aug. 27, 2004, at A19 (describing this evolution).

123. The agreement does too little because it does not obligate the developing world to reduce or even limit its greenhouse gas emissions. Critics say trends in the developing world—such as the explosive growth of the Chinese economy and coal-fired power production there, or the rapid deforestation in places like Brazil and Indonesia—will overwhelm any gains to be had by reducing developed world emissions. The treaty's proponents answer that the Kyoto Agreement addresses this problem by allowing the developed world to meet some of its obligations by helping the developing world to develop in ways that reduce the presence of greenhouse gases in the atmosphere. David M. Driesen, *Free Lunch Or Cheap Fix?: The Emissions Trading Idea And The Climate Change Convention*, 26 B.C. ENVTL. AFF. L. REV. 1, 31 (1998).

cost.¹²⁴ These criticisms have not troubled European politicians, who are moving forward with their own plan to reach the Kyoto targets irrespective of whether the agreement itself ever takes effect.¹²⁵

Legislative Proposals. Several bills before the last Congress reflected these disputes between Democrats and environmental interests, on the one hand, and Republicans and industry, on the other, over air pollution from coal-fired power plants. A bill sponsored by Senator Jim Jeffords¹²⁶ would require reductions in emissions of sulfur dioxide, nitrogen oxides, mercury and carbon dioxide from coal-fired power plants. The President's Clear Skies Act,¹²⁷ by contrast, would address emissions of the first three pollutants only, and would achieve smaller reductions at a slower pace.¹²⁸ Table 1 summarizes the differences between the two bills' emissions targets. Both bills would rely on a cap and trade system for reducing sulfur dioxide and nitrogen oxides; only the Clear Skies Act would use a cap and trade system to reach mercury targets as well. During the 108th Congress, neither bill progressed beyond committee consideration.

124. For a discussion of the cost impacts of the treaty on the American coal-fired power industry, see *infra* notes 154-156 and accompanying text.

125. See Directive 2003/87/ec of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, available at http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_275/l_27520031025en00320046.pdf (last accessed Mar. 2, 2005) (illustrating the EU's establishment of a cap and trade system for carbon dioxide irrespective of whether the Kyoto Agreement takes effect).

126. The Jeffords Bill was designated S.366, 108th Cong. (2003), the Clean Power Act of 2003.

127. The Clear Skies Act of 2003 was designated S.1844, 108th Cong. (2003).

128. Another bill, designated S.843, the Clean Air Planning Act of 2003, proposes a compromise approach. Its emissions targets are less stringent than the Jeffords bill's, but more stringent than the Clear Skies Act's. It would address carbon dioxide emissions, but less stringently than the Jeffords bill. S. 843, 108th Cong. (2003).

TABLE 1

	Jeffords Bill	Clear Skies Act
Sulfur Dioxide (Emissions Target / Percent Reduction)	2.25 million tons in 2009 / 79% reduction	4.4 million tons in 2010, 3.0 million tons in 2018 / 72% reduction
Nitrogen Oxides (Emissions Target / Percent Reduction)	1.51 million tons in 2009 / 68% reduction	2.19 million tons in 2008, 1.79 million tons in 2018 / 62% reduction
Mercury (Emissions Target / Percent Reduction)	5 tons in 2008 / 90% reduction	34 tons in 2010, 15 tons in 2018 / 69% reduction
Carbon Dioxide (Emissions Target / Percent Reduction)	1,863 million metric tons in 2009 / 43% reduction (below projected levels)	No cap

III. RESTRUCTURING: BOON FOR COAL?

Environmental groups have been critical of the Bush Administration's approach to coal-fired power, and the Clear Skies Act in particular, calling it "a misnomer" that turns a blind eye to global warming problems and falls short of the pollution reductions that would have been achieved by applying the Clinton policy on new source review.¹²⁹ While the air pollution policies of the Bush Administration have tended to be less stringent than their Democratic alternatives or the Clinton policies they replaced, the combination of electricity restructuring and Bush Administration environmental policies may not produce quite the boon for dirty coal-fired power that some fear. This is true for two primary reasons. First, governments retain

129. See, NRDC, *The Bush Administration's Air Pollution Plan*, at <http://www.nrdc.org/air/pollution/qbushplan.asp#clearskies> (last revised Sept. 5, 2003) (saying that Clear Skies will "weaken and delay" pollution reductions that would have occurred under existing law); Sierra Club, *Clean Air: Facts About the Bush Administration's Plans to Weaken the Clean Air Act*, at http://www.sierraclub.org/cleanair/clear_skies.asp (last assessed Feb. 27, 2005) (making the same arguments, asking why "the Administration [is] bragging about a plan that will actually result in more pollution than if we simply enforced the existing Clean Air Act?").

significant leverage over the power generation mix even within restructured electricity markets, and many are already using that leverage to try to ensure that price competition does not squeeze out cleaner sources of power in favor of dirtier ones. Second, parts of the case against the Bush Administration's treatment of air pollution from coal-fired power plants are overstated or incomplete. Specifically, some of the Administration's concerns—about new source review as a pollution reduction strategy, the costs of command-and-control approaches, and how we balance the burdens and benefits of carbon dioxide regulation—are sufficiently legitimate to leave room for good faith disagreements among those who favor a cleaner energy generation mix.

As the restructuring process has continued into the 21st century, restructuring states have not abandoned their laws and policies favoring restructuring. To the contrary, restructuring states have created or strengthened laws and rules favoring the use of cleaner generation sources, instituting renewable portfolio standards requiring that retail electric service providers purchase a specified percentage of their power from renewable sources.¹³⁰ Some of these standards set relatively modest goals: for example, Texas, which gets about 1 percent of its power from renewables now and has ample wind energy potential, requires retailers to get about 3 percent of their power from renewable sources by 2009, and is well on the way toward exceeding that goal.¹³¹ Others, like California's standard (20 percent by 2017)¹³² and New York's standard (25 percent by 2013),¹³³ are far more ambitious.

130. Different states define "renewable" differently, with the major points of contention being whether to include within the definition hydroelectric power or biomass combustion facilities that burn non-waste organic material. However, all such definitions exclude coal-fired power. For good summaries and comparisons of state renewable portfolio standards, see Energy Information Administration, *Renewable Energy Annual 2000* (With Data For 1999)(Mar. 2001), at http://www.eia.doe.gov/cneaf/solar.renewables/page/rea_data/; *Democratic Energy's web site on renewable portfolio standards*, at <http://www.newrules.org/electricity/rps.html> (last accessed Apr. 18, 2005); Energy Justice Network, *Promoting Green Energy: The Free Market Approach vs. the Public Policy Approach*, at <http://www.energyjustice.net/rps/> (last accessed Apr. 18, 2005); and the State Environmental Resource Center's renewable portfolio standards web site, at <http://www.serconline.org/RPS/fact.html> (last accessed Apr. 18, 2005).

131. Ryan Wiser & Ole Langniss, *The Renewable Portfolio Standard in Texas: An Early Assessment* (Nov. 2001) at <http://eerd.lbl.gov/EPA/EMP/>.

132. SB 1078 (2002).

133. "By Order issued September 24, 2004, the Public Service Commission of the State of New York (Commission, PSC) adopted a policy of increasing to at least 25 percent the percentage of electricity used by retail consumers in New York State that is derived from a renewable resources." Case 03-E-0188, Order Regarding Retail Renewable Portfolio Standard (issued & effective Sept. 24, 2004), at 4, at <http://www3.dps.state.ny.us/pscweb/WebFile>

However, almost all state renewable portfolio standards would represent a significant increase in renewable generation over current levels.¹³⁴ Thus, while some non-restructuring states have also enacted or are considering renewable portfolio standards,¹³⁵ it is the restructuring states (due in part to fears of increased reliance on inexpensive coal-fired power under price competition) that have led the movement toward stronger standards.¹³⁶

What about the non-renewable portion of the electric generation mix: Will coal-fired power comprise an increasing portion of that remainder? Certainly the notion that coal-fired power will be favored in electricity markets is intuitively reasonable, for several reasons. In a market where daily and seasonal demand varies greatly, investments in base load seem more attractive than investments in plants serving peak load, or as reserves. As a historically cheap source of power from relatively large plants, coal-fired power has claimed much of that favored base load market in the past. According to the U.S. Energy Information Administration (“USEIA”), coal-fired generation has grown in the last few years, though no more quickly than total generation.¹³⁷ Indeed, projected additions of coal-fired generating capacity to the grid will be dwarfed by additions of capacity from

Room.ns/Web/85D8CCC6A42DB86F8526F1900533518/\$File/301.03e0188.RPS.pdf?OpenElement.

134. See Energy Information Administration, *Electric Power Annual—Table 1.1—Net Generation by Energy Source by Type of Producer*, at <http://www.eia.doe.gov/cneaf/electricity/epa/epat1p1.html> (last modified Dec. 22, 2004 (showing that nationally, non-hydro renewables constituted less than one half of one percent of all power generated by electric utilities and independent power producers in 2002)).

135. Minnesota and Iowa, for example, initiated renewable portfolio standards within the last decade without simultaneously restructuring.

136. Neither the FERC nor the Congress seems close to enacting a national renewable portfolio standard. The Union of Concerned Scientists and other interest groups have lobbied for such a standard. See Union of Concerned Scientists, *Clean Energy FAQ*, at http://www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=46 (last accessed Apr. 15, 2005). See also Sierra Club, *Myths vs. Reality About a 20% Renewable Portfolio Standard*, at <http://www.sierraclub.org/globalwarming/cleanenergy/renewables.asp> (last accessed Feb. 27, 2005). See also, Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market, at http://www.europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=Directive&an_doc=2001&nu_doc=77 (last accessed Feb. 27, 2005) (showing how the European Union, by contrast, has established an EU-wide goal of providing more than 20 percent its electricity from renewable energy sources by the year 2010).

137. Energy Information Administration, *U.S. Natural Gas Markets: Recent Trends and Prospects for the Future* ch. 3, available at http://www.eia.doe.gov/oiaf/servicerpt/naturalgas/chapter_3.htm (last modified May 17, 2001).

other sources, primarily natural gas.¹³⁸ USEIA projects that just under 10,000 megawatts of coal-fired plant capacity will be added to the grid between 2003 and 2007, representing about eight percent of the total (roughly 115,000 megawatts) to be added during that period.¹³⁹ Thus, the growth in coal-fired power production has not kept pace with growth in other sources, particularly natural gas.

Why might this be? Coal plants require a larger investment than gas plants and other alternatives.¹⁴⁰ Investors eyeing volatile electricity prices in some newly restructured markets¹⁴¹ may be wary of making such a large investment until these markets mature. In addition, the price of supplying coal-fired power to the electric grid is growing. Regardless of any future changes in pollution control rules, any new coal-fired power plants—unlike their older, dirtier cousins—will be subject to the Clean Air Act's ever-more-stringent, new source emissions standards for sulfur dioxide, nitrogen oxides and particulate matter.¹⁴² Furthermore, since the Bush Administration has proposed the imposition of additional sulfur dioxide, nitrogen oxides and mercury emissions limits on coal-fired plants, it seems likely that new plants will face increased regulatory compliance costs in the near future. In addition, the price of coal has been rising recently. Increasing demand from China and from the worldwide steel industry, record low coal inventories at many coal powered electricity generating facilities (due to rail transportation problems), and decreases in the reserve life at many coal mines across the U.S., have all pushed coal

138. *Id.*

139. Energy Information Administration, *Form EIA-860, "Annual Electric Generator Report,"* at <http://www.eia.doe.gov/cneaf/electricity/epa/epat2p4.html> (last accessed Mar. 2, 2005) (also showing that natural gas plants (102,000 megawatts) represent about 90 percent of that total).

140. The International Energy Agency estimates typical construction costs for coal-fired plants of between \$1000 and \$1500 per kilowatt. The comparable range for natural gas plants is between \$400 and \$800. See Energy Information Administration, *Projected Costs of Generating Electricity—2005 Update*, Executive Summary, at <http://www.iea.org/textbase/npsum/ElecCostSUM.pdf> (last accessed Apr. 18, 2005). Since coal-fired plants have a larger capacity, typically, than natural gas-fired plants, the corresponding investment required is larger.

141. Wholesale prices in the California market experienced extreme volatility in the winter of 2000-01, reaching peaks that were several orders of magnitude above historical prices. Short term markets in the Midwest experienced similar volatility the previous winter. The inability to store electricity, imbalance of supply and demand in California (and the manipulation of that market by sellers), lack of investment in transmission capacity in many parts of the country, and the influence of weather factors on both supply and demand all contribute to that price volatility.

142. See discussion of these rules, *supra* notes 87-102 and accompanying text.

prices upward by about 5 percent over the last year.¹⁴³ This modest average price increase belies widely varying price changes in different parts of the United States. Thus, while the price of some competing fuels has also been rising, these cost factors for coal may make new coal-fired capacity slightly less cost competitive than it might otherwise have been.

Regardless, coal remains a very large part of our electric generation mix, and market forces may some day favor accelerated investment in new coal-fired plants once again. Capacity factors for coal-fired plants are significantly higher than for natural gas plants,¹⁴⁴ and critics worry that however large the future portfolio of coal-fired plants might be, it will continue to benefit from relatively lenient Bush Administration air pollution control policies. Mercury and carbon dioxide emissions from new and old plants alike are essentially unregulated under current law, and the Administration's less aggressive new source review policy will allow old grandfathered plants to continue to emit other pollutants at very high levels.¹⁴⁵ The Bush Administration defends its approach to controlling pollution from these plants on efficiency grounds,¹⁴⁶ and while some of the charges leveled at the Bush Administration's policies toward coal-fired power plants are fair, others seem to rest on shakier foundations.

It is obvious that the Administration's Clear Skies proposal would not reduce emissions as much as the Jeffords bill favored by most Democrats in Congress. The Jeffords bill calls for larger and

143. See Energy Information Administration, *Electric Power Monthly—Table ES2B Summary Statistics: Reports and Costs of Fossil Fuels for the Electric Power Industry by Sector, btus, 2004 and 2003*, at <http://www.eia.doe.gov/cneaf/electricity/epm/tablees2b.html> (last modified Feb. 28, 2005) (stating that the average price electric utilities pay for coal increased by about 5 percent over the last year, according to the U.S. EIA).

144. We can infer this from the fact that the percentage of electricity from coal-fired generation each year routinely exceeds the percentage of plant capacity that comprises coal-fired plants. This could reflect increased reliance on cheaper coal power as electricity markets liberalize. On the other hand, coal-fired plants have always been base load plants, and therefore tend to have higher capacity factors even under traditional regulation.

145. As described in *supra* notes 18-19 and accompanying text, the only Clean Air Act provisions that grandfathered plants face are those contained in the acid rain program, limiting sulfur dioxide emissions. Since that program allows plants to buy and sell pollution rights, it is possible for individual plants to continue to pollute at high levels while total pollution decreases, simply by purchasing the necessary pollution rights. EPA's inspector general has recently concluded that the Administration's approach to new source review is weakening ongoing enforcement actions against grandfathered plants.

146. U.S. Dep't of Energy, Office of Fossil Energy, *DOE's Innovations for Existing Plants – Helping Achieve Clear Skies*, at <http://www.fossil.energy.gov/programs/powersystems/pollutioncontrols/>.

quicker reductions in emissions of sulfur dioxide, nitrogen oxides, and mercury than the Clear Skies Act, and would regulate carbon dioxide emissions while the Bush bill would not.¹⁴⁷ It is also clear that the Clinton EPA's approach to new source review would reduce emissions of sulfur dioxide and nitrogen oxides faster than the Bush EPA's approach, since the former concluded that more plants have already been "modified" (triggering new source standards) than the latter. However, it is *not* clear that aggressive new source review would reduce sulfur dioxide or nitrogen oxide emissions faster or more effectively than the Clear Skies Act. New source review reduces emissions using a resource intensive case-by-case enforcement process, one focused on bringing "modified" older power plants up to new source standards.¹⁴⁸ Each enforcement case presents two questions to regulators: first, whether new source standards apply; and second, what the new source emissions limit ought to be.¹⁴⁹ It is, therefore, very difficult to project the rate at which emissions would decrease under such a process. Some analysts believe that a cap and trade system like that proposed in the Clear Skies Act might produce faster and more certain reductions in total emissions than the Clinton policies would have produced;¹⁵⁰ others disagree.¹⁵¹ In any case, the cap and trade approach favored by the Clear Skies Act would almost certainly offer a cheaper means (in terms of compliance costs) of achieving emissions reduction goals compared to the new source review approach.

On the other hand, the argument for the flexible Bush approach over the Clinton command-and-control approach is less persuasive with respect to mercury pollution. While a cap and trade approach to

147. See *supra* notes 131-133 and accompanying text.

148. See the description of this process, *supra* note 91 and accompanying text.

149. Recall that the technology-based standards in the Clean Air Act are stated in relative terms, and that the Act leaves the establishment of actual emissions limits up to permit writers. See *supra* notes 38-39 and accompanying text.

150. See, e.g., A Danny Ellerman, *Are Cap and Trade Programs More Environmentally Effective than Conventional Regulation?*, MIT Working Paper, 2003, at <http://web.mit.edu/ceep/www/2003-015.pdf> (last accessed Mar. 2, 2005); A. Danny Ellerman & Paul L. Joskow, *Clearing the Polluted Sky*, N.Y. TIMES, May 1, 2002, at 25.

151. See, e.g., Natural Resources Defense Council, *Dirty Skies: The Bush Administration's Air Pollution Plan*, at <http://www.nrdc.org/air/pollution/qbushplan.asp#clearskies> ("if Congress passes the Clear Skies bill, the result will be to weaken and delay health protections already required under the law")(last accessed Apr. 19, 2005); Sierra Club, *Facts About the Bush Administration's Plan to Weaken the Clean Air Act*, at http://www.sierraclub.org/cleanair/clear_skies.asp ("[W]hy is the Administration bragging about a plan that will actually result in more pollution than if we simply enforced the existing Clean Air Act?")(last accessed Apr. 19, 2005).

mercury would guarantee a specified total amount of emissions reductions, it would not prevent “hot spots” —locations near individual plants whose owners purchase pollution rights so as to continue to pollute at high levels. Arguably, hot spots pose more of a concern with a toxic pollutant like mercury than with conventional pollutants like sulfur dioxide. In addition, the gains to be had from applying the Clinton command-and-control approach to mercury emissions are greater than for emissions of sulfur dioxide and nitrogen oxides. In the case of the latter two pollutants, new plants were already subject to new source standards, and many otherwise grandfathered plants were covered by the acid rain program. Consequently, despite projections of continued, slow growth in coal-fired generation, total emissions of these two pollutants has decreased over time, and will continue to decrease.¹⁵² Thus, because of the progress that has already been made, these different approaches to new source review by the Clinton and Bush Administrations yield relatively minor differences in emissions for these two pollutants. Not so with mercury. The Clinton EPA’s proposed mercury permitting standard would have applied to old and new plants alike, irrespective of disputes over new source review.¹⁵³ Since neither new nor old plants are subject to any federal mercury standard right now, the Clinton EPA proposal would likely have made a far bigger impact on emissions, and would have eliminated the problem of hot spots. Thus, while it remains difficult to predict precisely how much and how fast mercury pollution would have fallen under the proposed Clinton EPA mercury standard, the pollution control gains to be had under that standard may very well have yielded sharper reductions (albeit with the higher transaction costs associated with a case-by-case permitting approach) than the Clear Skies proposal.¹⁵⁴

152. See Energy Information Administration, REDUCING EMISSIONS OF SULFUR DIOXIDE, NITROGEN OXIDES, AND MERCURY FROM ELECTRIC POWER PLANTS 11-12 (Sept. 2001), available at [http://www.eia.doe.gov/oiaf/servicerpt/mepp/pdf/sroiaf\(2001\)04.pdf](http://www.eia.doe.gov/oiaf/servicerpt/mepp/pdf/sroiaf(2001)04.pdf):

Although fossil fuel use is expected to grow over the next 20 years, SO₂ and NO_x emissions are not projected to be higher in 2020 than they are today As a result of the emission reduction programs established in the Clean Air Act . . . SO₂ and NO_x emissions are expected to be lower in 2020 than they were in 1999.

153. Environmental Protection Agency, *Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units*, 65 Fed. Reg. 79825, 79826 (Dec. 20, 2000) (The Clinton EPA proposed to regulate mercury as a toxic pollutant under section 112 of the Clean Air Act, which calls for a stricter technology-based standard than that applicable to conventional pollutants like sulfur dioxide and nitrogen oxides, and applies that standard to old and new plants alike.).

154. See *Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Elec-*

What about carbon dioxide pollution, then? The Administration's criticisms of the carbon dioxide emissions cuts called for by Kyoto and the Jeffords bill ought not to be dismissed casually. Significant cuts in carbon dioxide emissions would be far more expensive than analogous reductions in emissions of the other three pollutants. The USEIA has estimated that for sulfur dioxide and nitrogen oxides, the cost of meeting even the Jeffords bill's emission caps while significant, would not be so great as to produce more than negligible increase in electricity prices, less than one cent per kilowatt-hour, or one percent increase.¹⁵⁵ A carbon dioxide cap would be much more costly: approximately 2.5 cents per kilowatt-hour, representing a 30 to 43 percent increase in electricity prices.¹⁵⁶ Concerns about these costs, coupled with skepticism about the likely environmental benefits of reducing carbon dioxide emissions worldwide, and the possibility of emissions reductions in the developed world being dwarfed by emissions increases in the developing world, all underlie the Bush Administration's opposition to the Jeffords bill and the Kyoto Agreement.¹⁵⁷ While these arguments may offer little solace to the majority of scientists and the public who believe that global warming is a serious problem that the world's leading emitter of greenhouse gases ought to address, they are not trivial objections.

Thus, like so many debates about the future impacts of current policy choices, many of these policy choices concerning air pollution from coal-fired power plants require a balancing of costs and benefits in the face of considerable uncertainty. The Bush Administration assesses that uncertainty and balances costs and benefits differently

tric Utility Steam Generating Units; Proposed Rule, 69 Fed. Reg. 4652 (Jan. 30, 2004) (showing the preamble to EPA's 2004 proposed mercury rule which estimates that the rule would reduce nationwide emissions of mercury by 14 tons (29 percent) by the end of 2007); see Press Release, NRDC, June 29, 2004, at <http://www.nrdc.org/media/pressreleases/040629.asp> (citing an internal EPA analysis, and disputing those numbers, contending that the reductions achieved by the rule will be far less).

155. Energy Information Administration, *Analysis of Strategies for Reducing Multiple Emissions from Power Plants: Sulfur Dioxide, Nitrogen Oxides, and Carbon Dioxide xv-xvii* (Dec. 2000), at [http://www.eia.doe.gov/oiaf/servicerpt/powerplants/pdf/sroiaf\(2000\)05.pdf](http://www.eia.doe.gov/oiaf/servicerpt/powerplants/pdf/sroiaf(2000)05.pdf).

156. *Id.* at xvii (stating that these projections depend upon a number of assumptions, including estimates of the likely cost of pollution allowances for all three pollutants, future technological changes, and the effect of increasing coal-fired power prices on prices of other fuels and that the EIA's analysis means that while coal-fired power plants could comply with stricter regulation of SO₂ and NO_x by installing pollution controls, strict CO₂ emissions caps would drive roughly a third of the nation's coal-fired power plants out of business).

157. See Office of the Press Secretary, *Press Briefing by Ari Fleischer, March 28, 2001*, at <http://www.whitehouse.gov/news/briefings/20010328.html#KyotoTreaty> (transcript discussing why the Bush Administration opposed joining the Kyoto Protocol).

than its predecessor, and so has abandoned the Clinton EPA's approach to new source review, mercury emissions, and carbon dioxide emissions. It has proposed legislative solutions to the first problem, both legislative and regulatory solutions to the second, and no solution to the third. While at least two of these three policy decisions will increase expected emissions from coal-fired power plants in the future,¹⁵⁸ the fact remains that coal-fired power production will continue to grow less pollution intensive over time.

It is difficult to predict how big a role coal-fired power plants will play in restructured electricity markets of the future, though restructuring does not appear to have been the boon for coal-fired power that some feared. There are good reasons to suppose, however, that if and when coal-fired power production begins to take an increasing share of the electric generation portfolio, those plants will produce power with fewer emissions than the average current coal-fired power plant. The fight to impose new source review aggressively will continue in the courts, and irrespective of the outcome, new plants will face ever more stringent new source standards for conventional pollutants. The Bush Administration's mercury rule and Clear Skies proposals, if enacted, would further reduce total emissions of those pollutants. In addition, the development of promising technologies for burning coal more cleanly¹⁵⁹ may also make regulatory compliance cheaper. All these possibilities suggest that the relationship between coal-fired generation and a dirtier energy future may be weaker and less direct than advertised.

158. This discussion has taken the Bush Administration proposals at face value. A cynic might suggest that the Administration's Clear Skies Act might be a proposal designed only for public consumption, and that the Act has not moved forward in Congress because the Administration would prefer the status quo. It is impossible to prove or disprove that conjecture, but it is worth noting that some of the Congressional opposition to the Act comes from proponents of the Jeffords bill or other alternative bills. Presumably, those members of Congress oppose Clear Skies not because they prefer the status quo, but because they prefer more radical changes to the status quo.

159. There are several promising technologies on the horizon. Some involve pre-combustion preparation of the coal to reduce its ash content. Others such as improved flue gas desulfurization, electrostatic precipitation, and selective catalytic reduction, reduce sulfur dioxide, particulate matter, and nitrogen oxides emissions. Fluidized bed combustion produces fewer emissions than traditional pulverized fuel combustion, and an even more promising technology—integrated coal gasification combined cycle ("IGCC") generation—would transform coal into a fuel gas that burns efficiently and produces less emissions of sulfur dioxide, nitrogen oxides and carbon dioxide. BRENDA BUCHAN & CHRISTI CAO, OFFICE OF MARKET MONITORING AND STRATEGIC ANALYSIS, FLORIDA PUBLIC SERVICE COMMISSION: PROVEN AND DEVELOPING TECHNOLOGIES 2-3 (2004).