STATE ENVIRONMENTAL POLICY INNOVATIONS: NORTH CAROLINA'S CLEAN SMOKESTACKS ACT

BY

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An important and longstanding limitation of the federal Clean Air Act was its failure to assure cleanup of the hundreds of old coal-fired electric power plants that were built prior to the 1970s, most of which were "grandfathered" and thus continued to operate. In 2002, North Carolina enacted an unusually innovative state-level solution to this problem: a permanent, year-round cap on overall NO_X and SO_2 emissions from each of its two major utilities, stringent enough to require cleanup or retirement of all forty-five of their coal-fired units. Using the leverage of this law, North Carolina also brought legal actions against its principal upwind source (TVA) and the EPA, leading to a similar cleanup commitment by TVA and a federal judicial decision to assure protection of downwind states under EPA's Clean Air Interstate Rule.

This Article documents the history of how the Clean Smokestacks Act was developed and enacted, its implementation and consequences, and the lessons it offers for other environmental law and policy initiatives. In contrast to the gridlocked adversarial politics of the federal Congress in recent years, it provides an example of a case in which stakeholders with different interests were able to negotiate a compromise solution that provided benefits to each participant, as well as major benefits to the public. It also represents a reversal of the more familiar pattern of environmental federalism: In this case a state initiative capped emissions within its own borders more stringently than federal requirements, and leveraged this commitment with legal pressures to achieve similar results from out-of-state upwind sources and the federal government.

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I. INTRODUCTION

The Clean Air Act of 1970 established strict technology based standards for reducing air pollution from new fossil-fueled electric power plants and other stationary sources, but it left existing sources unregulated, on the assumption that they would gradually be retired and replaced by more modern and well-controlled plants.[1] Three decades later, however, most of these older and dirtier plants were

[1] Clean Air Amendments of 1970, Pub. L. No. 91-604, § 111, 84 Stat. 1676, 1683–84 (1970).

still in operation, owing at least in part to the greater costs of building new plants with more expensive controls.

In 2002, North Carolina enacted an unusually creative law, the Clean Smokestacks Act (CSA), to solve this problem by state rather than federal initiative.[2] The CSA set caps on total annual emissions of nitrogen oxides (NO_x) and sulfur dioxide (SO_2) by each of North Carolina's two investor-owned utilities, Duke Energy and Progress Energy, which required them in effect to permanently reduce their total year-round NO_x emissions 77% by 2009 and their SO_2 emissions 73% by 2013, and to maintain these caps notwithstanding any future growth in service.[3] These caps were sufficiently stringent to force either modernization or retirement of all forty-five coal-fired electric generating units (EGUs) at their fourteen sites in North Carolina.[4] The law also created a novel cost recovery mechanism to pay for these improvements, and it required the utilities to surrender to the State any emissions allowances thereby gained so that they could not be resold to polluters in upwind states.[5] It mandated reporting processes for steps to reduce NO_x and SO_2 emissions even further, and for reducing mercury and CO_2 emissions as well. Finally, it directed the state's Attorney General to "use all available resources and means, including negotiation, participation in interstate compacts and multistate and interagency agreements, petitions pursuant to 42 U.S.C. § 7426, and litigation" to induce other states to achieve comparable reductions in emissions, particularly by the Tennessee Valley Authority (TVA) and other upwind utilities.[6]

A decade later, the direct results of this law have become clear. As of 2012, NO_x emissions by the two utilities have decreased by 84% compared to 1998, and their SO_2 emissions by 89%, two years before the 2013 deadline.[7] Duke Energy has retired or scheduled retirement of fifteen of its twenty-eight coal-fired power plants, and has added SO_2 flue gas desulfurization (FGD) scrubbers and NO_x burners or selective catalytic or non-catalytic reduction (SCR/SNCR) technology on all the rest; and it has built one large new coal-fired power plant to operate far more efficiently using advanced emissions control technology.[8] Duke also has invested in new gas fired generating plants, as well as in renewable energy and

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2 Air Quality/Electric Utilities Bill (Clean Smokestacks Act), N.C. Sess. Laws 2002-4, S.B 1078 § 1(i) (2002) [hereinafter Clean Smokestacks Act].

3 *See id.* § 1(b)(2), 1(d)(2). *See also* William G. Ross Jr., *The North Carolina Clean Smokestacks Act*, 72 N.C. MED. J. 128–29 (2011) (outlining that Clean Air Act regulations required only summertime seasonal control of NO_x in North Carolina).

4 Press Release, State of North Carolina Office of the Governor, Easley Signs Clean Smokestacks Bill (June 20, 2002), *available at* http://digital.ncdcr.gov/cdm/compoundobject/collection/p16062coll5/id/1603/rec/20.

5 Clean Smokestacks Act, *supra* note 2, § 1(i).

6 *Id.* § 10.

7 N.C. DEP'T ENV'T & NATURAL RES. & N.C. UTILS. COMM'N (NCUC), IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT: A REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION AND THE JOINT LEGISLATIVE COMMISSION ON GOVERNMENTAL OPERATIONS 3 (2012), *available at* http://www.ncair.org/news/leg/2012_Clean_Smokestacks_Act_Report.pdf [hereinafter 2012 IMPLEMENTATION REPORT]. *See also* N.C. DIV. AIR. QUALITY, CLEAN SMOKESTACKS ACT BENEFITS UPDATE (2010), *available at* http://daq.state.nc.us/news/leg/.

8 2012 IMPLEMENTATION REPORT, *supra* note 7, at 19–20.

energy-efficiency incentive programs.[9] Progress Energy is on schedule to retire eleven of its eighteen coal-fired plants, to build major new natural gas-fired facilities in their place, and to upgrade emissions control technologies on all the rest.[10] No specific caps were set for mercury, particulates, or CO_2, but mercury emissions were expected to be reduced by more than 60% as a cobenefit of closing or upgrading all the coal-fired plants for SO_2 and NO_x .[11] As a result of further study mandated by the Act, North Carolina in 2007 adopted additional regulations requiring each utility to either retire or install mercury control technology by 2017 at each generating unit to achieve "the maximum level of reductions in mercury emissions at each unit that is technically and economically feasible without reliance on mercury allowances obtained through allowance trading."[12] This requirement was expected to achieve an 88% reduction in mercury emissions by 2018.[13] As an additional cobenefit, fine particulate matter was being significantly reduced, because SO_2 emissions are a major component of fine particulate matter pollution in North Carolina.[14]

Acting on the law's mandate, North Carolina's Attorney General sued TVA in 2006 to force cleanup of its upwind emissions. In 2011, TVA agreed to a court-approved settlement that set an aggregate cap—similar to and in some respects even more stringent than North Carolina's—on emissions from its entire fleet of facilities, and committed itself to retire or install scrubbers and SCR (NO_x) technology on virtually all its generating units by specific dates, retire all emissions allowances that would have been generated by these actions, and spend $290 million on emissions mitigation (primarily renewable energy and energy efficiency projects) including spending $60 million on the surrounding states.[15] The Attorney General petitioned and then successfully sued EPA to require that emissions trading under EPA's Clean Air Interstate Rule (CAIR) be modified to assure that allowance trading did not leave excess air pollution burdens on some downwind states.[16] The resulting changes were incorporated into EPA's subsequent Cross-State Air Pollution Rule (CSAPR), issued in 2011.[17]

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9 DUKE ENERGY, THE DUKE ENERGY CAROLINAS INTEGRATED RESOURCE PLAN (ANNUAL REPORT) (2012), *available at* http://www.energy.sc.gov/files/view/Duke_IRP2012.pdf.

10 2012 Implementation Report, *supra* note 7, at 14, 19–20.

11 N.C. DIV. AIR QUALITY, MERCURY EMISSIONS AND MERCURY CONTROLS FOR COAL-FIRED ELECTRICAL UTILITY BOILERS: FINAL REPORT 3 (2005), *available at* http://daq.state.nc.us/news/leg/Mercury_Final_09012005.pdf (stating also that emissions of oxidized mercury, the mercury form of greatest concern, were expected to be reduced by 80%).

12 15A N.C. ADMIN. CODE 2D.2511(b) (2007); Mercury Emission Limits, 21 N.C. Reg. 1,401, 1,402 (Feb.1, 2007).

13 Press Release, N.C. Div. Air Quality, Commission Adopts Rules for Curbing Mercury Emissions (Nov. 9, 2006), http://ncair.org/news/pr/2006/hg_rule_11092006.shtml.

14 WAYNE CORNELIUS ET AL., 2010 AMBIENT AIR QUALITY REPORT 4 (2012); EPA, *Clean Air Interstate Rule: North Carolina*, http://www.epa.gov/cair/nc.html (last visited Nov. 23, 2013).

15 North Carolina *ex rel.* Cooper v. Tenn. Valley Auth., 615 F.3d 291, 298 (4th Cir. 2010).

16 Petition for Review, North Carolina v. EPA, 531 F.3d 896 (D.C. Cir. 2008) (No. 05-1244), *reh'g in part*, 550 F.3d 1176; North Carolina v. EPA, 531 F.3d 896, 896, 906–07 (D.C. Cir. 2008), *reh'g in part*, 550 F.3d 1176.

17 The CAIR would have allowed unrestricted nationwide trading of allowances for fine particulates ($PM_{2.5}$) and ozone precursors, which could have left North Carolina and other states still vulnerable to interstate pollution if upwind utilities were to buy allowances and continue polluting. The CAIR also would have allowed use of a large national pool of millions of NO_x allowances carried forward from the 1990 Clean Air Act cap and trade program, which could have delayed actual

In short, North Carolina's CSA has had major effects in achieving cleanup of coal-fired power plants that had been left uncontrolled by federal law for more than three decades—both in North Carolina and beyond—and in reducing air pollution from these sources. Other forces also contributed to the development of EPA's interstate air pollution control regulations, and emissions from motor vehicles and other sources remain important unsolved problems. Yet the CSA stands as an important and effective innovation in state environmental policy. It exemplifies a rare and successful process of coalition building and negotiation that achieved its enactment in a relatively conservative southern state long accustomed to low electric rates derived substantially from cheap coal-fired electric generation, and even during a period when the State was rapidly losing jobs in its traditional textile and furniture industries—both sensitive to electricity costs—to foreign competition.

This Article documents the history, implementation, and results of the CSA, and identifies lessons from it, both as a state level innovation for solving an unsolved national environmental problem and as a successful political process for enacting and implementing such an innovation. Part II outlines the context of federal air pollution policy from 1970 through the 1990s. Part III frames the more specific circumstances in which the proposal for the CSA arose in North Carolina. Part IV recounts the negotiation process by which the bill developed and was ultimately enacted, and discusses its key provisions. Part V documents the implementation of its requirements by the North Carolina utilities. Part VI documents its direct results for air quality. Part VII discusses the law's broader impacts resulting from North Carolina's successful lawsuit against TVA and from its section 126 petition and lawsuit against EPA's CAIR rule. Finally, Part VIII discusses lessons from this case for other state environmental policy innovations, for environmental federalism, and for further policy initiatives to address the nation's remaining air pollution challenges.

II. BACKGROUND

A. The Clean Air Act

The federal Clean Air Act of 1970 authorized minimum National Ambient Air Quality Standards (NAAQS) for six major pollutants ("criteria pollutants"): sulfur dioxide, nitrogen oxides, carbon monoxide, particulates, ozone, and lead.[18] It required each state to develop an EPA-approved state implementation plan (SIP) for assuring that these standards were achieved.[19] It also required that every new stationary source of air pollutant emissions—coal-fired power plants, among others—obtain an EPA permit satisfying new source performance standards (NSPS) based on the best system of emission reduction that has been adequately

compliance with its nominal 2015 cap until sometime after 2020. *North Carolina*, 531 F.3d 896, 903–04 (D.C. Cir. 2008), *reh'g in part*, 550 F.3d 1176. The CSAPR was itself vacated by the D.C. Circuit in 2012 on grounds that it would force some states to overcomply and interfere with their right to decide how to comply, thus leaving the CAIR in place pending further EPA refinement of the CSAPR. EME Homer City Generation, L.P., v. EPA, 696 F.3d 7, 27 (D.C. Cir. 2012).

18 Clean Air Act Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (codified as amended at 42 U.S.C. §§ 7401–7414 (2006)).

19 Clean Air Act, 42 U.S.C. § 7410 (2006).

demonstrated for limiting emissions of the six criteria pollutants.[20] In separate provisions, the Clean Air Act also authorized EPA to regulate "hazardous" air pollutants—such as mercury and benzene—individually, based on their degree of risk and cost of regulation.[21]

B. Grandfathering

The 1970 Clean Air Act failed to address two other major sources of air pollutants, however. First, it "grandfathered" existing emissions sources, leaving emissions from existing power plants unregulated unless they were forced to clean up by state governments under state specific SIP mandates.[22] Amendments enacted in 1977 required that any preexisting stationary source that was modified or upgraded in ways that might increase emissions must also install emissions control technology similar to a new source ("new source review," or NSR); but in the absence of such modifications, preexisting sources could continue polluting.[23] The authors of the law appear to have assumed that these older facilities would gradually be retired and replaced by newer ones as they approached the end of their economic lives.[24] Given the greater costs of building new facilities with state of the art control technology, however, the cost differential created an unintended incentive for the utilities to keep operating these facilities for far longer, at greater intensity, and with less maintenance or upgrading.[25] As of 2008, nearly four decades after enactment of the Clean Air Act, the overwhelming majority of these older and dirtier facilities were still operating.[26]

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20 *Id.* § 7411.

21 *Id.* § 7412.

22 *See* Heidi Gorovitz Robertson, *If Your Grandfather Could Pollute, So Can You: Environmental "Grandfather Clauses" and Their Role in Environmental Inequity*, CATH. U. L. REV., Fall 1995, at 131, 132, 134–35. According to EPA administrator Douglas Costle, new sources could be restricted by law to 12 pounds of SO_2 per ton of coal burned; in contrast, power plants built prior to 1979 emitted an average of 83 pounds of SO_2 per ton of coal burned. Douglas Costle, *New Source Performance Standards for Coal-Fired Power Plants*, 29 J. AIR POLLUTION CONTROL ASS'N 690, 690 (1979).

23 Clean Air Act Amendments of 1977, Pub. L. No. 95-95, § 108, 91 Stat. 685, 694 (codified as amended at 42 U.S.C. §§ 7401–7671 (2006)). A "modification" of a major source is "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." 42 U.S.C. §§ 7501(4), 7411(a)(4) (2006)). Technically, NSR is required only in "nonattainment areas" (urban or industrial areas already out of compliance with the NAAQS), but there is also a provision requiring "prevention of significant deterioration" of areas of cleaner air, especially around national parks and other protected areas. Jonathan Remy Nash & Richard L. Revesz, *Grandfathering and Environmental Regulation: The Law and Economics of New Source Review*, NW. U. L. REV. 1677, 1682–83 (2007).

24 Nash & Revesz, *supra* note 23, at 1681.

25 Robert N. Stavins, *Vintage-Differentiated Environmental Regulation*, 25 STAN. ENVTL. L.J. 29, 49–50 (2006). Similarly, in air quality nonattainment areas (areas already polluted in excess of the NAAQS), new facilities must include technologies to achieve the "lowest achievable emissions rate" (LAER), whereas existing ones must only install "reasonably available control technology" (RACT). Robertson, *supra* note 22, at 155.

26 As of 2008, there were 1,140 coal-fired EGUs in operation for electric utility power generation purposes in the U.S., of which 844 were placed in service in 1977 or earlier; these older facilities represented more than 63% of the total 540,583.5-megawatt nameplate capacity of these facilities. An additional 35 EGUs, all pre-1977, were listed as standby or out of service. U.S. ENERGY INFO. ADMIN.,

C. Tall Stacks and Acid Rain

Second, the Clean Air Act failed to anticipate the incentive effects of an air pollution control regime based primarily on SIPs by each individual state. Under the SIP approach, the focus for each state was solely on controlling its own pollution sources and levels at the lowest economic cost to its own industries and utilities.[27] This framework therefore created a strong incentive for the states and their industries and utilities simply to build taller smokestacks, dispersing their air pollutants higher into the atmosphere and thus farther downwind, reducing their own regulated local concentrations but increasing the interstate transport of pollutants, and EPA consistently approved major increases in stack heights despite Congressional efforts to restrict this practice.[28] This practice exacerbated the burden of compliance with the NAAQS by downwind states, and also created the new problem of acid rain as air pollutants were transported and chemically transformed in the atmosphere, and ultimately rained out in more acidic form farther downwind, damaging lakes and forests as well as human health.[29] The Reagan administration chose to wait for a decade of scientific studies as a substitute for regulatory action during the 1980s, but by 1990 these studies culminated in scientific evidence supporting additional federal action to address interstate transport of air pollutants.[30]

The long-range interstate movement of air pollutants was thus a widely recognized problem since at least 1980, but before 1990 the downwind states had no effective legal means by which to prove the impact of upwind states' emissions, and thus to pressure upwind states to reduce them. So long as upwind states in the South and Midwest were in attainment of the NAAQS standards within their own borders, EPA could not require them to clean up further to benefit downwind states and had no authority to establish interstate regional control standards.[31]

ANNUAL ELECTRIC GENERATOR REPORT (2008), *available at* http://www.eia.gov/cneaf/electricity/page/capacity/existingunitsbs2008.xls.

27 Gregory Wetstone, *Air Pollution Control Laws in North America and the Problem of Acid Rain and Snow*, 10 ENVTL. L. REP. 50,001, 50,006 (1980).

28 *Id.* at 50,007; James R. Vestigo, *Acid Rain and Tall Stack Regulation Under the Clean Air Act*, 15 ENVTL. L. 711, 730 (1985). In 1970, there were only two stacks higher than 500 feet; by 1980, the average stack height was over 730 feet, and by 1985 there were over 180 stacks higher than 500 feet and numerous stacks over 1,000 feet. *Id.*

29 COMM. ON AIR QUALITY MGMT. IN THE U.S., AIR QUALITY MANAGEMENT IN THE UNITED STATES 62 (2004).

30 The National Acid Precipitation Assessment Program (NAPAP) was initiated and funded by Congress in 1978 during the Carter administration. Ellis B. Cowling, *The Performance and Legacy of NAPAP*, ECOLOGICAL APPLICATIONS 111, 111–112 (1992). Reagan biographer Lou Cannon states that "[a]fter three years of much talk and little action by the United States, Ruckelshaus wanted the administration to make a major budget commitment to reducing the causes of acid rain. His proposal was assailed as wasteful government spending by David Stockman and rejected by Reagan, who questioned the scientific evidence on the causes of acid rain and was reluctant to impose additional restrictions on industry." LOU CANNON, PRESIDENT REAGAN: THE ROLE OF A LIFETIME 470 (1991).

31 Charles E. McChesney II, Note, *The Interstate Ozone Pollution Negotiations: OTAG, EPA, and a Novel Approach to Negotiated Rulemaking*, 14 OHIO ST. J. ON DISP. RESOL. 615, 626 (1999).

D. 1990 Amendments: Cap and Trade

In response to the acid rain studies and improved emissions modeling, the 1990 Clean Air Act amendments took several major new steps to reduce air pollution. First, the amendments created a federal "cap and trade" program to reduce acid rain.[32] The amendments capped total SO_2 emissions from the nation's largest power plants at ten million tons per year (TPY) lower than they had collectively emitted in 1980, and NO_x emissions at two million TPY below 1980 levels.[33] The program initially affected 263 large generating units at 110 sites in twenty-one eastern and midwestern states; a second phase included over 2,000 smaller units.[34] Each utility was allocated a number of emissions allowances in proportion to their historical percentages of total emissions. The total number of allowances was limited to the capped levels.[35] Each utility thus was allowed either to reduce its emissions below the number of allowances it received—with flexibility to achieve this reduction by whatever combination of control technologies, fuel substitutions, changes in operating regimes, and plant retirements it found most attractive—and sell its unused allowances, or to continue to emit pollutants at higher levels by purchasing additional allowances at market prices from utilities selling them.[36] As of 2009, regulated units emitted 5.7 million tons of SO_2, well below that year's annual emission cap of 9.5 million tons and already below the statutory annual cap of 8.95 million tons set for compliance in 2010, amounting to a reduction of 67% below 1980 levels.[37] Similarly, NO_x emissions from these units were reduced to two million tons in 2009, more than six million tons less than the projected level in 2000 without the Acid Rain Program, and more than triple the NO_x emission reduction objective stated in the 1990 law.[38]

The total emissions of SO_2 and NO_x thus were reduced dramatically: The national composite average of SO_2 annual ambient concentrations decreased 76% between 1980 and 2009.[39] However, under the 1990 law's flexible cap and trade approach, the emissions from any particular power plant—or even from a whole set of them in a particular region, and their associated downwind impacts—might or might not be reduced, so that they did not necessarily benefit all downwind states that might be affected. During at least the first five years of the Acid Rain Program, North and South Carolina and Tennessee were all among the major net importers of emissions allowances, continuing to pollute while purchasing allowances rather than cleaning up emissions to sell allowances to others.[40]

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32 The acid rain allowance trading program was superseded in 2011 by four separate pollutant trading programs under EPA's CSAPR, discussed below. Clean Air Act, 42 U.S.C. § 7651 (2006).

33 *Id.* § 7651(b).

34 EPA, *Acid Rain Program*, http://www.epa.gov/airmarkets/progsregs/arp/basic.html (last visited Nov. 23, 2013).

35 *Id.*

36 EPA, *Acid Rain and Related Programs: 2009 Highlights*, http://www.epa.gov/airmarkets/progress/ARP09_4.html (last visited Nov. 23, 2013).

37 *Id.*

38 *Id.* EPA notes that other programs—notably the CAIR (discussed below), compliance with EPA's NO_x SIP Call, the Ozone Transport Commission (OTC), and other regional and state NO_x emission control programs—also contributed significantly to the NO_x reductions that were achieved. *Id.*

39 *Id.*

40 The other major allowance-importing states were Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia; Florida, Michigan, and Virginia also were minor net importer states.

E. Interstate Pollution and State Petitions

The 1990 amendments made several other important changes. The new law included a "good neighbor" provision authorizing the EPA to disapprove a state's SIP if it did not address interstate pollution impacts, and it allowed states to petition EPA for action against groups of upwind emissions sources rather than just against an individually identifiable large source.[41] Section 176A authorized the EPA to establish an emissions transport region within which to address multistate air pollution problems contributing to downwind violations of a NAAQS, and in 1995 EPA established an Ozone Transport Assessment Group (OTAG), which included representatives of thirty-seven states, environmental groups, and the EPA, to develop recommendations for reducing interstate impacts of ozone and its precursors.[42]

Second, the 1990 amendments rewrote the provisions regarding interstate transport of pollution. Under the new section 126(b), any state may petition EPA for a finding that stationary sources located in another state are emitting pollutants that "significantly contribute" to the nonattainment of a NAAQS by their state.[43] EPA is to respond to the petition within sixty days, and if the petition is granted, the offending sources must cease operations within three months unless they comply with EPA-approved emission controls and compliance schedules.[44]

The 1990 Clean Air Act amendments also added a new section 169B that directed EPA to address regional haze, which caused visibility impairments to major visual resources such as national parks, including the Great Smoky Mountains and several other national parks across the nation.[45]

F. Mercury

Finally, the 1990 amendments made a major change in the regulation of hazardous air pollutants, potentially including mercury that is released as a contaminant of coal combustion emissions.[46] Prior to 1990, the Clean Air Act directed EPA to regulate individual hazardous air pollutants based on risk-benefit analysis, a laborious, litigious, and ultimately ineffective approach.[47] Recognizing that this approach had failed, the 1990 amendments directed that the EPA itself set technology based performance standards for 188 "hazardous air pollutants" based on the "maximum achievable control technology" (MACT) for each industry

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Barry D. Solomon, *Five Years of Interstate SO_2 Allowance Trading: Geographic Patterns and Potential Cost Savings*, 11(4) ELECTRICITY J., May 1998, at 58, 65–67, 70.

41 McChesney, *supra* note 31, at 630; Clean Air Act, 42 U.S.C. §§ 7410(a)(2)(D), 7410(k)(5), 7426(b) (2006).

42 EPA, REGIONAL EFFORTS TO ADDRESS AIR POLLUTION, *available at* http://www.epa.gov/wastes/nonhaz/industrial/tools/iwair/ap_001_3.pdf; LARRY PARKER & JOHN BLODGETT, CONG. RESEARCH SERV., 98-236 ENR, AIR QUALITY: EPA'S PROPOSED OZONE TRANSPORT RULE, OTAG, AND SECTION 126 PETITIONS – A HAZY SITUATION? 2 (1998).

43 42 U.S.C. § 7426(b) (2006).

44 PARKER & BLODGETT, *supra* note 42, at 14.

45 42 U.S.C. § 7492 (2006).

46 *Id.* § 7412(c)(6).

47 *Id.* § 7412 (1988).

emitting them.[48] This standard was more stringent than the "best available control technology" (BACT) required for the six conventional NAAQS criteria pollutants, and unlike the NSPS approach governing those pollutants, the MACT standards could be applied to existing and new sources.[49]

Lengthy conflict ensued, however, as to whether to regulate mercury emissions from power plants under this provision.[50] In 2000, the Clinton administration EPA announced that it found it "appropriate and necessary" to regulate mercury emissions from EGUs under this provision.[51] But in 2005, the Bush administration EPA reversed this position, proposing to delist mercury as a hazardous air pollutant and regulate it instead under the cap and trade approach of section 111.[52] In 2008, a federal appeals court struck down the Bush proposal.[53] Then in March 2011, the Obama administration EPA issued proposed mercury regulations for power plants that reaffirmed the Clinton administration's approach and would assure reduction of mercury emissions from power plants by 79%.[54]

G. The NO_x SIP Call

In December 1996, the Clinton administration proposed new regulations tightening the NAAQS for both ozone and particulate matter, thus increasing protection of public health but also increasing the challenges of compliance for the states.[55]

OTAG submitted its report in 1997, confirming that long-range interstate transport of ozone was an important problem, that it occurred within a large but well-defined region of the eastern United States, and that it could be controlled by actions taken within that region, particularly by more stringent control of NO_x

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48 *Id.* § 7412(d)(3) (2006).

49 *Id.* § 7412(d)(3). The MACT "floor" for existing sources was based on the performance of the best 12% of facilities in the affected industry. *Id.* § 7412(d)(3)(A).

50 A central point of conflict is whether regulating mercury emissions from power plants as a hazardous air pollutant will provide significant additional benefits beyond those that are achieved as an inherent cobenefit of regulations reducing emissions of SO_2 and particulates (e.g., plant retirements or scrubbers), or will merely add costs for little additional benefit. Karen Palmer et al., *The Benefits and Costs of Reducing Emissions From the Electricity Sector*, 83 J. ENVTL. MGMT. 115, 117 (2006).

51 Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units, 65 Fed. Reg. 79,825, 79,830 (Dec. 20, 2000).

52 Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units and the Removal of Coal- and Oil-Fired Electric Utility Steam Generating Units From the Section 112(c) List, 70 Fed. Reg. 15,994, 16,025 (Mar. 29, 2005) (codified at 40 C.F.R. pt. 63); Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units, 70 Fed. Reg. 28,606, 28,606 (May 18, 2005) (codified at 40 C.F.R. pts. 60, 72, and 75). One effect would be to regulate only aggregate mercury emissions, leaving open the possibility of "hot spots" downwind from allowance buyers.

53 New Jersey v. EPA, 517 F.3d 574, 578 (D.C. Cir. 2008).

54 National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Stem Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units, 76 Fed. Reg. 24,976, 24,977, 25,073 (proposed May 3, 2011) (codified at C.F.R. pts. 60 and 63).

55 National Ambient Air Quality Standards for Ozone: Proposed Decision, 61 Fed. Reg. 65,716, 65,716 (proposed Dec. 13, 1996) (codified at 40 C.F.R. pt. 50); National Ambient Air Quality Standards for Particulate Matter: Proposed Decision, 61 Fed. Reg. 65,638, 65,638 (proposed Dec. 13, 1996) (codified at 40 C.F.R. pt. 50).

emissions.[56] It recommended a range of possible regional NO_x reductions by upwind states but left the specific decisions to EPA.[57] In August of that year, eight Northeastern states filed section 126 petitions asking EPA to designate upwind states' emissions as significantly contributing to their nonattainment of the ozone standard and to impose strict emission limits on these upwind power plants.[58] In 1997, EPA finalized a new and more stringent standard for ground level ozone, intended to better protect the health of at-risk populations and of those who spend active time outdoors; the new standard limited ozone to .08 parts per million (ppm) measured over eight hours, in place of the previous 1979 standard of .12 ppm measured over one hour.[59] In 1997, eight Northeastern states petitioned EPA under section 126 to demand strict regulation of upwind emission sources in the Midwest and South, reasoning that no consensus was likely to emerge since the states had such strongly conflicting interests.[60]

To implement this new standard, and also to respond to the demands of the downwind states, in 1999 the EPA issued a new rule finding that twenty-two upwind states and the District of Columbia "contribute significantly" to ozone nonattainment in downwind states, in violation of section 110(a)(2)(D)(i) of the Clean Air Act.[61] In response, EPA required them to revise their SIPs so as to reduce annual summertime NO_x emissions about 28% (1.2 million tons) by 2003 to allow downwind states to meet their NO_x emission budgets.[62] This new rule was known as the "NO_x SIP Call," and it recommended that the upwind states consider adopting NO_x allowance trading programs within each of their jurisdictions to meet the NO_x SIP Call requirement.[63]

In short, a series of actions by EPA in the late 1990s—some of them prompted by legal actions by downwind states—triggered more stringent direct federal regulation of stationary sources of NO_x in North Carolina and other upwind states. This approach was particularly burdensome for North Carolina, since there more than most other affected states, motor vehicles caused a far greater relative fraction of NO_x emissions than stationary sources, yet the EPA SIP Call mandated increased control only of stationary sources.[64] In the late 1990s, North Carolina initiated an

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56 OTAG AIR QUALITY ANALYSIS WORKGROUP, TELLING THE OTAG STORY WITH DATA: FINAL REPORT, VOL. I: EXECUTIVE SUMMARY (1997), *available at* http://capita.wustl.edu/otag/reports/AQAFinVol_I/Html/V1_Exsum7.html.

57 *See* Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone, 62 Fed. Reg. 60,318, 60,323 (proposed Nov. 7, 1997) (codified at 40 C.F.R. pt. 52).

58 McChesney, *supra* note 31, at 615.

59 National Ambient Air Quality Standards for Ozone, 62 Fed. Reg. 38,421, 38,856 (July 18, 1997) (codified at 40 C.F.R. § 50).

60 McChesney, *supra* note 31, at 615, 633, 661.

61 Findings of Significant Contribution and Rulemaking on Section 126 Petitions for Purposes of Reducing Interstate Ozone Transport, 64 Fed. Reg. 28,089, 28,252 (May 25, 1999). The 126 Rule was finalized in January 2000, incorporating multiple refinements based on court decisions. 65 Fed. Reg. 2,674 (Jan. 18, 2000) (codified at 40 C.F.R. pts. 52, 97).

62 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, 57,438 (Oct. 27, 1998) (codified at 40 C.F.R. pts. 51, 72, 75, 96).

63 *Id.* at 57,356, 57,456; 40 C.F.R. § 96 (1999) (implementing section 110(k)(5) of the Clean Air Act, 42 U.S.C. § 7410(k)(5) (2000)).

64 The SIP Call was challenged in court by North Carolina, as well as by the State of Michigan, the Appalachian Power Company, the American Trucking Association, and others. North Carolina

aggressive motor vehicle inspection and maintenance program in its urban ozone nonattainment areas to begin addressing these sources.[65]

H. Particulate Matter

In 1997, EPA established a new NAAQS for fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), which was increasingly recognized as a greater public health hazard than the larger particles (less than 10 microns in diameter), which were already regulated.[66]

I. New Source Review

A major conflict intensified during the 1990s over the application of new source review (NSR) requirements to preexisting grandfathered power plants. "Routine repair, maintenance and replacement" activities, such as increases in hours of operation or in production rates, had always been allowed without NSR.[67] The EPA argued, however, that many utilities had abused these terms with more expansive modifications, upgrades, and increases in use that had contributed to significant increases in emissions.[68] The utilities responded that the vast majority of such actions were indeed routine maintenance actions that EPA had implicitly allowed for nearly three decades, and therefore the utilities should not be burdened by NSR compliance reviews for them.[69] In an important 1990 decision, the Seventh Circuit Court of Appeals upheld EPA's narrower definition of "routine maintenance."[70] Following that decision, the Clinton administration brought suit against nine electric utilities for upgrading or increasing power generation at older facilities without adding NSR-approved emission control technology.[71] In contrast, the Bush administration made repeated attempts throughout the following decade to redefine and limit the scope of NSR, allowing thousands of grandfathered plants to

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supported EPA's goal of reducing ground level ozone, but argued that EPA's SIP Call should be based on actual ozone violations in downwind states rather than just on its judgment of the affordability of cleanup technologies in upwind states. It also argued that EPA should have allowed each state to propose its own strategies for meeting the new NO_x and PM standards rather than imposing its own approach based entirely on "affordable" stationary source controls and not including motor vehicles. Final Brief of Petitioning States at 10–11, Michigan v. EPA, 213 F.3d 663 (D.C. Cir. 2000) (No. 98-1497); Final Reply Brief of Petitioning States at 2–3, *Michigan*, 213 F.3d 663 (No. 98-1497). The EPA determination was largely upheld by the D.C. Court of Appeals, as well the Supreme Court in *Whitman v. American Trucking Association*, 531 U.S. 457, 471, 486 (2001). *Michigan*, 213 F.3d 663, 695; Appalachian Power Co. v. EPA, 249 F.3d 1032, 1036 (D.C. Cir. 2001).

65 1999 N.C. Sess. Laws 1153–54 (providing for ambient air quality improvement).

66 National Ambient Air Quality Standards for Particulate Matter, 62 Fed. Reg. 38,651, 38,652, (July 18, 1997); 40 C.F.R. § 50.7(a)(1) (1998).

67 Nash & Revesz, *supra* note 23, at 1687–89.

68 *Id*. at 1692–93.

69 *See, e.g.*, EPA, NEW SOURCE REVIEW: REPORT TO THE PRESIDENT 9 (2002), *available at* http://www.epa.gov/nsr/documents/nsr_report_to_president.pdf. Note that this report was authored by EPA officials of the Bush Administration, and it therefore reflects their perspective rather than that of Clinton's appointees.

70 Wis. Elec. Power Co. v. Reilly (*WEPCO*), 893 F.2d 901, 910, 913 (7th Cir. 1990) ("[T]he EPA's consideration of cost, magnitude and nature" of a project to determine whether it constituted "routine maintenance," was not arbitrary or capricious).

71 Nash & Revesz, *supra* note 23, at 1694–95.

modernize without adopting the new source pollution control requirements; however, it was in turn repeatedly overruled by the courts.[72]

J. Regional Haze Regulations

Finally, in 1999 EPA also issued regulations to improve visibility in 156 national parks and wilderness areas across the country—including North Carolina's Great Smokies—with the goal of restoring pristine visual conditions by 2064.[73]

As early as 1993, National Park Service scientists had published reports documenting a severe decline in visibility in the Great Smokies, one of the most popular national parks and a major tourism asset for western North Carolina.[74] Visibility had decreased from 93 miles under natural conditions to an average of twenty-four miles, and as little as twelve miles or less during the summer months—more than an 80% reduction—mainly due to upwind sulfate emissions.[75] The report also documented ozone and acid rain damage to the Southern Appalachian mountain forests and surface waters.[76] At the instigation of its researchers, the Park Service convened a conference to promote discussion of mountain air quality in 1992. One immediate result of this conference was the EPA-sponsored Southern Appalachian Mountains Initiative (SAMI), a detailed study that involved all the surrounding states and included extensive monitoring and modeling to document air quality issues across the region.[77]

The 1999 EPA regulations required each state to submit a regional haze SIP that would establish goals for improving visibility in national parks and wilderness areas and long term strategies for reducing emissions of air pollutants that cause visibility impairment.[78] In April 1999, North Carolina Governor Jim Hunt hosted a multistate summit to build regional support for solutions to ozone pollution, haze, acid rain, and other air quality problems in the Southern Appalachians, and in April 1999, North Carolina and Tennessee signed an agreement with federal land managers on formal permit review procedures to ensure that new industrial emissions would not degrade air quality in the Great Smoky Mountains and other pristine natural areas.[79] North Carolina encouraged other Southeastern states to sign similar agreements.

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72 North Carolina's Duke Energy was the subject of one pivotal NSR case, in which the federal government sued the utility for failing to obtain NSR approval for one of its plants. The district court and subsequently the Fourth Circuit found for Duke, in language that would have adopted an expansive interpretation of routine maintenance when the rate of emissions did not increase even if net emissions did so; the Supreme Court however reversed. United States v. Duke Energy Corp., 278 F. Supp. 2d 619, 640–42 (M.D.N.C. 2003), *aff'd.* 411 F.3d 539 (4th Cir. 2005), *rev'd sub nom.* Envtl. Def. v. Duke Energy Corp., 549 U.S. 561 (2007). *See* Nash & Revesz, *supra* note 23, at 1696–1707.

73 Regional Haze Regulations, 64 Fed. Reg. 35,714, 35,746 (July 1, 1999).

74 Christine L. Shaver, Kathy A. Tonnessen, & Tonnie G. Maniero, *Clearing the Air at Great Smoky Mountains National Park*, 4 ECOLOGICAL APPLICATIONS 690, 695 (1994).

75 *Id.*

76 *Id.* at 693–95.

77 *See generally* S. APPALACHIAN MOUNTAINS INITIATIVE, FINAL REPORT (2002), *available at* http://www.nature.nps.gov/air/pubs/pdf/SAMI_Final_Report_0802.pdf (explaining the region's air quality issues and possible remedies).

78 64 Fed. Reg. at 35714, 35722.

79 N.C. DIV. AIR QUALITY, NORTH CAROLINA, TENNESSEE SIGN AIR QUALITY PACT FOR PRISTINE AREAS, http://daq.state.nc.us/news/pr/1999/pact.shtml (last visited Nov. 23, 2013).

III. ORIGINS OF THE CLEAN SMOKESTACKS ACT

A. Context

Against this background, the story of the CSA began with public and business concern over air pollution damage to the mountains and forests of the tourism-dependent economy of western North Carolina.

North Carolina as of 2011 was the nation's tenth largest state in population[80] and eighth in gross state product.[81] Most of its electric power was generated by two investor-owned utility companies, Duke Energy and Progress Energy (formerly Carolina Power & Light),[82] and all its utilities are subject to rate regulation by the North Carolina Utilities Commission (NCUC).[83] Rates are approved or adjusted based on each company's capital investment (its "rate base"), its operating costs, and a rate of return on its investment that the NCUC considers appropriate.[84]

North Carolina's air quality was an increasingly significant concern by the late 1990s. More than half its electric power was generated by forty-five coal-fired units at fourteen sites, nearly all built in the 1970s or earlier, which were operated by Duke and Progress Energy. As noted earlier, these power plants were net importers rather than exporters of emissions allowances; in 2002 they emitted 459,643 tons of SO_2 and 140,689 tons of NO_x,[85] amounting to approximately 82% of the state's total SO_2 emissions, 45% of its NO_x emissions, and 65% of its mercury emissions.[86] The number of unhealthy air pollution days had nearly doubled over the 1990s. In 1999, North Carolina experienced sixty-eight unhealthy air days, ranking it fifth in the country; ozone levels across many areas of the state also exceeded the new EPA eight-hour standard.[87] Smog in North Carolina during

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80 U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES: 2011, tbl. 12 (2011), *available at* http://www.census.gov/compendia/statab/2011/tables/11s0012.pdf.

81 U.S. BUREAU OF ECON. ANALYSIS, ECONOMIC RECOVERY WIDESPREAD ACROSS STATES IN 2010 tbl. 1 (2011), *available at* http://www.bea.gov/newsreleases/regional/gdp_state/2011/pdf/gsp0611.pdf.

82 The remainder includes an area of northeastern North Carolina served by Dominion North Carolina Power Company, all of whose generating units are in Virginia, and a number of small electric membership corporations and municipal-owned electric distribution systems. Duke and Progress merged in 2012, approved by the NCUC after considerable controversy. *See* U.S. Energy Info. Admin., *Merger Of Progress Energy and Duke Energy Created Largest U.S. Electric Utility*, http://www.eia.gov/todayinenergy/detail.cfm?id=7650 (last visited Nov. 23, 2013) (describing the merger between Duke and Progress).

83 NCUC, *Electric Industry*, http://www.ncuc.commerce.state.nc.us/industries/electric/electric.htm (last visited Nov. 23, 2013).

84 Charles Anderson, North Carolina Clean Smokestacks: A Critical Case Study On The Process Of State-Level Environmental Policy Making 51 (Apr. 2005) (unpublished B.A. Honors Thesis, University of North Carolina at Chapel Hill) (on file with author).

85 N.C. DEP'T OF ENV'T NATURAL RES. & NCUC, IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 5 (2003), *available at* http://www.ncuc.commerce.state.nc.us/reports/smokstak.pdf [hereinafter IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2003].

86 ENVIRONMENTAL DEFENSE FUND, NORTH CAROLINA'S CLEAN SMOKESTACKS PLAN 19 (2001) (on file with author).

87 NORTH CAROLINA DIV. AIR QUALITY, *North Carolina To Work With EPA On Ozone Reduction Plan*, http://daq.state.nc.us/news/pr/2000/workwepa_0800.shtml (last visited Nov. 23, 2011); NORTH CAROLINA DIV. OF AIR QUALITY, EIGHT-HOUR OZONE AVERAGES IN NC IN 1999, *available at* http://daq.state.nc.us/monitor/data/files/o3data_1999.pdf.

April through October 1997 was estimated to have caused 1,900 respiratory-related hospital admissions, 5,700 respiratory visits to emergency rooms, and 240,000 asthma attacks.[88] Particulate emissions from power plants were estimated to be responsible for some 1,800 premature deaths each year.[89] Person County, the site of Progress Energy's Roxboro coal-fired plant and two others, ranked highest in the nation for toxic releases from electric utilities; Catawba County, home of Duke Power's Marshall Plant, ranked ninth.[90] As noted above, summer visibility in the Great Smokies had declined by over 80%, a serious concern to the tourism-based economy of western North Carolina. Studies estimated that improving visibility in the Great Smokies could increase visitation enough to bring in more than $200 million per year in additional sales and more than $20 million in additional tax revenues.[91]

As early as the late 1980s, influential businessmen and conservationists such as Hugh Morton, the owner of Grandfather Mountain, had begun to forcefully publicize concerns about air pollution damage to the mountain forests with the help of outspoken scientists such as Dr. Robert Bruck of North Carolina State University.[92] By the late 1990s, North Carolina had taken a leading role in the SAMI study, represented by Bill Holman, who was then Assistant Secretary of the State's Department of Environment and Natural Resources and previously a longtime lobbyist for environmental advocacy groups.[93]

North Carolina was one of the states significantly impacted by the NO_x SIP Call, both as an upwind state whose emissions contributed to pollution in other states and as a downwind state impacted by emissions from TVA, the Ohio River Valley, Alabama, and other upwind sources, as well as from its own power plants, other industries, and increasing motor vehicle emissions associated with rapid economic and population growth.[94] In 1999, Governor Jim Hunt issued a Clean Air

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88 ABT ASSOC. INC., ADVERSE HEALTH EFFECTS ASSOCIATED WITH OZONE IN THE EASTERN UNITED STATES ES-7 (1999), *available at* http://www.abtassociates.com/reports/ES-ozone.pdf.

89 CLEAN AIR TASK FORCE, DEATH, DISEASE, AND DIRTY POWER: MORTALITY AND HEALTH DAMAGE DUE TO AIR POLLUTION FROM POWER PLANTS 6, *available at* http://www.catf.us/resources/publications/files/Death_Disease_Dirty_Power.pdf (based on data from ABT ASSOC., THE PARTICULATE-RELATED HEALTH BENEFITS OF REDUCING POWER PLANT EMISSIONS, Exhibit 6-8, *available at* http://www.abtassociates.com/reports/particulate-related.pdf).

90 Bruce Henderson, *EPA Reports Industries' Toxic Releases*, CHARLOTTE OBSERVER, May 26, 2002, at 9B.

91 ABT ASSOC. INC., OUT OF SIGHT: THE SCIENCE AND ECONOMICS OF VISIBILITY IMPAIRMENT 5, 58, exhs. 3-4, 5-3, 5-4, 7-2, *available at* http://www.catf.us/resources/publications/files/Out_of_Sight.pdf.

92 Harrison Metzger, *Commission Urged to Fight Acid Rain*, HENDERSONVILLE TIMES-NEWS, Sept. 11, 1989, http://news.google.com/newspapers?nid=1665&dat=19890911&id=AUYaAAAAIBAJ&sjid=PiQEAAAAIBAJ&pg=6903,2853994 (last visited Nov. 23, 2013). Grandfather Mountain at the time was the only privately owned United Nations World Biosphere Reserve of 324 sites worldwide. After Morton's death, it was preserved as a state park. Blue Ridge Country, *Up On Grandfather Mountain*, http://blueridgecountry.com/travel/north-carolina/up-on-grandfather-mountain/ (last visited Nov. 23, 2013).

93 *See* S. APPALACHIAN MOUNTAINS INSTITUTE, FINAL REOPORT (2002), *supra* note 77 (describing decade long effort to improve air quality in southeastern United States).

94 Edith Gégo et al., *Observation-Based Assessment of the Impact of Nitrogen Oxides Emissions Reductions on Ozone Air Quality over the Eastern United States*, 46 J. APPLIED METEOROLOGY & CLIMATOLOGY 994, 1002–07 (2007), *available at* http://journals.ametsoc.org/doi/pdf/10.1175/JAM2523.1.

Plan that called for reducing NO_x emissions from the state's five largest power plants by two-thirds by 2003, reducing motor vehicle emissions, and increasing funding for rail and transit projects.[95] Most of this program was enacted by the General Assembly in July 1999.[96] North Carolina lost its suit against EPA in 2000 and agreed to work with EPA to implement the EPA NO_x SIP call.[97] In October 2000, the state Environmental Management Commission (EMC) adopted rules reducing utility emissions of NO_x from 89,000 TPY in 2000 to 37,294 TPY in 2004 (a 58% reduction), then to 28,100 TPY in 2006 (a 68% reduction).[98] The EMC adopted a contingency plan guaranteeing a minimum reduction of 56% in NO_x emissions from power plants, to take effect if the courts upheld a legal challenge to EPA's NO_x rules.[99] Under the contingency rules, electric utilities would have to reduce emissions from 89,000 tons of NO_x in 2000 to 39,377 tons in 2004.[100]

The NO_x SIP Call process included invitations to utilities and environmental groups to propose the State's plan, as well as public hearings around the State during 2000.[101] The hearings attracted widespread public participation, particularly in the mountain areas of western North Carolina, and environmental groups lobbied hard for an 80% reduction in NO_x emission levels.[102] Ultimately, however, the state EMC chose the governor's "middle" plan, reducing NO_x by 65% and establishing seasonal (not year round) emission caps for fossil fuel–fired electric generators and other combustion sources with heat inputs greater than 250 million Btu per hour, under which sources could choose either to meet the caps or to buy allowances from other sources under the trading program. Sources that did not use all their allowances could sell them or bank them for use in a later season.[103]

This solution represented some improvement, but left many environmental advocates feeling less than successful. It also left mountain-area citizens and legislators concerned that air pollution impacts on the mountains were being disregarded. It addressed neither year-round emissions nor SO_2 emissions, which were a far more significant cause of regional haze—and were more closely associated with particulate emissions, a major health issue—than NO_x.[104] All but one of North Carolina's own power plants were generally downwind of the mountains, but a highly visible political issue in western North Carolina was

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95 N.C. Div. Air Quality, *The Hunt Administration's Plan for Clean Air*, http://www.ncair.org/news/pr/1999/airfinal.shtml (last visited Nov. 23, 2011).

96 *Id.*

97 N.C. Div Air Quality, *North Carolina To Work With EPA On Ozone Reduction Plan*, http://daq.state.nc.us/news/pr/2000/workwepa_0800.shtml (last visited Nov. 23, 2011).

98 N.C. Div. Air Quality, *New Rules To Take Effect Fighting Air Pollution*, http://daq.state.nc.us/news/pr/2000/newrules_1000.shtml (last visited Nov. 23, 2011).

99 *Id.*

100 *Id.* Reductions also would be required at other NO_x sources, including large industrial boilers, electric cogeneration plants, and petroleum pipeline compressor stations.

101 BILL HOLMAN, N.C. WATER & ENERGY: NEW CHALLENGES FOR A NEW CENTURY (2010), *available at* http://iei.ncsu.edu/wp-content/uploads/2013/02/Holman-Leadership-on-Clean-Water-v2.pdf.

102 *Id.*

103 15A N.C. ADMIN. CODE 2D.1416–1417 (repealed 2009); Anderson, *supra* note 84, at 58; N.C. DIV. AIR QUALITY, NO_x BUDGET AND PROGRAM OVERVIEW 2 (2004), *available at* http://daq.state.nc.us/monitor/eminv/noxbudget/nox_budget_program_overview.pdf

104 Anderson, *supra* note 84, at 58.

upwind emissions from the TVA power plants affecting the mountain forests.[105] This cause united environmentalists to an unusual degree with conservative mountain business interests who were highly dependent on tourism. These groups built alliances with public health organizations, who helped them assemble data about the statewide health impacts of air pollution on asthma and other lung diseases, emergency room visits, children, the elderly, and other vulnerable populations, a key step in attracting broader legislative support.[106]

B. The Clean Smokestacks Plan

After a widely attended public meeting in the mountains showed vigorous support for state action, a coalition of environmental groups led by the Environmental Defense Fund (EDF) approached state legislators with a proposed plan for more far reaching pollution reduction.[107] Through the Western North Carolina Alliance, they targeted state Senator Steve Metcalf and state Representative Martin Nesbitt, both Democrats representing urban Asheville in the otherwise Republican-leaning mountain counties in a Democratic-majority state legislature.[108] During the first week of the legislative session, Senator Metcalf had an opportunity to raise the issue during a chance lunch encounter with Senator Marc Basnight (D-Dare), the powerful president pro tem of the Senate, and Senator Basnight reportedly responded that "if it's that important to you, then let's do it."[109]

Metcalf invited the electric utilities to collaborate in crafting a bill. The utilities reportedly were unenthusiastic at first, but recognized the strength of the forces in play and some potential benefits to themselves, depending on the bill's language, and ultimately agreed to participate. The legislators then convened a small group representing both the environmental groups and the utilities, and began meeting with them and other stakeholders to draft a bill.

In March 2001, EDF produced a formal proposal for a North Carolina Clean Smokestacks Plan.[110] The plan identified the pre-1977 power plants as the

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105 U.S. Energy Info. Admin., *North Carolina: State Profile and Energy Estimates*, *available at* http://www.eia.gov/state/?sid=NC (last visited Nov. 23, 2013) (illustrating geography of North Carolina's mountains, which are in the western portion of the state, and geography of North Carolina's coal power plants, which are generally east of those mountains); Nigel Barrella, Comment, *North Carolina v. Tennessee Valley Authority*, 35 HARV. ENVTL. L. REV. 247, 248 n.2 (2011) (discussing east coast airflow from west to east, and discussing TVA's ownership of upwind plants).

106 Western North Carolina had a number of highly influential conservationists among its business leaders, some of whom also were board members of NC EDF at the time, such as Hugh Morton (owner of Grandfather Mountain) and a member of the Cecil family (owners of the Biltmore Estate). Tourism is a primary industry in Western North Carolina.

107 Anderson, *supra* note 84, at 59.

108 Brownie Newman, executive director of WNCA and later vice-Mayor of Asheville, took the lead in this effort. *Id.* at 58–59.

109 *Id.* at 61 (quoting interview with Senator Basnight's legislative assistant). Basnight reportedly was eager to give a victory to Metcalf as a vulnerable Democratic State Senator in a district otherwise represented by Republicans in both the Federal and State Houses of Representatives.

110 ENVIRONMENTAL DEFENSE FUND, *supra* note 86, at 2. Other coalition members included the Sierra Club, North Carolina Public Interest Research Group (NCPIRG), and grassroots groups such as the Western North Carolina Alliance, Appalachian Voices, Blue Ridge Environmental Defense League, among a dozen member organizations. *Id.*

dominant sources of SO_2 and mercury and nearly half the NO_x emissions in the state.[111] It also documented proven emission control technologies that could dramatically reduce these emissions—scrubbers for SO_2, and SCR for NO_x—and estimated economic benefits of improved air quality that would far exceed the costs of such investments.[112] The report recommended a four pollutant strategy, similar to proposals that were also being promoted at the federal level at the time: capping summertime NO_x emissions at 23,000 TPY by 2007 (an 80% reduction from 1998 levels), year-round NO_x emissions at 50,000 tons (also an 80% reduction), SO_2 emissions at 85,000 TPY (an 82% reduction), mercury at a 90% reduction, and CO_2 at 1990 levels.[113] The report also called on the State to use the Clean Air Act's section 126 petition process to bring pressure on upwind states to reduce their emissions as well.[114]

Senator Metcalf introduced the first version of the Clean Smokestacks bill on April 1, 2001.[115] With the active efforts of a broad environmental and health coalition and the utilities' acquiescence, the bill attracted twenty-nine cosponsors, including even some outspoken Republican conservatives, such as Senator Virginia Foxx, who represented a mountain district, and Senator Robert Rucho from the Charlotte area.[116]

C. Senate Bill

The initial version of the bill had four main elements. First, it directed the State Environmental Management Commission to develop NO_x and SO_2 standards for all coal-fired EGUs greater than 25-megawatts that were operated by investor-owned utilities in North Carolina. Second, it directed the North Carolina Utilities Commission to "allow each electric utility to recover all just, reasonable, and prudently incurred environmental compliance expenditures through an environmental compliance expenditure-recovery factor separate from the electric utility's base rates."[117] Third, it stated the

> . . . intent of the General Assembly that the State use all available resources and means, including negotiation, participation in interstate compacts and multistate and interagency agreements, and litigation, to induce other states and entities, including the Tennessee Valley Authority, to achieve reductions in emissions of oxides of nitrogen (NO_x) and sulfur dioxide comparable to those [being required of North

111 *Id.* at 17.

112 *Id.* at 5–7.

113 *Id.* at 30. The CO_2 levels were those called for in the United Nations Framework Convention on Climate Change, which the U.S. Congress had ratified. *Id.* For an example of the arguments for a four-pollutant strategy at the federal level see U.S. ENERGY INFORMATION ADMIN., SR/OIAF/2001-05, ANALYSIS OF STRATEGIES FOR REDUCING MULTIPLE EMISSIONS FROM ELECTRIC POWER PLANTS WITH ADVANCED TECHNOLOGY SCENARIOS iii (2001).

114 ENVIRONMENTAL DEFENSE FUND, *supra* note 86, at 9.

115 S. 1078, N.C. Gen. Assemb., Sess. 2001 (first version, Apr. 5, 2001).

116 Senator Foxx also reportedly had a personal friendship with Senator Metcalf, and followed the lead of the widely respected Republican conservationist Senator Hamilton Horton of Winston-Salem in signing on as a cosponsor. NC Public Interest Research Group (NCPIRG) led a major statewide grassroots lobbying campaign to bring citizen pressures on legislators. Anderson, *supra* note 84, at 59–60.

117 S. 1078, N.C. Gen. Assemb., Sess. 2001 (first version, Apr. 5, 2001).

> Carolina utilities under this statute and] on a comparable schedule. The State shall give particular attention to those states and other entities whose emissions negatively impact air quality in North Carolina or whose failure to achieve comparable reductions would place the economy of North Carolina at a competitive disadvantage.[118]

Finally, the bill directed the Division of Air Quality to study and report back on the desirability of more stringent reduction of NO_x and SO_2 as well as mercury and CO_2 emissions: in effect, as a concession to the utilities, adopting a two- rather than four-pollutant approach, but with the expectation that radically reducing SO_2 and NO_x would also reduce mercury and CO_2 as cobenefits (and that if not, these could be targeted for future regulation).[119]

Two weeks later a committee-approved second version of the bill was issued, which made several key refinements to the initial version.[120] First, it set permanent, year-round caps on NO_x and SO_2 emissions by each utility, limiting their total collective emissions of NO_x to 60,000 TPY beginning in 2007 and 56,000 TPY by 2009; and to 250,000 TPY of SO_2 by 2009 and 130,000 tons by 2013.[121] Second, it limited cost recovery only to expenditures incurred after enactment of the law, and only to expenditures beyond those already required to comply with the state's NO_x SIP Call.[122] It also required public hearings on requests for cost recovery, and based cost recovery on specified twelve month periods.[123]

In effect, the Senate bill set permanent collective caps on the utilities' NO_x and SO_2 emissions, whereas federal regulation only addressed summer NO_x emissions and did not address SO_2 from pre-existing power plants.[124] It provided an open-ended cost recovery mechanism, on top of the utilities' normal rates, for expenses of meeting the caps that exceeded compliance with the NO_x SIP call.[125] It directed the state attorney general to pursue similar reductions by upwind states and emissions sources.[126] And in an early concession to the utilities, it dropped two of the original four pollutants—mercury and CO_2—to the status of study requirements.[127] In short, it would achieve major reductions in air pollution directly, and it would also explicitly and intentionally position North Carolina on moral and legal high ground to bring legal action against upwind polluters as well.[128]

With Senator Basnight's support, the Clean Smokestacks bill sailed through the state Senate on April 23, just three weeks after it was introduced and five days

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118 *Id.*

119 *Id.*

120 S. 1078, N.C. Gen. Assemb., 2001 Sess. (as passed Apr. 18, 2001).

121 *Id.* at 3–4.

122 *Id.* at 4.

123 *Id.*

124 *Id.* at 3–4. EPA's Clean Air Interstate Rule (CAIR), which addressed interstate transmission of sulfur and year-round nitrogen emissions at a federal level, was not promulgated until 2005. Rule To Reduce Interstate Transport of Fine Particulate Matter and Ozone (CAIR), 70 Fed. Reg. 25,162, 25,166–67, 25,172, 25,201 (May 12, 2005).

125 S. 1078, *supra* note 120, at 4.

126 *Id.* at 4–5.

127 *Id.* at 5–6.

128 Anderson, *supra* note 84, at 66–67 (discussing interview with Steven Metcalf).

after the committee substitute was approved, by a vote of 43–5.[129] As it moved to the House, however, it encountered its first serious opposition, particularly from groups representing the industrial customers of the utilities who would have to pay the added costs: the Manufacturers and Chemical Industry Council (MCIC) and the Carolina Utility Customers Association (CUCA).[130] By this time the utilities themselves publicly supported the bill so long as they were assured of cost recovery.[131] An important consideration for them appears to have been that they were already anticipating additional federal regulation (and in some cases, NSR enforcement suits) that would likely require them to make such future investments anyway. Getting ahead of these requirements might even save them money, compared to bidding for technology vendors once federal requirements forced other utilities to do so as well.[132] MCIC and CUCA, however, faced the prospect of having to pay the bulk of the costs, in effect a 4–7% surcharge totaling some $2.3 billion,[133] at a time when the economy was under pressure from the dotcom bust and the rapid loss of North Carolina's old industries—textiles, furniture, and tobacco in particular—to China and other countries.[134] Health groups added arguments important to the urban populations of central North Carolina as well as the mountains. North Carolina had the fifth highest number of unhealthy air days nationally in 1999, and had four urban regions in the worst twenty-five for air pollution. One of every three North Carolinians lived in areas that did not meet healthy air standards, asthma cases and respiratory visits to emergency rooms and even premature deaths attributable to air pollution were climbing, and power plants were the sources of 82% of the SO_2, 45% of the NO_x, and 65% of the mercury emissions.[135] The prospect of reducing mercury emissions by 60%, even merely as a cobenefit of control technologies for SO_2 and NO_x, would be an attractive health benefit for the fishing constituencies of eastern North Carolina as well.

Despite intense lobbying by environmental and health groups and their legislative allies, however, the bill did not pass the House in 2001, because of

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129 North Carolina General Assembly, *Senate Roll-Call Vote History*, http://www.ncleg.net/gascripts/voteHistory/RollCallVoteHistory.pl?sSession=2001&sChamber=S (last visited Nov. 23, 2013) (providing voting history of the second reading of S. 1078 on Apr. 23, 2001). Interestingly, it was passed by the Senate (and even by the House the following year, where it was far more controversial) without any formal fiscal note attached, a procedure usually demanded by legislators for any bill that might have significant economic impacts. At least three of the five opposing votes were by senators from districts heavily affected by overseas competition and unemployment. Anderson, *supra* note 84, at 67–72 (detailing the reservations of all the Senators based on interviews).

130 *See* Anderson, *supra* note 84, at 64, 72–73 (discussing the opposition from MCIC and CUCA despite mechanisms meant to assuage them).

131 *See id.* at 88, 90.

132 *See, e.g.*, DAVID HOPPOCK ET AL., BENEFITS OF EARLY STATE ACTION IN ENVIRONMENTAL REGULATION OF ELECTRIC UTILITIES: NORTH CAROLINA'S CLEAN SMOKESTACKS ACT 5 (2012).

133 Anderson, *supra* note 84, at 62 (discussing the MCIC's concern about the price tag).

134 *Id.* at 59–60.

135 The N.C. Division of Public Health, for instance, estimated that the costs of asthma attacks just to seventh and eighth graders in North Carolina in 2001 were $14 million in hospitalizations and $1.4 million in emergency room visits. The costs to all the state's children could be as high as $100 million, including hospital costs, doctor's visits, prescription medications, and lost wages by parents caring for them. CLAY BALLANTINE, AIR POLLUTION AND HEALTH: MEDICAL EVIDENCE SUMMARY (2001), (on file with author). A similar version of this summary is available at http://www.centerfortheenvironment.org/tl_files/cfte/ppt/clay%20ballantine%20presentationnew.ppt (last visited Nov. 23, 2013).

pressure from concerned industries and the more general public turmoil surrounding the September 11 World Trade Center attacks.[136] Since it had passed the Senate, however, it remained active for further consideration in the 2002 short legislative session.

D. Negotiation Process

As the 2001 session ended and over the ensuing winter, a new key player became actively involved in driving negotiation of a successful compromise: Governor Michael Easley, who had taken office in 2001 after serving as state Attorney General from 1993 to 2001 while Jim Hunt was governor. During this period he had taken personal responsibility for a number of major policy negotiations, including the tobacco Master Settlement Agreement, restrictions on predatory lending, and the Smithfield Foods negotiations on controlling hog wastes, the last of which was also an environmental issue and had been a major campaign point for him. Clean air was initially an important but not top tier issue for him—he had been working primarily on a preschool initiative and a patients' bill of rights—but when the Clean Smokestacks issue presented itself, especially as a rare alliance between the utilities and the environmental groups, and he could see a potential solution to close the deal, he seized the opportunity.[137]

Governor Easley and his policy advisors convened a series of stakeholder meetings in late 2001 as the legislative session wound down, hoping to craft a limited compromise that the House could pass immediately.[138] Ultimately they decided that it was unwise to try to force through a last minute compromise in that session, but they continued to sponsor intense negotiations over the winter to develop a workable solution.

The critical sticking point for MCIC, CUCA, and other industry opponents was the cost recovery mechanism: they strongly opposed a surcharge on their electric bills, especially during an economic recession when the state also was losing industries to other states and countries. Governor Easley himself reportedly came up with a creative solution: with the drop in interest rates during the dot-com recession, and the fact that the utilities were just finishing paying off their debts for nuclear power plants and asbestos claims, the utilities (Duke in particular) were earning a higher rate of return than the maximum allowable rates set by the NCUC,

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136 Anderson, *supra* note 84, at 31.

137 Interview with Alan Hirsch, Chief Policy Advisor to Governor Easley (July 25, 2011). Governor Easley was strongly enthusiastic about the proposed legislative mandate to pursue emissions reductions by upwind states and utilities, a cause he himself had championed as Attorney General. Since 1999 the governors of North Carolina, South Carolina, Georgia, and Tennessee had been holding annual Air Quality Summit meetings, and in 2001 they entered into a Southern Air Principles agreement, which recognized that regional air quality problems must be addressed through multipollutant strategies and regional approaches that consider each state's unique qualities and needs. As directed by this agreement, the signatory states were to work together to develop joint multipollutant strategies to address the problems of ozone pollution, acid deposition, and reduced visibility, and to develop transportation and energy policies that would protect and improve air quality in the South. Press Release, N.C. Dep't of Env't & Natural Res., 4th Governors' Air Summit in Charlotte (May 7, 2002) (on file with author).

138 Anderson, *supra* note 84, at 85–87. Alan Hirsch and Hawley Truax, with support from staff lawyers of the Attorney General's office, conducted the stakeholder meetings. Another key member of the governor's staff, John MacArthur, took a senior position at Progress Energy during this period.

and therefore could potentially be forced into a rate hearing to reduce their rates: a time consuming, contentious and uncertain process for the utilities.[139]

Governor Easley proposed that rather than impose a surcharge, the utilities' rates simply be frozen for five years rather than potentially be reduced.[140] The excess revenues would be used to pay for compliance with the proposed caps on SO_2 and NO_x over a seven year period through accelerated cost amortization. MCIC and CUCA thus would not get a rate decrease for at least five years, but they would have no surcharge either, and would simply continue to pay the rates they were already paying.[141] At a meeting in January 2002, Easley made it clear to the utilities that he was committed to moving forward with this initiative, and invited them to work with the other stakeholders in designing the details.

With this proposal as a potential solution to the central issue, the governor's advisors led a lengthy series of negotiations beginning in March 2002 with all the main stakeholder groups to hammer out the details.[142] A key step was a decision to designate the staff lawyers of the Attorney General's office, as a trusted neutral party, to lead the actual drafting of the negotiated language.[143] The environmental groups chose to focus their negotiations solely on the air quality provisions and not on the cost recovery issues. They accepted the idea of an overall cap rather than the unit-by-unit technological controls recommended in their 2001 Clean Smokestacks Plan, but insisted that any emissions allowance credits generated by compliance beyond federal requirements—that is, by meeting North Carolina's tighter requirements under the CSA—not be saleable to upwind states or emissions sources to generate extra profits for the utilities.[144]

The utilities in turn foresaw stronger federal standards emerging in the near future, and were willing to accept the air quality caps so long as they got a cost recovery mechanism and could avoid the uncertainties of a rate reduction

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139 Anderson, *supra* note 84, at 52–53. *See also* NCUC, REPORT OF GRANT THORNTON LLP, NO. E-7 Sub 722 (filed Oct. 22, 2002) (commissioned Dec. 10, 2001) (reporting independent investigation and accounting review of Duke Power on behalf of the NCUC). The NCUC regulates each utility's rates, and periodically adjusts them based on the utility's capital investments (its "rate base"), operating costs, and a maximum allowable rate of return on investment that the Utility Commission considers appropriate for the company's ability to attract investment, the appropriate dividends to pay on preferred stock, and a fair return on equity. The approved rates of return at the time of the CSA were 12.75% for Duke Power and 12.5% for Progress Energy, set in a 1991 rate case. Anderson, *supra* note 84, at 51. In 2002–2003 Duke Energy made 14.43%, or about $100 million more than the approved level. David Mildenberg, *Duke Sees $100M Excess Profit*, CHARLOTTE BUS. J., Oct. 6, 2003, http://www.bizjournals.com/charlotte/stories/2003/10/06/story1.html (last visited Nov. 23, 2013). CUCA was concurrently requesting that the Utilities Commission initiate a rate case to reduce Duke's excess earnings. Anna Griffin, *Review of Duke's Rates is Sought*, CHARLOTTE OBSERVER, July 3, 2002, at 1D.

140 Anderson, *supra* note 84, at 85–87.

141 Changes in fuel costs would continue to be passed along directly as they occurred, without rate hearings.

142 Participants included representatives of the utilities, the key environmental groups, MCIC and CUCA, the N.C. Justice Center (representing low income utility customers), the NCUC, the Department of Environment and Natural Resources and its Division of Air Quality, the Attorney General's office, and several other individual industries. A few members of the General Assembly also sat in.

143 The attorney general in North Carolina is independently elected, not appointed by the governor. The attorneys involved were James Gulick, Marc Bernstein, and Allen Jernigan.

144 Anderson, *supra* note 84, at 87.

process.[145] Their key issues were the details of how the rate freeze would actually come into effect, the timetables for meeting the caps, and the assurance that the caps would be on total emissions rather than plant by plant, leaving them flexibility to make their own decisions about how to control each individual generating unit.[146] They also lobbied hard until the very end of the negotiations to retain ownership over any emissions credits that might be generated.[147]

The industrial stakeholders also wanted the emissions credits to be owned and sold by the utilities and used to reduce their rates.[148] The governor's staff was willing to be flexible about a year or two of delay in reaching the caps so long as the caps were assured, but did not support giving the utilities what they considered undeserved benefits in the form of the extra emissions credits.[149]

The concurrent SAMI study provided valuable ammunition for the arguments in support of the legislation.[150] The SAMI emissions modeling data provided important new evidence to support and justify legislative initiatives, and its draft final report was released in the midst of the negotiations.[151] Particularly influential findings included SAMI's documentation that SO_2 was a key uncontrolled pollutant affecting both health and visibility; that the electric utilities were the principal source of this pollutant; and that while SO_2 emissions were projected to decrease by 23% by 2010 across the eight SAMI states as a group, they were expected to continue to *increase* in North Carolina, South Carolina, and Virginia because of growth and emission trading programs.[152]

Perhaps most influential of all, the SAMI report found that while controlling interstate pollution was valuable and important, the greatest benefit to each state would result from controlling its *own* emissions sources, persuasively strengthening the evidence that the law would provide benefits throughout the state as well as in the mountains.[153] The final consensus report, released in August 2002, also included a statement that each SAMI state "support[s] and will promote strong national multipollutant legislation for electric utility plants" and that "leadership by states ahead of national legislation is encouraged."[154]

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145 *Id.* at 89, 108–09. At least for Duke Energy, the proposed statute may also have been viewed as an attractive solution to two other legal issues: Its excess profits, which were then being investigated by an independent auditor for the NCUC in response to a lawsuit by its industrial customers, and an EPA lawsuit for noncompliance with NSR. NCUC, *supra* note 139, at 184; United States v. Duke Energy Corp., 278 F. Supp. 2d 619, 621 (M.D.N.C. 2003), *aff'd.*, 411 F.3d 539 (4th Cir. 2005), *vacated*, 549 U.S. 561 (2007). *See also* Nash & Revesz, *supra* note 23, at 1696–1707.

146 Anderson, *supra* note 84, at 86–87, 114; Paul Chesser, *Duke Doubted Smokestacks' Merits*, http://www.carolinajournal.com/exclusives/display_exclusive.html?id=2265 (last visited Nov. 23, 2013).

147 Interview with Alan Hirsch, Chief Policy Advisor to Governor Easley (July 25, 2011).

148 *Id.*

149 *Id.*

150 *See* Secretary William G. Ross, Jr., Division of Air Quality, *North Carolina's Clean Smokestacks Act*, http://daq.state.nc.us/news/leg/cleanstacks.shtml (last visited Nov. 23, 2013).

151 Ross, Jr., *supra* note 150.

152 S. APPALACHIAN MOUNTAIN INITIATIVE, FINAL REPORT 2.5–2.8 (2002). The draft findings were released and publicized in Spring 2002. *See* Pat Brewer, *S. Appalachian Mountains Initiative Observations and Conclusions*, Governors' Summit on Air Quality, Charlotte, NC, May 10, 2002 (on file with author).

153 Ross, Jr., *supra* note 150.

154 S. APPALACHIAN MOUNTAINS INITIATIVE, *supra* note 152, at ix.

In the end, with most issues resolved but still no agreement on the ownership of emissions credits, Speaker of the House Jim Black called in a dozen key stakeholders and demanded an agreement within twenty-four hours.[155] Ultimately, all stakeholders except CUCA agreed to a solution under which the utilities would surrender the emissions credits to the state, which could then decide later whether to retire them unused or (with the approval of both the legislature and the governor required) allow them to be used.[156] On June 11, 2002, the House committee approved a new version of the bill reflecting these negotiated agreements, and an essentially identical bill was approved overwhelmingly by both houses of the General Assembly and signed into law.[157] The following day, the two utilities formally signed over their emissions credits to the governor.

E. Final Version

The final bill as enacted made several major refinements from the Senate version.[158] First, it confirmed the caps proposed in the Senate bill, but specified shares for each utility, rather than just a total for both utilities.[159] The total amounts of the caps—60,000 tons of NO_x by 2007 and 56,000 tons by 2009, and 250,000 tons of SO_2 by 2009 and 130,000 tons by 2013—summed to the amounts that had been proposed in the Senate bill, and represented reductions of the utilities' NO_x emissions by approximately 77% by 2009 and of SO_2 emissions by 73% by 2013.[160] On a statewide basis, they represented reductions of about one-third of the total NO_x emissions, and half of the SO_2 emissions, from all sources in North Carolina in 2000.[161] These were "hard caps" on total emissions by each utility, which could not be satisfied by alternatives such as buying emissions allowances from other firms, either within or outside the state: total actual emissions in North

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155 Interview with Alan Hirsch, Chief Policy Advisor to Governor Easley (July 25, 2011).

156 For instance, they could either be sold on the allowance market for revenue, or could be given back to the utilities at some future time if the utilities needed them to meet tougher federal caps. This agreement was later drafted into S. 1078, N.C. Gen. Assemb., Sess. 2001 (third version, Apr. 5, 2001).

157 S.B. 1078, Gen. Assembly of N.C., Sess. 2001. (2002); Improve Air Quality/Electric Utilities Act, 2002, N.C. Sess. 2001, Sess. Law 2002-4. The final bill was approved by votes of 111–4 in the House, 45–1 in the Senate, ratified on June 19, 2002, and signed by the governor June 20, 2002. North Carolina General Assembly, *Senate Bill 1078/S.L. 2002-4*, http://www.ncleg.net/gascripts/BillLookUp/BillLookUp.pl?Session=2001&BillID=s1078 (last visited Nov. 23, 2013). The surrender of credits was officially stated as "voluntary" to avoid potential lawsuits, but was understood by all to be an essential element of the agreement and was carried out immediately. Anderson, *supra* note 84, at 85.

158 Clean Smokestacks Act, *supra* note 2, § 1 (codified as amended at N.C. GEN. STAT. ANN. § 143-215.107D (2002)).

159 *Id.*

160 *Id.* §§ 1(b)(1)–1(e)(2); N.C. Div. Air Quality, *Key Facts about the Clean Smokestacks Act*, http://daq.state.nc.us/news/leg/stackfacts.shtml (last visited Nov. 23, 2013).

161 Duke Energy emitted more than 75,000 tons of NO_x in North Carolina in the year 2000; it was now capped at 35,000 tons of NO_x beginning in 2007 and 31,000 tons beginning in 2009. Duke emitted more than 225,000 tons of SO_2 in 2000; it was now capped at 150,000 tons beginning in 2009 and 80,000 tons in 2013. Progress Energy, which emitted less than Duke's quantities in 2000, was capped at 25,000 tons of NO_x by 2007 and 100,000 tons of SO_2 beginning in 2009, and 50,000 tons of SO_2 beginning in 2013. Clean Smokestacks Act, *supra* note 2, § 1 (codified as amended at N.C. GEN. STAT. ANN. § 143-215.107D (2002)); *Key Facts about the Clean Smokestacks Act*, *supra* note 160; Ross, Jr., *supra* note 150.

Carolina by each utility company must be reduced. The caps also applied year-round, not just during the summer high-ozone season during which existing federal restrictions applied. Finally, the caps were permanent, limiting all future emissions from the electric utilities regardless of future electric demand growth.

The law also specified that the caps would continue to apply even if generating units were no longer operated by that utility; it required testing, monitoring, recordkeeping and reporting; it required the surrender of emissions allowances to the state; [162] and at the behest of the Attorney General's office, it added stiff civil and criminal penalties for any violations, including stronger ones for willful violations and strongest for those that caused harm.

Second, it spelled out the cost recovery mechanism: it froze the utilities' rates for five years, and allowed the utilities to recover costs of complying with these caps (beyond the costs already required to comply with the federal NO_x SIP Call or other requirements) by accelerating their compliance cost recovery over a seven-year period (2002–2009), with Duke amortizing up to $1.5 billion and Progress amortizing up to $813 million over that period.[163] It set maximum amounts that could be recovered by each utility during the five-year period, and stated that there was no guarantee that this would cover all costs of compliance; the Utilities Commission would review the costs claimed to assure that they were just, reasonable and prudent, and "true up" the actual expenditures after they were incurred.[164] Finally, the law included the mandate from the original Senate version that the Attorney General pursue action against upwind states and utilities,[165] and also the mandate that the state study further reductions in SO_2, NO_x, mercury, and CO_2.[166] Finally, the law required annual public reports on all aspects of the law's implementation.[167]

Taken together, these provisions represented a unique and far reaching state initiative to require as well as pay for permanent cleanup of coal-fired power plants, to cap all future emissions of NO_x and SO_2 at levels dramatically lower than their historic emissions rates, and to authorize vigorous state legal action to force cleanup of upwind emissions sources in other states as well. It thus ranks among the most far reaching air quality policies of any state. It had dramatic effects on air pollutant emissions both within North Carolina and from upwind utilities, and on the development of the EPA Clean Air Interstate Rule (CAIR) and its successor Cross-State Air Pollution Rule (CSAPR).

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162 Clean Smokestacks Act, *supra* note 2, § 1(i).
163 *Id.* § 9.
164 *Id.* § 1(b).
165 *Id.* § 10.
166 *Id.* §§ 11–13.
167 *Id.* § 14.

IV. IMPLEMENTATION: N.C. UTILITIES

A. Initial Steps: Emission Control Technologies

Duke and Progress Energy approached the implementation of the CSA in somewhat different ways, and each company's strategy evolved in significant ways over the decade after the law was enacted.

By 2002, Duke Energy had already reduced its NO_x emissions to 83,992 TPY—a 47% reduction compared to 1996—to comply with EPA's NO_x standards and the NO_x SIP Call.[168] In its first-year CSA compliance report, Duke Energy reported that to comply with the CSA caps it would add NO_x control technologies at all twenty-seven of its generating units, including selective catalytic reduction (SCR) on Cliffside Unit 5 and Belews Creek 1 and 2, and would install selective noncatalytic reduction (SNCR) with low-NO_x burners on its other twenty-four units.[169] For SO_2 reductions, Duke planned to install flue gas desulfurization (FGD) wet scrubbers on its twelve largest generating units; its most expensive costs would be FGD scrubbers at five of its largest units.[170]

Progress Energy began by installing scrubbers on its two Asheville units in 2003.[171] The Asheville plant was the only facility covered by the CSA that is located in the mountains, and Progress began with that plant in deference to public and political concerns about mountain air quality that had produced the CSA.[172] Like Duke, Progress had already reduced its NO_x emissions substantially to comply with the NO_x SIP Call, from 112,000 TPY in 1997 to 59,000 TPY in 2002.[173] To comply with its tighter CSA cap, it planned to install NO_x control technologies at sixteen of its eighteen generating units—four of them specifically attributed to CSA compliance—and SO_2 scrubbers at its eleven largest units.[174]

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168 *See* EPA, *Facility Emissions Report – Criteria Air Pollutants* (1996), http://iaspub.epa.gov/airsdata/adnet.ranking?geotype=st&geocode=NC&geoinfo=st~NC~North+Carolina&pol=NOX&year=1996&fld=%%&fld=plt_name&fld=county&fld=state&rpp=1112&page=1&sort=a3&fmt= (last visited Nov. 23, 2013) (showing that Duke Energy facilities emitted 158,172 tons of NO_x in 1996); EPA, *Facility Emissions Report – Criteria Air Pollutants* (2002), http://iaspub.epa.gov/airsdata/adnet.ranking?geotype=st&geocode=NC&geoinfo=st~NC~North+Carolina&pol=NOX&year=2002&fld=%%&fld=plt_name&fld=county&fld=state&rpp=1112&page=1&sort=a3&fmt= (last visited Nov. 23, 2013) (showing that Duke Energy facilities emitted 83,992 tons of NO_x in 2002).

169 IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2003, *supra* note 85, at attach. A-1.

170 *See id.* at attach. A-7 to A-8 (showing that the most expensive facilities were Belews Creek 1 and 2, Cliffside 5, and Marshall 3 and 4).

171 PROGRESS ENERGY CAROLINAS, INC., CLEARING THE AIR: FACTS ABOUT EMISSION REDUCTIONS AT THE ASHEVILLE PLANT (2006), *available at* https://www.progress-energy.com/assets/www/docs/company/ashevilleflyer2.pdf.

172 *See* IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2003, *supra* note 85, at 7, attach. B-4, B-7, B-11; N.C. Div. Air Quality, *North Carolina's Clean Smokestacks Act*, http://daq.state.nc.us/news/leg/cleanstacks.shtml (last visited Nov. 23, 2013).

173 IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2003, *supra* note 85, at attach. B-5.

174 *Id.* at attach. B-9; *see generally id.* at attach. B-10 (indicating that Progress's most expensive CSA compliance investments were the FGD scrubbers at Mayo 1, Roxboro 2–4, and Sutton 3); *id.* at attach. B-8 (stating that additional NO_x controls specifically to comply with CSA were also planned at Asheville 1, Lee 2 and 3, and Sutton 2. Weatherspoon 1 and 2, two of Progress's smallest and oldest units, were not scheduled for any additional controls).

Significantly, neither of the utilities' initial compliance plans discussed the possibility of retiring any units.[175] Duke proposed to recover NO_x compliance costs for SNCR technology at twenty-four of its twenty-seven units—and at three units, burners as well—while Progress sought cost recovery for additional NO_x technologies at just four of its eighteen units; and both planned to add SO_2 scrubbers at their larger units.[176] All the projected compliance costs to be recovered under CSA were for adding control technologies, not for plant retirements or other ways of achieving the caps.[177]

B. Plant Retirements and Replacements

Between 2002 and 2007, both utilities concentrated on constructing their highest priority NO_x control technologies and beginning their major investments in SO_2 scrubbers to meet the 2007 cap and amortization deadlines.[178] As early as 2005, Duke expressed concern about the cost of SNCR technology and the narrowness of its compliance margin to meet the initial 2007 NO_x cap, and suggested that it might therefore consider using SCR rather than SNCR or even perhaps retire some plants to assure compliance.[179] It also accelerated construction of scrubbers on its Allen units to assure compliance with the new federal CAIR promulgated by EPA in 2005 and the anticipated federal mercury rule.[180] Progress reported in 2004 that it was able to attain higher rates of SO_2 removal from its scrubbed units, thereby enabling it to cancel a scrubber it had proposed for one of its smaller units (Lee 3).[181]

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175 Note that since at least 2000, Duke Energy had been contemplating the potential retirement of 298 megawatts at its Riverbend, Buck, and Dan River sites (and others in South Carolina) during the time period of 2006–2009, but these were all small combustion turbines rather than coal-fired units. DUKE POWER ANNUAL PLAN, NCUC DOCKET NO. E-100 Sub 88, at 16–17, 20 (filed Sept. 6, 2000) (reconfirmed, DUKE ENERGY LLC NO_x AND SO_2 COMPLIANCE PLAN ANNUAL UPDATE, NCUC DOCKET NO. E-7, Sub 118 attach. A, (filed Mar. 27, 2008). Progress Energy had been contemplating incremental annual additions of combustion turbines and combined cycle gas fired units since at least 2000, but no retirements of its North Carolina units. CAROLINA POWER & LIGHT INTEGRATED RESOURCE PLAN, NCUC DOCKET NO. E-100 Sub 88, at 10–12 (filed Sept. 1, 2000) (reconfirmed, ANNUAL NC CLEAN SMOKESTACKS ACT COMPLIANCE REPORT, NCUC DOCKET NO. E-2, Sub 815, attach. B, (filed Mar. 31, 2008)).

176 *See* IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2003, *supra* note 85, at attach. A-8, attach. B-8, B-10.

177 *Id.* at attach. A-8, attach. B-10.

178 *See* DUKE ENERGY CAROLINAS, LLC, NO_x AND SO_2 COMPLIANCE PLAN ANNUAL UPDATE, NCUC DOCKET NO. E-7 Sub 718 (filed Mar. 27, 2008) (commissioned Mar. 27, 2008); ANNUAL NC CLEAN SMOKESTACKS ACT COMPLIANCE REPORT, NCUC DOCKET NO. E-2 Sub 815, at appx. a, attach. 3 (filed Mar. 31, 2008) (commissioned Mar. 31, 2008); *see generally* N.C. GEN. STAT. § 62-133.6(b) (2011) (requiring the utilities to amortize at least 70% of their estimated compliance costs during these first five years in order to reduce their excess profits).

179 NCUC PUBLIC STAFF'S REPORT ON COSTS INCURRED & AMORTIZED BY DUKE ENERGY CORP., NO. E-7 Sub 718, at 1–2 (filed May 17, 2005) (commissioned May 17, 2005).

180 N.C. DEPT. OF ENV'T NATURAL RES. & NCUC, IMPLEMENTATION OF THE "CLEAN SMOKESTACKS ACT" ATTACHMENT A (2005), *available at* http://www.ncuc.commerce.state.nc.us/reports/csa2005.pdf.

181 N.C. DEPT. OF ENV'T NATURAL RES. & NCUC, IMPLEMENTATION OF THE "CLEAN SMOKESTACKS ACT" 4 (2004), *available at* http://www.ncuc.commerce.state.nc.us/reports/csa2004.pdf [hereinafter IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2004].

In 2005, Duke took a major step further, requesting permission from the Utilities Commission to build two new 800-megawatt pulverized-coal units at its Cliffside site, both equipped with state of the art control technology, and at the same time to retire rather than retrofit the four oldest Cliffside units (Cliffside 1–4) by 2013. The Utilities Commission approved one of these two new units (Cliffside 6) coupled with requirements for the retirements of Cliffside 1–4 and for additional programs promoting energy efficiency.[182]

Beginning in 2005, both utilities began to report somewhat higher costs than initially anticipated: 18–31% higher in various years for Duke, 10% higher for Progress in 2005 but increasing to as much as 67% higher in 2006 and 90% higher in 2008, before ultimately finalizing in 2011 at 23% higher for Duke and 30% higher for Progress than their original estimates.[183] Both utilities therefore began documenting their possible intent to request additional cost amortization in 2008 and 2009. Progress also declared that it did not intend to request amortization of more than its initial $813 million cost estimate: any costs above that amount it proposed to request adding to its rate base and charging to its customers instead.[184]

In 2007, both utilities met their first NO_x caps and achieved significant reductions in SO_2 emissions: Duke had reduced its NO_x emissions to 33,000 tons (versus a cap of 35,000, a 60% reduction since 2002), and its SO_2 emissions by 15%, while Progress had reduced its NO_x emissions to 24,383 tons (versus a cap of 25,000, a 59% reduction since 2002) and its SO_2 emissions by 25%.[185] Both also met their financial mandates for amortization of 70% of compliance costs by 2007, and Progress sought authorization to amortize an additional $243.9 million (the balance of its initially estimated $813 million) in 2008 and 2009.[186] Duke, however, negotiated a new stipulation that it would not seek any further accelerated amortization—leaving $225.2 million of its originally estimated compliance costs unamortized—but would seek instead to have them added to its rate base.[187]

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182 NCUC, DUKE ENERGY APPLICATION FOR APPROVAL FOR AN ELECTRIC GENERATION CERTIFICATE TO CONSTRUCT TWO 800 MW STATE OF THE ART COAL UNITS FOR CLIFFSIDE PROJECT IN CLEVELAND/RUTHERFORD COUNTIES, NO. E-7 Sub 790 (filed Mar. 21, 2007) (commissioned Mar. 21,2007).

183 IMPLEMENTATION OF THE "CLEAN SMOKESTACKS ACT" 2003, *supra* note 85, at 3 (stating that total program cost estimates remained at $813 million for Progress and $1.5 billion for Duke as of 2003); IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2005, *supra* note 180 at 4; N.C. DEPT. OF ENV'T NATURAL RES. & NCUC, IMPLEMENTATION OF THE "CLEAN SMOKESTACKS ACT" 5 (2006), *available a*t http://www.ncuc.commerce.state.nc.us/reports/csa2006.pdf [hereinafter IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2006]; N.C. DEPT. OF ENV'T NATURAL RES. & NCUC, IMPLEMENTATION OF THE "CLEAN SMOKESTACKS ACT" 9 (2008), *available a*t http://www.ncuc.commerce.state.nc.us/reports/csa2008.pdf [hereinafter IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2008]; N.C. DEPT. OF ENV'T NATURAL RES. & NCUC, IMPLEMENTATION OF THE "CLEAN SMOKESTACKS ACT" 5–6 (2011) *available at* http://www.ncuc.commerce.state.nc.us/reports/csa2011.pdf [hereinafter IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2011].

184 Cost increases were attributed particularly to the rising cost of steel, and in Progress's case additional to costs of wastewater treatment that had not been included in the initial plan. IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2005, *supra* note 183, at 4–5; IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2006, *supra* note 183, at 5.

185 IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2008, *supra* note 183, at 13.

186 IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2008, *supra* note 183 2–4 & n.1 (2008).

187 *See* NCUC, ORDER APPROVING STIPULATION AND DECIDING NON-SETTLED ISSUES, NCUC DOCKET NO. E-7 Sub 828 and 829 (filed Dec. 20, 2007), *available at*

Progress subsequently also requested that all compliance costs beyond its initial $813 million be included in its rate base, and in 2008 followed Duke's lead in asking to terminate its accelerated amortization program and add all additional costs to its rate base instead.[188]

In 2008, Progress also began reconsidering the costs of additional control technology at several of its smaller plants (for instance, Cape Fear 5 and 6), to determine which technology would ultimately be most cost effective.[189] Then in 2009, it went a major step further and announced its intention to retire all three units of its Lee facility (397 megawatts total), and instead to build a 950-megawatt, state of the art combined cycle natural gas plant at that site.[190] This major natural gas substitution would dramatically reduce its SO_2, mercury, and CO_2 emissions as well as NO_x. It would thus be a more cost effective option—especially in light of North Carolina's tough new regulations of mercury emissions, and the anticipation of possibly tighter federal regulations including the CAIR, mercury, and possibly CO_2 rules as well as the tighter 2013 cap on SO_2 under CSA—than adding end of pipe control technology at the Lee and Sutton 3 units.

In December 2009, Progress went even further, announcing plans to retire *all* its remaining unscrubbed coal plants—eleven units totaling 1,485 megawatts, including Cape Fear 5 and 6, Sutton 1–3, Weatherspoon 1–3, and Lee 1–3—by 2017, rather than invest more than $500 million of capital costs in additional control technology—as well as some $580 million in operating and maintenance costs—on these old coal plants.[191]

In short, from an initial plan aimed at installing NO_x controls on all its units and scrubbers on all its large units, Progress's compliance strategy had shifted to maintaining only its seven largest units and adding a major new natural gas plant. It

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http://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=57a3b8c0-44bd-470d-a009-c5f11d2ce883 (filed Dec. 20, 2007).

188 Duke was relieved of further amortization requirements as part of a more complicated multi-party stipulation agreement with CUCA and other customer organizations regarding its environmental compliance costs. *Id.* at paras. 27–29. Progress's argument for relief was that due to the unanticipated increases in costs to comply with the CSA and for unbudgeted operating and maintenance needs at several of its plants, it was unable to amortize additional CSA compliance costs and still earn a reasonable rate of return. CUCA and other customer stakeholder groups agreed not to oppose this request. See DUKE ENERGY, APPLICATION FOR APPROVAL FOR AN ELECTRIC GENERATION CERTIFICATE TO CONSTRUCT TWO 800 MW STATE OF THE ART COAL UNITS FOR CLIFFSIDE PROJECT IN CLEVELAND/RUTHERFORD COUNTIES, NCUC DOCKET NO. E-7 SUB 790 (filed July 10, 2008) (commissioned July 10, 2008).

189 IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2008, *supra* note 186, at 8–9.

190 N.C. DEPT. OF ENV'T NATURAL RES. & NCUC, IMPLEMENTATION OF THE "CLEAN SMOKESTACKS ACT" add. 6, 9 (2009) *available at* http://daq.state.nc.us/news/leg/CSA2009_Addendum.pdf [hereinafter IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2009].

191 In its 2010 Integrated Resource Plan, Progress accelerated all these planned retirement dates to 2013–14. An additional natural gas plant might be proposed in 2014 to replace Sutton, and portions of the Cape Fear and Weatherspoon plants might be converted to run on renewable fuels. PROGRESS ENERGY CAROLINAS, INC. (PEC), PEC'S PLAN TO RETIRE 550 MWS OF COAL GENERATION WITHOUT SO2 CONTROLS, NCUC DOCKET NO. E-2 Sub 960 at 1, 9–14 (filed Dec. 1, 2009) (commissioned Dec. 1, 2009) [hereinafter PROGRESS MW RETIREMENT]; PEC, 2010 INTEGRATED RESOURCE PLAN, NCUC DOCKET NO. E-100 Sub 128, at B-6 (filed Sept. 13, 2010) (commissioned Sept. 13, 2010) [hereinafter PROGRESS 2010 IRP]; PEC, APPLICATION FOR CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 950 MW COMBINED CYCLE NATURAL GAS FUELED ELECTRIC GENERATION FACILITY IN WAYNE COUNTY, NCUC DOCKET NO. E-2 Sub 960, at attach. 2 (filed Aug. 18, 2009) (commissioned Aug. 8, 2009) [hereinafter PROGRESS 950 MW APPLICATION].

would then retire its other eleven units, representing nearly one-third of its total 1,533-megawatt coal-fired capacity.

With these facility retirements and the completion of scrubbers and NO_x control technologies at most of their other units, both Duke and Progress easily met their compliance mandates under the tighter 2009 caps, with emissions that were well below the required levels: Duke emitted only 20,474 tons of NO_x (versus a cap of 31,000 tons) and 22,038 tons of SO_2 (versus a cap of 150,000 tons, a dramatic reduction from its 2002 levels as eleven of its twelve scrubbers came on line); Progress emitted only 18,810 tons of NO_x (versus a cap of 25,000 tons) and 51,416 tons of SO_2 (versus a cap of 100,000 tons).[192] Duke's SO_2 emissions in 2009, in fact, were even well below their 80,000-ton cap for 2013, and Progress's were well on their way to achieving its 50,000 ton 2013 cap for 2013.[193]

By 2011, Duke had completed the installation of SO_2 scrubbers and NO_x control technologies at all generating units that it planned to continue operating, and Progress expected to complete the rest by the end of 2011. Progress also had scheduled the retirements of all its older and smaller nonscrubbed units, and Duke in its 2010 Integrated Resource Plan announced plans to retire all of its nonscrubbed units; six of these units had already been idled by 2011.[194] Even before all these retirements had been completed, the utilities' combined annual emissions of NO_x had been reduced by more than 80% since 1998, and their emissions of SO_2 by more than 76%. Both continued to meet their 2009 caps for both NO_x and SO_2, and with Progress's planned retirements of its Lee units in 2013, both confidently expected to meet or exceed their SO_2 cap requirements for 2013; Duke, in fact, had already far more than met its 2013 SO_2 cap.[195] In 2011, Duke for the first time acquired and surrendered to the State 28,492 SO_2 allowances and 1,958 annual NO_x allowances, both for compliance year 2009; Progress surrendered 41,259 tons of SO_2 allowances for 2009 (it had no NO_x allowances to surrender).

Both utilities thus used the law's combination of firm time-dated caps with flexibility as to how they could achieve them to make unprecedented 70–80% reductions in their emissions of both NO_x and SO_2, initially by planning to install scrubbers and NO_x control technologies at most or all of their facilities but then substituting retirements of their older, smaller and least efficient units.[196] The shift to retirements of older units indicated a shift in strategy by both utilities to shut down their older, smaller, and least efficient coal-fired power plants because of a combination of inefficient operating costs, the expenses that would be required to bring them into compliance with CSA and with anticipated new federal regulations, and undoubtedly also the rapidly falling cost of natural gas as an alternative fuel.[197]

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192 2012 IMPLEMENTATION REPORT, *supra* note 7, at 19–20.

193 *Id.*

194 DUKE ENERGY CAROLINAS, INTEGRATED RESOURCE PLAN, NCUC DOCKET NO. E-100 Sub 118, at 43 (filed Jan. 11, 2010) (announcing plans to close Buck 3–6, Cliffside 1–4, Dan River 1–3, and Riverbend 4–7 plants).

195 2012 IMPLEMENTATION REPORT, *supra* note 7, at 2–3.

196 Duke's newest coal-fired plant at the time, for instance, was built in 1975. Progress had built one unit in 1984 and one in 1980, but the newest before these was built in 1973, and nine of them before 1960.

197 In its 2010 Integrated Resource Plan, for instance, Progress itemized a lengthy list of anticipated EPA regulations that it expected to add significantly to the costs of coal-fired generation: the CAIR

Each also used the CSA compliance process as an opportunity to propose new and larger generating units—the Cliffside 6 pulverized-coal plant by Duke, and the Wayne combined-cycle natural gas plant by Progress—that would not only be cleaner and more efficient but also significantly larger, to provide for additional anticipated demand growth.

The costs of achieving these results were higher than originally estimated, but still well below the estimated benefits of the air pollution damage that was avoided. Duke's 2012 estimate of its total compliance costs was $1.84 billion, which was $340 million (23%) higher than its original 2002 estimate of $1.5 billion; Progress's was $1.055 billion, which was $242 million (30%) higher than its $813 million estimate in 2002.[198] In comparison, Hoppock et al. estimated the median cumulative mortality benefits to North Carolina in the range of $6 billion to $16 billion, not including other benefits such as to health effects other than mortality and to tourism.[199] Based on the Utility Commission's audit, the total annual impact of each utility's compliance with CSA on its cost of service to its residential customers was $2.64 per 1,000 kilowatt hours per month for Duke, and $1.97 per 1,000 kilowatt hours per month for Progress.[200]

C. Enforceability Confirmed

In September 2011, the U.S. EPA formally accepted the Clean Smokestacks emission caps as an integral element of North Carolina's SIP for meeting the 1997 $PM_{2.5}$ and eight-hour ozone NAAQS, among other federal standards; for improving visibility in the mountains and other scenic vistas; and for reducing acid rain.[201] In doing so, EPA noted that all areas in the State that were designated as nonattainment for the 1997 $PM_{2.5}$ and eight-hour ozone NAAQS were currently attaining the standards.[202] The effect of this action was that as of 2011, the CSA caps would become permanent as a matter of federal and state law, and thus become federally enforceable.[203]

Similarly, in January 2012 the Southern Environmental Law Center (SELC) announced a legal settlement with Duke Energy on behalf of a group of conservation organizations, confirming Duke's commitment to retire a number of its old coal-fired generating units totaling 1,667 megawatts in order to assure that

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(later revised and renamed as the CSAPR), the federal Clean Air Visibility Rule and Clean Air Mercury Rule, a further tightening of the national NO_x standards, and the possibility of federal greenhouse gas legislation or regulations. PROGRESS 2010 IRP, *supra* note 191, at F-1 to F-2. Some of these potential federal regulations were anticipated to require SO_2 and NO_x controls on each individual generating unit, in contrast to the CSA which required each utility only to meet overall caps. Substituting a gas plant for the Lee units would thus help Progress to comply more cost-effectively not only with the Clean Smokestacks Act but also with the North Carolina and expected federal mercury rules, and would reduce the utility's greenhouse gas emissions by about 1.1 million TPY. *See* PROGRESS 950 MW APPLICATION, *supra* note 191, at 7–8.

198 2012 IMPLEMENTATION REPORT, *supra* note 7, at 6.

199 HOPPOCK ET AL., *supra* note 132, at 20.

200 *Id.* at 18–19.

201 Approval and Promulgation of Air Quality Implementation Plans, 76 Fed. Reg. 59,250, 59,251–52 (Sept. 26, 2011) (codified at 40 C.F.R. § 52.1781).

202 *Id.*

203 *Id.*

Duke's addition of the Cliffside 6 unit would be carbon neutral by 2018.[204] These retirements would include Cliffside 1–4, plus additional units of Duke's choice, to total 998-megawatts by 2018 and 669-megawatts more by 2020—most likely the same units that Duke had announced for planned closure under the CSA (that is, its older, unscrubbed coal-fired units). Incorporation of these plans into the settlement of SELC's lawsuit made them legally enforceable commitments.[205]

V. BROADER IMPACTS

In addition to its impacts on North Carolina's utilities, the CSA had far broader interstate impacts resulting from legal proceedings initiated under the mandate of section 10 of the law, which directed the attorney general to pursue all legal avenues to reduce upwind pollution sources.[206] The first of these proceedings was a petition and subsequent lawsuit against the EPA, challenging its proposed use of unrestricted allowance trading to reduce interstate air pollution.[207] The second was a lawsuit filed against the TVA, the largest single source of upwind pollution affecting North Carolina and the real target of the mountain region constituencies and legislators who initiated the law.[208]

A. North Carolina's EPA Petition and Lawsuit

Before its enactment of the CSA, North Carolina had generally been considered an "upwind" state, one of the large group of Midwestern and Southern states that were responsible for pollution affecting the "downwind" states in New England and the Northeast. With its enactment of the CSA, however, North Carolina asserted itself also as a *downwind* state: it argued that it had now taken effective action to reduce its own pollution, but was prevented from full compliance with the NAAQS by continuing emissions from interstate sources upwind. At the time, thirty-two of North Carolina's 100 counties were out of compliance with one or both of the ozone and fine particulate standards.[209]

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204 Press Release, Kathleen Sullivan, S. Envtl. Law Ctr., Agreement Cuts Pollution by Retiring Dirty, Old Coal Plants in Carolinas (Sept. 17, 2012), http://www.southernenvironment.org/newsroom/press_releases/agreement_cuts_pollution_by_retiring_dirty_old_coal_plants_in_carolinas/.

205 For comparison, these retirements totaled just over twice the capacity of the new Cliffside 6 coal-fired generating unit, which Duke received permission to build in 2008. The new unit includes state of the art technology for minimizing emissions of conventional air pollutants such as SO_2 and NO_x (and implicitly, of particulates and mercury). *N.C. Waste Awareness & Reduction Network v. N.C. Dep't of Env't & Natural Res., Div. of Air Quality*, N.C. Office of Administrative Hearings, 08 EHR 0771, 0835 & 0836, (2008) and 09 EHR 3102, 3174, & 3176 (2009) (consolidated); Sullivan, *supra* note 204.

206 2002 N.C. Sess. Laws 79.

207 Final Brief of Petitioner at 2, North Carolina v. EPA, 531 F.3d 896 (D.C. Cir. 2008) (No. 05-1244).

208 Tenn. Valley Auth. v. Alabama, 615 F.3d 291 (4th Cir. 2010); Elizabeth Shogren, *North Carolina Sues TVA to Clean Up Pollution*, NPR, Nov. 1, 2006, http://www.npr.org/templates/story/story.php?storyId=6417740 (last visited Nov. 23, 2013).

209 Press Release, North Carolina Department of Environmental and Natural Resources, North Carolina Air Quality Chief Comments on EPA Particulate Matter Designation (Dec. 17, 2004), *available at* http://daq.state.nc.us/news/pr/2004/pm_12172004.shtml.

In March 2004, North Carolina petitioned EPA under section 126 of the Clean Air Act to issue a finding that power plants in twelve upwind states contributed significantly to its noncompliance with the ozone standard, and five to its noncompliance with the $PM_{2.5}$ standard. EPA denied the petition, acknowledging that "for purposes of Section 126(b)" many of these upwind sources were in fact contributing significantly to North Carolina's noncompliance with the particulates standard, but arguing that its federal implementation plans (FIPs) for the new CAIR, which it had proposed in January 2004 and published in May 2005, would solve these problems.[210] The CAIR would in fact require substantial reduction of emissions across all 28 eastern states, but only in the aggregate: it used a cap and trade approach allowing emissions trading across the entire region, which would not assure that emissions from particular sources upwind of North Carolina, for instance, would in fact reduce their emissions rather than simply buy allowances from overcompliance elsewhere.[211]

North Carolina therefore sued EPA, arguing that unrestricted allowance trading under the CAIR would not in fact assure that North Carolina would be freed from the burden of upwind pollution, and that whereas section 126 required emission controls within three years, relying on FIPs under CAIR could postpone upwind compliance indefinitely.[212] In 2008, the D.C. Circuit ruled that EPA must revise CAIR's emissions trading program to assure that it would not allow continued significant interstate contributions to North Carolina's noncompliance or interfere with its maintenance of compliance.[213] Initially, it vacated the entire rule but on reconsideration left it in place while EPA developed an acceptable alternative.[214] In 2010, the EPA issued a substitute rule, initially entitled the Clean Air Transport Rule (subsequently finalized in July 2011 and renamed the Cross-States Air Pollution Rule, or CSAPR), which it proposed to remedy the problems.[215]

In short, North Carolina was the first state to challenge EPA's proposed CAIR over the potential problems with its unrestricted trading of emissions allowances and its weaker deadlines for compliance. It thus deserves primary credit for forcing development of the stronger CSAPR that resulted. Whether the CSAPR will itself withstand broader legal challenges by upwind states and utilities remains to be seen: It was vacated in August 2012 by the D.C. Circuit, leaving the previous CAIR rule in place once again.[216] North Carolina's section 126 petition, initially denied

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210 Rulemaking on Section 126 Petition from North Carolina to Reduce Interstate Transport of Fine Particulate Matter and Ozone; Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone; Revisions to the Clean Air Interstate Rule, Revisions to the Acid Rain Program, 71 Fed. Reg. 25,328, 25,337–38 (Apr. 28, 2006); Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Interstate Air Quality Rule), 69 Fed.Reg. 4,566 (Jan. 30, 2004); Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule); Revisions to Acid Rain Program; Revisions to the NO_x SIP Call, 70 Fed.Reg. 25162 (May 12, 2005).

211 71 Fed. Reg. at 25,328, 25,330, 25,333–34.

212 North Carolina v. EPA, 531 F.3d 896, 905–06 (D.C. Cir. 2008).

213 *Id.* at 908.

214 Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals, 76 Fed. Reg. 48,208, 48,211 (Aug. 8, 2011).

215 76 Fed. Reg. at 48,208.

216 On a 2–1 vote, the court held that the CSAPR exceeded EPA's authority under the Clean Air Act, in that it would require some states to reduce emissions by more than what was required to avoid significant contributions to downwind states' noncompliance, and also that it imposed FIPs to mandate

by EPA, was reinstated by the D.C. Circuit in 2009 and remanded to EPA for reconsideration pending the outcome of judicial review of the CSAPR and CAIR.[217]

B. North Carolina's Lawsuit and Settlement With TVA

In the meantime, in January 2006 the North Carolina Attorney General also sued the TVA, noting North Carolina's progress under the CSA in reducing its own emissions, and arguing that continued air pollution from TVA's upwind power plants constituted a public nuisance under the laws of their own states (Alabama and Tennessee), causing damage to North Carolina's health, environment and economy, and that TVA had repeatedly declined to make binding commitments to clean it up.[218] Significantly, public nuisance is a matter traditionally defined in state law, not a federal claim that TVA was failing to comply with the Clean Air Act.[219]

In 2008, perhaps in response to this lawsuit, TVA added additional NO_x controls (SNCR) at all four units of its John Sevier site, one of four TVA facilities within 100 miles of North Carolina that were the subject of North Carolina's complaint; it also added an SO_2 scrubber to its Bull Run unit, one of its largest units and another of those closest to North Carolina.[220] Bull Run thus became one of only five TVA units equipped with scrubbers, and the only one to which they were added in the decade since 2000.

In January 2009, Judge Lacy Thornburg of the U.S. District Court for western North Carolina nonetheless ruled in North Carolina's favor with respect to the twenty-two generating units at the four TVA power plant sites within 100 miles of North Carolina, ruling that all those units must be fitted with emission controls by 2013 and several of them earlier.[221] In his decision he specifically noted North Carolina's progress in aggressively cleaning up its own emissions under the CSA, as well as its related efforts to obtain relief from upwind sources by petitioning EPA.[222]

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upwind emissions reductions rather than leaving it to each state to decide how to do so. In essence, EPA had calculated the excess emissions from each upwind state, but then used modeling of costs per ton to project compliance assuming that each state would clean up all facilities below a specified cost per ton. The outcome would be an arguably efficient result, but would compel some states to clean up more than their share of the actual excess pollutants. Each state, the court argued, was responsible for reducing its own significant burden on downwind states, but not for cleaning up additional air pollution simply because it was cheaper to clean up in that state than in another upwind state. Whether or not it was good policy, the court majority argued, it was not what the language of the Clean Air Act required. EME Homer City Generation, L.P. v. EPA, 696 F.3d 7, 12 (D.C. Cir. 2012).

217 Sierra Club & Env't N.C. v. EPA, 313 F. App'x. 331 (D.C. Cir. 2009); NC withdrew its petition with respect to TVA and to the State of Maryland, both of which had adopted emission control measures sufficient to satisfy North Carolina's complaints. 2012 IMPLEMENTATION REPORT, *supra* note 7, at 11.

218 North Carolina *ex rel.* Cooper v. Tenn. Valley Auth., 439 F. Supp. 2d 486 (D.N.C. 2006) (holding that North Carolina's challenge was a justiciable nuisance law challenge).

219 EPA had previously failed in attempts to penalize TVA for evasion of the NSR requirements of the Clean Air Act. *See generally*, Tenn. Valley Auth. v. Whitman, 336 F.3d 1236 (11th Cir. 2003).

220 EPA, *Air Markets Program Data*, http://ampd.epa.gov/ampd/ (last visited Nov. 23, 2013).

221 North Carolina *ex rel.* Cooper, 593 F. Supp. 2d at 832. TVA plants within 100 miles of North Carolina included Bull Run 1, Kingston 1–9, John Sevier 1–4, and Widows Creek (AL) 1–8. *Id.* at 825.

222 *Id.* at 816.

TVA appealed, and in 2010 the Fourth Circuit Court of Appeals reversed and remanded Thornburg's decision, holding that such a decision would "encourage courts to use vague public nuisance standards" to bypass the regulatory scheme of the Clean Air Act.[223] North Carolina requested review by the U.S. Supreme Court in 2011, arguing that the appellate reversal had improperly treated the Clean Air Act as preempting state tort laws, that it was inconsistent with decisions by the highest courts in Alabama and Tennessee, and that it was also inconsistent with the leading precedent of the Supreme Court itself in a similar interstate water pollution case.[224] Faced with strong arguments by North Carolina and several amicus briefs, TVA in 2011 agreed to a negotiated settlement in which they met all of North Carolina's demands and more.[225] TVA agreed to cap aggregate emissions from all its power plants, reducing SO_2 emissions to 38% of their 2011 level by 2019 and NO_x to 51% by 2018 ; and to retire or add scrubbers at nearly all its coal-fired generating units (fifty-nine units at eleven sites), beginning with those closest to North Carolina.[226] As under the CSA, any excess emissions allowances generated by these actions would be retired rather than sold. These commitments were equivalent or even more stringent than the cap levels set by the CSA for North Carolina's utilities, and in applying to TVA's entire fleet of coal-fired plants, the settlement agreement also was far broader in its consequences than the district court decision would have required. In addition, TVA agreed to spend $290 million on environmental mitigation projects (mainly energy efficiency and renewable energy) and to pay $60 million to the four states for similar projects, including $11.2 million to North Carolina.[227] The agreement also settled the NSR claims that EPA and the several states had previously been unable to resolve.

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223 The court also held that Judge Thornburg had "improperly applied home state law" (the Clean Smokestacks Act) beyond North Carolina's borders, and that TVA was in fact already in compliance with EPA's NAAQS and SIP requirements, which it claimed were more stringent than state public nuisance laws required. The decision appeared to claim that the Clean Air Act in effect preempted state nuisance law, and that the Clean Air Act permit program shielded the permittee from nuisance claims. *North Carolina ex rel. Cooper*, 615 F.3d at 296.

224 Petition for Writ of Certiorari, *North Carolina ex rel. Cooper*, 615 F.3d 291 (4th Cir. 2010) (No. 10-997); Int'l Paper Co. v. Ouellette, 479 U.S. 481, 497 (1987). *See also* Barrella, *supra* note 105, at 248, 252 (written prior to the settlement agreement).

225 *Compare* Complaint at 3, *North Carolina ex. rel. Cooper*, 593 F. Supp. 2d 812 (W.D.N.C. Jan. 30, 2006) (No. 1:06CV20) (requesting injunctive relief regarding emissions at eleven coal-fired electric generating units located in Tennessee, Alabama, and Kentucky), *with* Consent Decree at 9, *North Carolina ex rel. Cooper*, Nos. 3:11-cv-00170 & 3:11-cv-00171 (D.T.N. June 16, 2011), *available at* http://www.ncdoj.gov/getattachment/4d94a7c4-54bf-4f6c-b636-2b9c72b72060/TVA-settlement-filed-motion-to-enter-decree.aspx (establishing aggregate emissions caps for TVA's fifty-nine coal-fired units). The consent decree gave North Carolina everything it had asked for and more, but left unchallenged the Fourth Circuit's decision overturning its nuisance claim. As several case comments have noted, this decision rested on arguments suggesting that the Clean Air Act preempted state nuisance law and that its emissions permitting process shield the permittee from nuisance claims, both of which are at odds with other Supreme Court holdings and questionable on their merits, but which accordingly created new uncertainties to be resolved in later cases. *See, e.g.*, Barrella, *supra* note 106, at 248, 252*;* Emily Sangi, Note, *The Gap-Filling Role of Nuisance in Interstate Air Pollution*, 38 ECOLOGY L.Q. 479 (2011); Erin Dewey, Comment, *Dust in the Wind: Is TVA's Permit Shield a Death Knell for Interstate Public Nuisance Claims?*, 52 E. SUPP B.C. L. REV. 43, 46 (2011).

226 Consent Decree, *supra* note 225, at 9.

227 *Id.* at 51.

In his presentation to TVA's board requesting approval of this settlement, TVA's president noted that most of these units were more than fifty years old, and that it did not make sense to continue operating or investing in controls at many of them.[228] He proposed a vision that by 2020 TVA would become one of the nation's leading providers of low cost, cleaner energy, and specifically that TVA would idle or retire 2400–4700 megawatts of coal-fired generating units and instead plan to invest in a 3600–5100-megawatts equivalent of energy efficiency improvements, 1500–2500 megawatts of renewable energy, 1500–5900 megawatts of nuclear capacity, and 900–9300 megawatts of natural gas generation. This vision represented a dramatic change from a recent history in which TVA had been the nation's largest consumer of coal, more than half of it strip mined.[229]

By 2012, the results were already becoming clear. EPA data show that between 2001 and 2011, TVA added NO_x control technologies at all twenty-one of its units within 100 miles of North Carolina, added an SO_2 scrubber to the largest of them (Bull Run), and reduced usage of these units by 50%, including idling Widows Creek 1–5 beginning in 2011.[230] The effect of these decisions was to reduce its 2011 SO_2 emissions affecting North Carolina by 79%, and its NO_x emissions by 91%.[231] Most of the SO_2 reductions arguably are attributable to North Carolina's legal initiative under the CSA, since the Bull Run scrubber was the only one TVA installed in the decade since 2000 and was installed after TVA had successfully resisted an EPA attempt to require additional controls, and only after North Carolina had initiated its lawsuit. The idling of Widows Creek 1–5 also occurred at the time of the legal settlement; and TVA's binding commitments to retire two units per year in 2013, 2014, and 2015 were also specific conditions of the settlement agreement. Some of the NO_x reductions (particularly the addition of SNCR technology at John Sevier 1–4) may also be attributable to North Carolina's pressure, although earlier reductions likely should be credited to the NO_x SIP Call. A major additional cause of both these reductions was the 50% reduction in TVA's generation of power from these units, which was likely due to a mix of these considerations along with other decision criteria.

In April 2011, TVA confirmed further plans to retire ten of these units, among others.[232] Comparing to their emissions in 2011, the retirements would further reduce TVA's 2015 SO_2 emissions affecting North Carolina by 32% from their 2011 levels (or 85% from the 2001 baseline), and NO_x emissions by 43% from

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228 TENN. VALLEY AUTH., OUR VISION: ONE OF THE NATION'S LEADING PROVIDERS OF LOW-COST AND CLEANER ENERGY BY 2020 (2011), *available at* http://www.tva.com/abouttva/board/pdf/4-14-2011_board.pdf. TVA was facing North Carolina's Supreme Court petition as well as the prospects of EPA's CAIR and other tighter regulations affecting the operating costs of its coal plants and coal suppliers (particulate matter, ozone, mountaintop mining, ash disposal, and others). It also faced rapidly declining costs both for natural gas and for some forms of renewable energy. TVA apparently decided to seek a comprehensive solution to this entire suite of problems in a substantially revised integrated resources plan for its future.

229 U.S. GENERAL ACCOUNTING OFFICE, OPPORTUNITIES FOR IMPROVEMENTS IN RECLAIMING STRIP-MINED LANDS UNDER COAL PURCHASE CONTRACTS: TENNESSEE VALLEY AUTHORITY 5 (1972), *available at* http://www.gao.gov/assets/120/112578.pdf.

230 EPA, *EPA Air Markets Program Data*, http://ampd.epa.gov/ampd (last visited Nov. 23, 2013).

231 *Id.*

232 Press Release, TVA, TVA Board Sets Path for Environmental Future (Apr. 14, 2011), *available at* http://www.tva.com/news/releases/aprjun11/board_meeting_0414.htm.

2011 or 95% from 2001.[233] All these retirements were associated with legal commitments established by the settlement agreement.[234]

VI. OUTCOMES

The CSA took effect during a period when the utilities also were reducing NO_x emissions in response to other mandates, including the NO_x SIP Call, the Clean Air Act amendments of 1990 (the acid rain cap-and-trade program), the anticipated implementation of federal CAIR and mercury rules, and a possible further tightening of the federal ozone standard. In this context, how much improvement in air quality and associated benefits actually resulted from the CSA?

A. In-State Emissions Reductions

To identify emissions improvements attributable to the law, we identified from compliance reports all generating units that installed SO_2 or NO_x control technologies and recovered their costs specifically in compliance with the CSA. We then compared the actual emissions from those units in 2011 (the most recent year for which data were available) with the emissions they would otherwise have released based on their emissions rate for the year before installation of the new technologies, adjusted for the actual use of each generating unit in 2011. All data are from EPA's Clean Air Markets Division (CAMD) database. All emissions are calculated from unit-specific heat input and tons of emissions each year as reported to CAMD.[235]

As shown in Table 1, as of 2011, the two utilities' actions specifically in response to the CSA had reduced their total annual SO_2 emissions by 315,035 tons (81%), and their NO_x emissions by 54,663 tons (58%). Both utilities' emissions for 2011 were substantially below the 2009 CSA caps, and Progress was close to meeting (and Duke was already far below) their stricter caps for 2013 SO_2 emissions.[236]

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233 *Id.* TVA's plans included retiring two units at John Sevier by 2012; idling the other two units at John Sevier by 2012 and either controlling or retiring them by 2015; and retiring Widows Creek 1–6, two each year in 2013, 2014, and 2015. These estimates assume that all four Sevier units are retired. All these retirements were specified in the Settlement Agreement.

234 Consent Decree, *supra* note 225, at 22–24, 31–33.

235 *EPA Air Markets Program Data*, *supra* note 230.

236 In its Integrated Resource Plan filed with the N.C. Utilities Commission in 2012, Duke stated that by 2013 it would achieve a 75% reduction in SO_2 emissions from its levels in 2000, specifically attributable to compliance with the CSA, and an overall NO_x reduction of 80% from 1997 to 2009, attributable to both CSA and federal requirements. DUKE ENERGY, DUKE ENERGY CAROLINAS INTEGRATED RESOURCE PLAN ANNUAL REPORT 74 (2012), *available at* http://www.energy.sc.gov/files/view/Duke_IRP2012.pdf. This reflects some additional increase in SO_2 emissions from their low point in 2012, but still within the CSA cap. Progress Energy's 2012 IRP projects that from 2000 to 2013 it will have reduced its SO_2 emissions by 93% and its NO_x emissions by 88%. PEC, PROGRESS ENERGY CAROLINAS INTEGRATED RESEARCH PLAN, NCUC DOCKET NO. E-100, SUB 137, at F-1 (filed Sep. 4, 2012) (commissioned Mar. 29, 2012).

2011 (tons)	Duke NOx		Progress NOx		Total
Baseline	72,744		21,505		94,249
CAIR	31,630		23,619		55,249
CSA	31,000		25,000		56,000
Actuals	20,474		18,810		39,285
Reduction (Baseline - Actual)	52,269		2,695		54,964
Percent reduction	72%		13%		58%
Costs ($000)	$ 92,981		$ 40,044		$ 133,025

2011 (tons)	Duke SO2		Progress SO2		Total
Baseline	250,983		138,654		389,637
CAIR (affected units)	149,574		107,156		256,730
CSA	150,000		100,000		250,000
Actuals	22,038		51,420		73,458
Reduction (Baseline - Actual)	228,945		87,234		316,179
Percent reduction	91%		63%		81%
Costs ($000)	$ 1,747,072		$ 1,014,497		$ 2,761,569
Total CSA Costs recovered (000)					$ 2,894,594

Baseline = estimated emissions without CSA, based on unit-specific emissions rate in year prior to control technology multiplied by its 2011 heat rate. CAIR, CSA = limits set by each requirement on the affected utility.
All inputs calculated from heat input and tons of emissions reported to EPA's Clean Air Markets Division's (CAMD) database.

Table 1: Emissions reductions by Duke and Progress Energy attributable to CSA, 2002–2011.

In short, the CSA produced dramatic reductions in SO_2 levels in North Carolina.

As noted earlier, SO_2 emissions are a major source of health damage and the primary source of acid rain and regional haze that damages visibility in the North Carolina mountains and natural areas.[237] An estimated 85% of the state's SO_2 emissions came from power plants alone, and they had not been subject to EPA standards forcing cleanup of pre-1977 power plants. Reducing SO_2 emissions had the additional cobenefits of removing large fractions of fine particles ($PM_{2.5}$) and mercury.

B. Additional Upwind Emissions Reductions

In addition to emissions reductions by Duke and Progress, it is also reasonable to project the additional results of TVA's added emission controls and plant retirements as specified in its CSA–driven settlement agreement with North Carolina. Table 2 shows actual emissions reductions documented from 2002–2011 in EPA's CAMD annual data series, and projects these further to account for the

237 For data showing the dominant influence of power plant SO_2 emissions on visibility in most national parks and wilderness areas in North Carolina, see generally N.C. DIV. AIR QUALITY, REGIONAL HAZE STATE IMPLEMENTATION PLAN FOR NORTH CAROLINA CLASS I AREAS 62–65 (2007), *available at* http://www.ncair.org/planning/RH_SIP_Imp_Plan_12-17-2007.pdf [hereinafter REGIONAL HAZE SIP].

required retirements of additional units as specified in the settlement agreement and planned by TVA. As these projections show, TVA's emissions of SO_2 over the period 2001–2011 were reduced by 79% as of 2012, and of NO_x by 91%. By 2015 they are projected to be reduced even further, by 85% and 95% respectively, though these reductions may be offset in part by emissions from other units picking up their loads. All these outcomes mean far less upwind emissions affecting health, tourism, and other benefits in North Carolina.

TVA Projected Emission Reductions	SO2	NOx
Baseline (2001) emissions (tons):	221,497	81,313
Actual 2011 (tons):	47,610	7,362
Tons reduced (2001-2011):	173,888	25,298
% reduction due to added controls, idling & use reduction:	79%	91%
Projected emissions 2015 after planned retirements (tons):	32,218	4,220
% additional reduction 2011-2015:	32%	43%
% overall reduction 2001-2015:	85%	95%

Table 2: Emissions reductions by TVA attributable to CSA–driven settlement.

C. Assessments

To date there have been only two other empirical analyses of the consequences of the CSA, one by a conservative advocacy group[238] and the other by a research team led by David Hoppock at Duke University.[239] Both have important limitations.

The Locke Foundation report compared data on ozone monitor readings in North Carolina with those of four neighboring states over 1999–2009, and concluded that while North Carolina's utilities had undertaken significant additional costs to comply with the CSA (initially estimated at $2.3 billion, ultimately increased to $3.2 billion), there was no identifiable additional ozone reduction in North Carolina compared to its neighboring states which did not implement such legislation.[240]

This study presented data only on ozone levels and not on the far more important reductions the CSA produced in sulfur oxides and associated emissions of particulates, mercury, and greenhouse gases. Ozone levels are driven by motor vehicles and NO_x from power plant emissions, particularly so in North Carolina, where in 2000 only 45% of NO_x emissions came from power plants. In contrast, 82% of its sulfur emissions and 65% of its mercury emissions came from power plants.[241] In addition, NO_x emissions in all five of the states compared were heavily driven by the EPA SIP Call. The CSA undoubtedly contributed to North Carolina's strategy for reducing them, but it is hardly surprising that the other states would also have made somewhat similar progress during this period.

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238 ROY CORDATO & KAMEN NIKOLAEV, JOHN LOCKE FOUND., THE CLEAN SMOKESTACKS BILL: A RETROSPECTIVE, Mar. 2010, at 1–4, http://www.johnlocke.org/acrobat/spotlights/spotlight-383_csbrevisited.pdf.

239 *See generally* HOPPOCK ET AL., *supra* note 132,

240 Cordato & Nikolaev, *supra* note 238, at 1, 3–4.

241 ENVIRONMENTAL DEFENSE FUND, *supra* note 86.

Far more important, the overwhelming majority of expenditures for compliance with the CSA were used not for ozone reduction, but for scrubbers to reduce SO_2 emissions (and as cobenefits, particulate and mercury emissions), a dramatic set of emission reductions attributable directly to the CSA that were not previously mandated by the EPA, and which as shown by subsequent data, have benefited North Carolina's health, environment, regional haze reduction, and tourism. North Carolina's settlement with TVA, also derived from a CSA mandate, contributed significant additional benefits in upwind emissions reductions, many of them occurring after the 2009 cutoff point for the Locke study.[242]

Hoppock et al. focused on SO_2 emissions reductions rather than NO_x and ozone, and examined the impacts of the CSA on health benefits and ratepayers over an eleven-year period, comparing what the costs of compliance with the federal CAIR, CSAPR, and Mercury Rule (MATS) would have been with and without the CSA that preceded them.[243] They concluded that earlier compliance with the CSA produced health benefits—based on reduced premature mortality from SO_2 emissions reductions—that were approximately an order of magnitude greater than the potential increases in costs for ratepayers, and that the emissions reductions achieved under Clean Smokestacks likely reduced other environmental compliance costs as well.[244] In addition, they found that Clean Smokestacks spread out the compliance costs and created the potential for future savings if retrofit costs were to escalate during the shorter compliance period for CSAPR and MATS.[245] In short, they argued that the CSA produced significant benefits to public health by beginning several years earlier than EPA's requirements. It also significantly benefited ratepayers by lowering compliance costs as an early mover compared to the costs that would have been bid up by later inflation, and as multiple states competed for the same vendors and materials during the federal compliance period.

These benefits are important and are probably significantly understated. First, Hoppock et. al. calculated only extra benefits estimated from the CSA being implemented earlier than the CSAPR and MATS, reasoning that tougher federal regulations were already foreseeable at the time CSA was enacted.[246] It is true that some increased stringency of federal regulations was anticipated in 2002, but the timing, the stringency, and the form of the federal regulations was not clear at the time. The Bush administration had just taken office in 2001 with strong support from the fossil fuel and electric utility industries, and was actively opposing the Clinton enforcement agenda against grandfathered coal-fired power plants under NSR.[247] The CAIR, CSAPR, and MATS rules had not yet been developed and, in fact, were still being litigated a decade later. Moreover, in 2003,[248] the EPA's

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242 DAVID HOPPOCK ET AL., *supra* note 132, at 7; Joint Motion to Enter Consent Decree, *State of Alabama v. Tenn. Valley Auth*., (E.D. Tenn. 2011) (No. 3:11–cv–00171).

243 HOPPOCK ET AL., *supra* note 132, at 3, 5, 12.

244 *Id.* at 19, 21.

245 *Id.* at 3, 21.

246 *Id.* at 6.

247 Nash & Revesz, *supra* note 23, at 1678.

248 The CAIR was proposed in 2004 (Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Interstate Air Quality Rule), 69 Fed. Reg. 4,566, 4,566 (Jan. 30, 2004)), and issued in 2005 (CAIR; Revisions to Acid Rain Program; Revisions to the No_x SIP Call, 70 Fed. Reg. 25,162, 25,162 (May 12, 2005)) but then remanded for refinement by the courts in 2008 (*North Carolina v. EPA*, 531 F.3d 896 (2008); *North Carolina v. EPA*, 550 F.3d 1176 (2008)), resulting in the CSAPR (Interstate

attempts to tighten regulation of TVA's power plants were overruled by the courts.[249]

Second, Hoppock et al. did not discuss additional CSA benefits from ozone reduction (as noted above, many but not all of these were probably attributable to compliance with the EPA SIP Call), from reduction of particulate emissions, or from reductions in regional haze (which was both a direct environmental benefit as well as an economic benefit to the tourism economy, and an additional compliance benefit with respect to EPA's anticipated regional haze regulation). Nor did they include the sizable additional benefits resulting from the TVA settlement, implementation of which is still in progress.

Finally, Hoppock et al. did not mention the additional benefits of increased reliability of North Carolina's electric generation as a result of making the transition to pollution controls or plant retirements ahead of EPA regulations and of other states. A 2012 report by the U.S. Government Accountability Office noted that some states were likely to experience potential reliability issues due to the difficulties of meeting EPA regulatory deadlines.[250] By cleaning up under the CSA ahead of these requirements, North Carolina not only did not experience reliability issues due to the CSA, but also protected itself from this risk.

D. Ambient Air Quality

There is evidence of beneficial changes in North Carolina's ambient air quality associated with these emissions reductions. Figures 1 and 2 show annual mean measured levels of fine particulates for the mountain and Piedmont regions of North Carolina respectively, for the years 1999–2011. These measurements provide both a direct measure of airborne particulates and a plausible surrogate for SO_2 emissions, since sulfate is one-third of the total measured particulates. In both regions the ambient levels of particulates fell gradually from 1999–2003, probably as a result of previous control measures to satisfy EPA's national cap and trade

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Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals, 76 Fed. Reg. 48,208, 48,208 (Aug. 8, 2011)), which in turn was overturned by the courts in 2012, leaving the CAIR still in place pending further refinement (*EME Homer City Generation, L.P. v. EPA*, 696 F.3d 7 (D.C. Cir 2012)). With respect to mercury, EPA under the Clinton administration had issued a determination in 2000 that proposed to regulate mercury emissions as a hazardous air pollutant under section 112 of the Clean Air Act (Regulatory on the Emissions of Hazardous Air Pollutants from Electric Utility Steam Generating Units, 65 Fed. Reg. 79,825, 79,825-79,826 (Dec. 20 2000)), but the Bush administration opposed this approach, and in 2004 proposed instead to regulate it under a cap and trade program entitled the Clean Air Mercury Rule (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, 69 Fed. Reg. 4,652, 4,652 (Jan. 30, 2004)). This mercury rule was overturned as too weak by a federal appeals court in 2008 (*New Jersey v. EPA*, 517 F.3d 574, 577, 583–584 (D.C. Cir. 2008)) and a revised version issued by the Obama administration EPA in 2012 (National Emission Standards for Hazardous Air Pollutants from Coal and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, 77 Fed. Reg. 9,304, 9,304 (Feb. 16, 2012)). But even this version was then partially put on hold by the EPA Administrator until November 2012 (77 Fed. Reg. at 45,967, 45,967).

249 Tenn. Valley Auth. v. Whitman, 336 F.3d 1236, 1239–40, 1260 (11th Cir. 2003).

250 U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-635, EPA REGULATIONS AND ELECTRICITY: BETTER MONITORING BY AGENCIES COULD STRENGTHEN EFFORTS TO ADDRESS POTENTIAL CHALLENGES 31, 33, 37, 44–45, 62–63 (2012), *available at* http://www.gao.gov/products/GAO-12-635.

program under the 1990 Clean Air Act amendments, but then rose again from 2003 to 2005 as those previous measures reached the limits of their effectiveness and electric generation increased. From 2005 onward, however, in both regions the measured pollutants fell consistently and dramatically, almost certainly due in large part to the new controls and plant retirements resulting from the CSA. In September 2011, the EPA noted that all areas in the State that were designated as nonattainment for the 1997 fine particulate matter and eight–hour ozone NAAQS were now attaining the standards.[251] A full modeling of the health and economic benefits of these changes is beyond the scope of this paper, but these data document significant and widespread improvements in North Carolina's air quality. These trends should improve even further from 2011 to 2018 as TVA's additional controls and plant retirements are implemented, and with further anticipated plant retirements by Duke and Progress Energy.

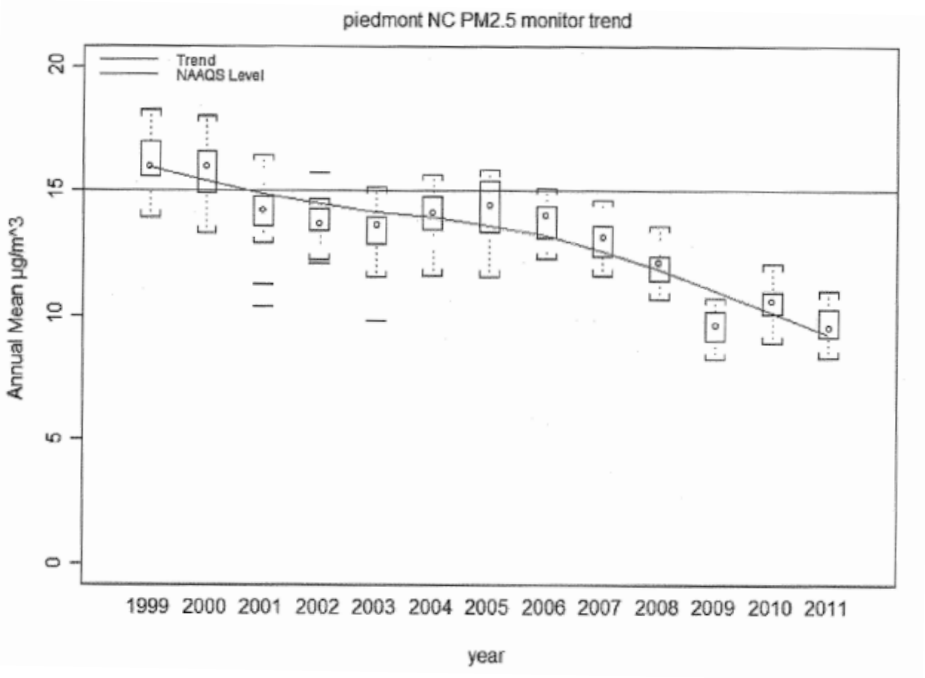

Figure 1. Piedmont North Carolina Particulate ($PM_{2.5}$) Monitoring Trend, 1999–2011 (annual mean concentration). Data from North Carolina Division of Air Quality.

[251] Approval and Promulgation of Air Quality Implementation Plans; North Carolina; Clean Smokestacks Act, 76 Fed. Reg. 59,250, 59,250 (Sept. 26, 2011) (codified at 40 C.F.R. pt. 52).

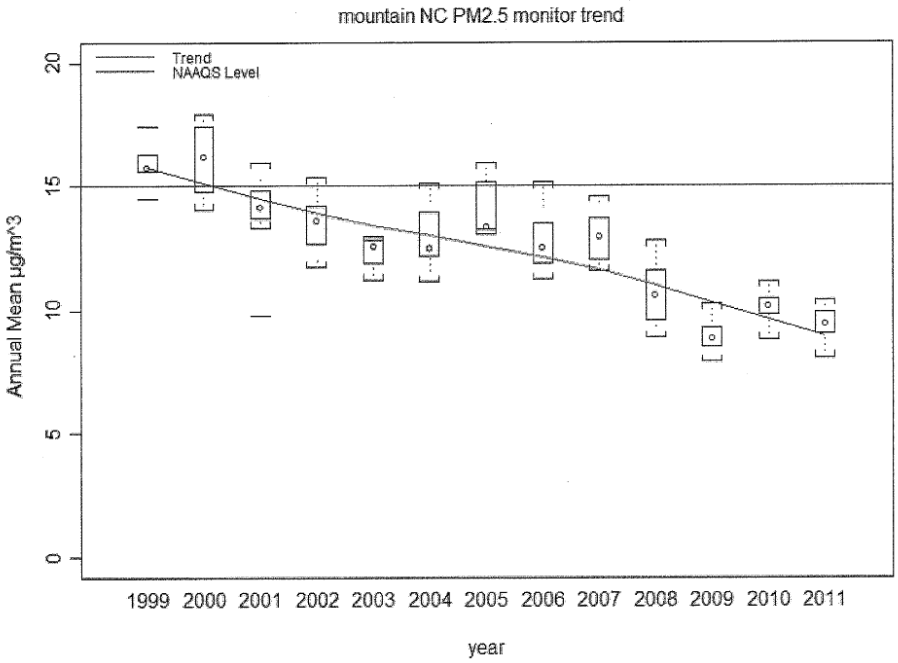

Figure 2. Mountain North Carolina Particulate ($PM_{2.5}$) Monitoring Trend, 1999–2011 (annual mean concentration). Data from North Carolina Division of Air Quality.

The annual changes in ozone concentrations were even more dramatic. As shown in Figure 3, the high and rising concentrations of ozone that occurred during the 1990s, exceeding federal NAAQS standards, declined precipitously from 2001 to 2004. This decline was most likely the result of measures complying with EPA's NO_x SIP Call. Ozone concentrations declined even more dramatically from 2007 to 2009, most likely reflecting the new controls put in place under the 2007 CSA deadline. In 2002, thirty of North Carolina's 100 counties were not complying with federal ozone standards. As of May 2012, only parts of seven counties in one metropolitan area (Charlotte) still were not fully compliant, and compliance in that area was anticipated soon.[252] Overall, in 2011 North Carolina recorded the second-lowest annual ozone levels since the state began monitoring air quality in the early 1970s.[253] Statewide, ozone levels exceeded the ozone standard of 0.075 ppm (adopted by EPA in 2008) on twenty-six days—the same number as in 2010—compared to about fifty days per year on average over the past ten years.[254]

252 Press Release, N.C. Dep't of Env't & Natural Res., New Federal Ozone Designations Show Air Improvements in N.C. (May 3, 2012), *available at* http://portal.ncdenr.org/c/journal/view_article_content?groupId=21953&articleId=7050288.

253 Press Release, N.C. Dep't of Env't & Natural Res., Air Quality Accomplishments 2011 (2011), *available at* http://www.ncair.org/news/pr/2011/Air_Quality_Accomplishments_2011.pdf.

254 *Id.*

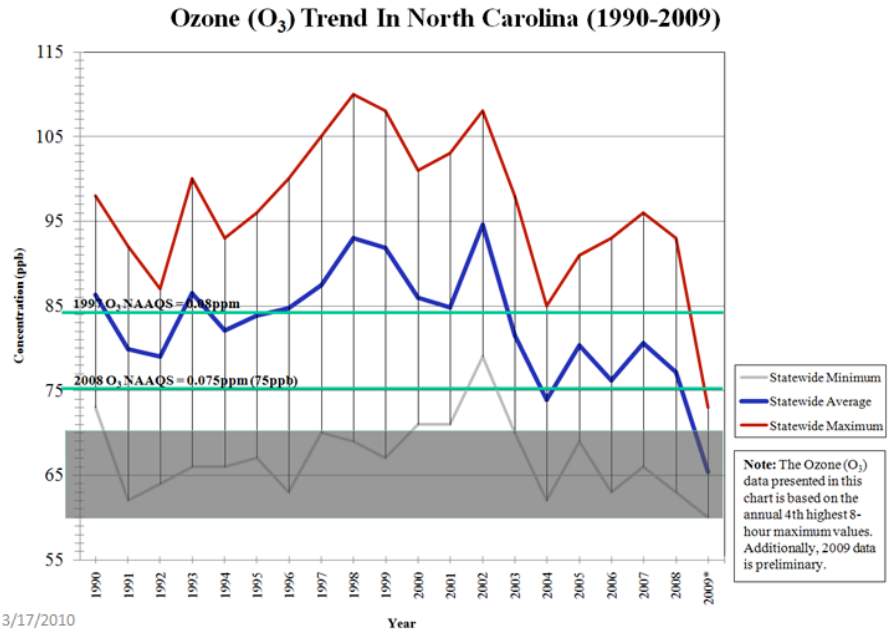

Figure 3. Ambient Ozone Trends in North Carolina, 1990–2009. Data from North Carolina Division of Air Quality.

Overall, the state's air quality was significantly improved by 2012, and the associated damages of air pollution both to health—asthma and other lung diseases in particular—and to visibility, and the associated economic benefits of the state's recreation and tourism economy, also could reasonably be assumed to have been reduced. NO_x emissions from the utility sector are not the only source of ozone—more aggressive emissions inspections of motor vehicles also contributed to the reductions—but the CSA played a key role in requiring reduction of power plant NO_x emissions by 58% in addition to earlier SIP Call reductions, and of SO_2 emissions by 81%.[255]

E. Mercury

Reduction in mercury emissions was expected to be a significant additional cobenefit of installing SO_2 scrubbers or retiring unscrubbed coal-fired power plants from use. The CSA directed the state Air Quality Division to develop further recommendations on control of mercury emissions. Acting on those recommendations, North Carolina's Environmental Management Commission in 2006 issued a mercury rule requiring that electric utilities reduce mercury emissions 88% by 2018 without reliance on allowance trading. It also required closure of any units that did not have scrubbers to remove mercury in addition to SO_2.[256] In July 2012, North Carolina's Division of Air Quality released a report documenting more than a 90% reduction in mercury emissions from the seven

255 *See id.*; New Federal Ozone Designations Show Air Improvements in N.C., *supra* note 252.
256 2012 IMPLEMENTATION REPORT, *supra* note 7, at 1, 12–14.

largest power plants in North Carolina, and that all the smaller ones were scheduled for retirement by 2015 (Figure 4).[257] Overall, the Division of Air Quality data showed more than a 70% reduction in power plant mercury emissions by 2010, and projected more than 80% reduction by 2025.[258] Since power plants were responsible for 52% of the state's total mercury emissions, these reductions would amount to nearly a 47% reduction in the state's total mercury pollution, with the associated health benefits. It also positioned North Carolina for compliance with forthcoming federal mercury standards well ahead of their 2018 deadline, as well as with North Carolina's own strict mercury standard.[259]

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257 N.C. DIV. AIR QUALITY, FINAL REPORT OF THE DIVISION OF AIR QUALITY TO THE ENVIRONMENTAL MANAGEMENT COMMISSION ON THE CONTROL OF MERCURY EMISSIONS FROM COAL-FIRED ELECTRIC STEAM GENERATING UNITS v, 5-1, 11-3 (2012), *available at* http://daq.state.nc.us/news/leg/Mercury_Report_7-1-12.pdf [hereinafter FINAL REPORT ON CONTROL OF MERCURY EMISSIONS].

258 *Id.* at vi.

259 DIV. OF AIR QUALITY, MERCURY EMISSIONS AND MERCURY CONTROLS FOR COAL-FIRED ELECTRICAL UTILITY BOILERS: FINAL REPORT, 1-3, III-1 (2005), *available at* http://daq.state.nc.us/news/leg/hg/; *see* 15A N.C. ADMIN. CODE 02D.2511 (2007); *see also* FINAL REPORT ON CONTROL OF MERCURY EMISSIONS, *supra* note 257, at 11-4 (stating that only 15% of the atmospheric deposition of mercury in North Carolina originates with North Carolina sources, so that despite the benefits of these reductions, they do not contribute equally to the actual reduction of mercury levels in North Carolina's vegetation and fish populations.).

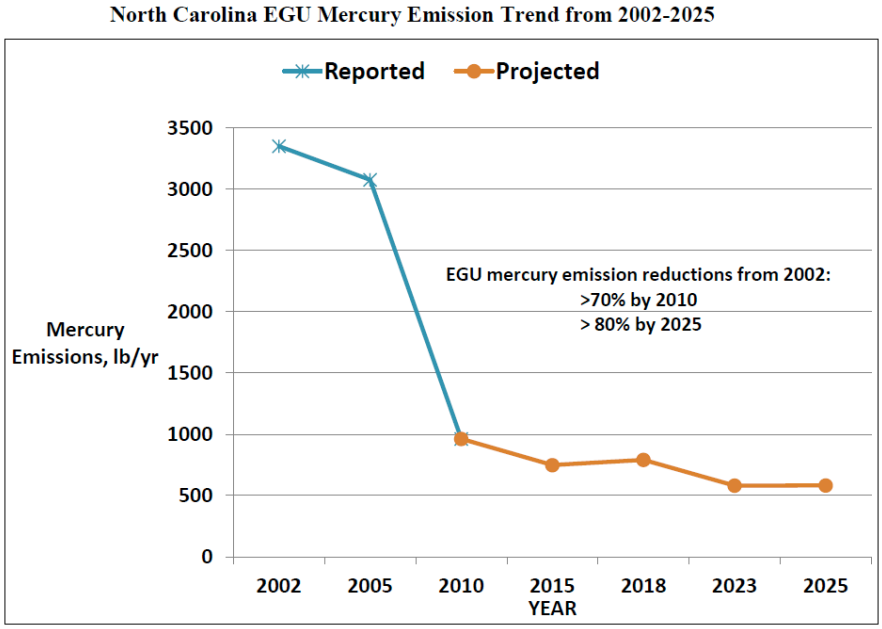

Figure 4. Mercury Emission Trends from North Carolina Electric Generating Units, 2002–2025. Data from North Carolina Division of Air Quality.

In short, the CSA placed North Carolina and its utilities in a position of leadership not only in SO_2 and NO_x reduction, but also in reduction of mercury and particulate emissions, and well ahead of others in complying with the federal mercury rules that were ultimately issued in 2011. The early adoption of mercury controls as a CSA cobenefit added some eight years of extra health benefits as a result of earlier reduction of mercury exposure.

F. Regional Haze

Finally, a major outcome of the TVA settlement for North Carolina was reduction of regional haze, as a cobenefit both of the Clean Smokestack Act's stringent caps on SO_2 and NO_x emissions and of TVA's legal settlement reducing its upwind emissions by similar amounts. According to a National Park Service briefing statement in 2010, the Great Smoky Mountains National Park (GSMNP) had regularly experienced some of the highest measured amounts of air pollution of any national park in the U.S, and was designated as part of a nonattainment area for EPA's NAAQS for both ozone and fine particles.[260] It reported that ozone concentrations during the summer months routinely exceed[ed] standards to protect public health and vegetation; that the park had experienced 264 unhealthy ozone days since 1997 under the older 85 ppb standard and over 500 days under the new

260 NATIONAL PARK SERVICE, AIR QUALITY BRIEFING STATEMENT (2010), *available at* http://www.nps.gov/grsm/naturescience/upload/Air%20Quality%20-%20Apr%202010.doc.

75 ppb standard; and that more than thirty plant species showed visible damage from ozone pollution.[261] Visibility on the worst days averaged only about fifteen miles, compared to natural visibility of seventy-seven miles, and sulfate particles reportedly accounted for 84% of the haze on the worst days.[262] High levels of acid deposition were damaging high-elevation streams and saturating soils with too much nitrogen, which harmed both wildlife and trees, and high levels of mercury had also been detected in a number of bird species.[263]

The North Carolina Division of Air Quality released a SIP for Regional Haze in 2007.[264] EPA's Regional Haze Rule required all states to plan to restore natural visibility conditions in all national parks, national forests and wilderness areas (Class I visibility areas) by 2064.[265] North Carolina's SIP projects that the controls required by the CSA will be sufficient to assure that North Carolina more than achieves its targets for visibility improvement in 2018, its first regional haze compliance period, as steps toward the 2064 goal.[266]

As of 2012, TVA's annual emissions reports to EPA showed a 79% reduction in upwind emissions of SO_2 and 91% reduction in NO_x already achieved, and an additional 32% reduction in SO_2 and 43% reduction in NO_x projected by 2015 (cf. Table 2 above); and North Carolina's ambient monitoring data for particulates in the mountain area already showed steady and steep reductions in particulate levels (Figure 2 above).[267] These data show that major improvements in regional haze are occurring as a result of the CSA, with their associated benefits to health, tourism, and other economic benefits.

G. Costs

Critics of the law have charged that none of these benefits were clearly documented at the time the law was developed and passed, and that the claims of its anticipated benefits were overstated and its costs understated.[268] They have asserted that the costs of compliance increased from $2.3 billion (the amount provided in the law's cost recovery mechanism) to $3.2 billion, plus additional costs of replacing coal plants with new natural gas units.[269]

The requirements of the CSA did turn out to cost more than originally anticipated: $340 million (23%) more for Duke Energy, and $242 million (30%) more for Progress, costs that subsequently were charged to the ratepayers.[270] This amounted to an estimated total annual impact of $2.64 per 1,000 kilowatt–hours per month for Duke's residential customers, and $1.97 for Progress's.[271] These

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261 *Id.*

262 *Id.*

263 *Id.*

264 REGIONAL HAZE SIP, *supra* note 237, at ii.

265 *Id.*

266 *Id.* at iv.

267 *See supra* Table 2 & Figure 2.

268 Paul Chesser, *Smokestacks Bill Helped Utilities*, CAROLINA JOURNAL ONLINE, Mar. 7, 2004, http://www.carolinajournal.com/exclusives/display_exclusive.html?id=2259 (last visited Nov. 23, 2013). Carolina Journal Online is a publication of the John Locke Foundation, a conservative think-tank.

269 Cordato, *supra* note 238.

270 2012 IMPLEMENTATION REPORT, *supra* note 7, at 6.

271 *Id.* at 18–19.

additional costs were actually lower than those publicly estimated by Senator Metcalf when he introduced the original Senate Clean Smokestacks bill.[272]

Overall, this outcome was still a positive one. For the public and the many tourism-related businesses, it provided the health and environmental benefits of much cleaner air, the estimated economic benefits of which were still well above their costs, especially when including cobenefits of fine particulate matter and mercury pollution, as well as regional haze reduction and value to the mountain economy. It also provided whatever benefits might have resulted from EPA regulations years earlier than they would otherwise have occurred.

For the utilities, it provided a cost recovery mechanism for pollution control equipment that they might soon have been required to install anyway by EPA regulations, paying for them using excess profits that might otherwise have triggered a rate reduction process involving greater cost and greater uncertainty. They also gained relief from a number of potentially costly lawsuits and other regulatory pressures (on NSR, for instance),[273] and paid lower installation costs than if they had waited for EPA regulations and then had to pay costs inflated by competition with other utilities for vendors.

The ratepayers did eventually have to pay higher rates to cover costs beyond the initial cost recovery mechanisms, but far less than they would otherwise have had to pay if the entire cost had been borne by the ratepayers in a later proceeding to comply with EPA requirements: Under CSA, the first $2.95 billion of these costs was covered by the excess profits mechanism, leaving only $592 million (less than 17%) still to be paid in addition by the ratepayers.[274] Far greater rate increases were attributable to Duke's new Cliffside 6 coal plant, yet North Carolina's electric rates remained far below the national average. Finally, many industrial customers may also have experienced less pressure and thus lower costs to further clean up their own emissions, due to the air quality improvements resulting from so significantly cleaning up the power plants.[275]

Finally, the full costs of replacing old coal-fired units with new generating units were not solely attributable to the CSA. Duke Energy requested three rate increases between 2009 and 2013 totaling 7% in 2009, 7.2% in 2012 (subject to a lawsuit by the state Attorney General, not yet decided), and 9.7% in 2013 (not yet acted upon).[276] In its 2013 application, it attributed these requests to a nationwide

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272 Senator Metcalf estimated that the additional costs would amount to a 3–5% surcharge on residential users per thousand kilowatt-hour per month, which would amount to $2.79 to $4.65 per 1000 kilowatt-hour at 2012 rates. Anderson, *supra* note 84, at 66.

273 *Id.* at 113.

274 The utilities' customers may also have gained an additional economic benefit unnoticed even by the utilities at the time: Under the CSA the utilities were allowed to recover direct compliance costs from their customers up to the amounts specified in the five-year rate freeze, but not the additional rate of return for their shareholders that they would also have been allowed to recover had they waited to comply with federal regulations.

275 Anderson, *supra* note 84, at 114–15.

276 DUKE ENERGY CAROLINAS, LLC, APPLICATION FOR ADJUSTMENT OF RATES AND CHARGES APPLICABLE TO ELECTRIC SERVICE IN NORTH CAROLINA, NCUC DOCKET NO. E-7, Sub 909, at 7 (filed June 2, 2009) (commissioned Dec. 7, 2009); DUKE ENERGY CAROLINAS, LLC, APPLICATION FOR ADJUSTMENT OF RATES AND CHARGES APPLICABLE TO ELECTRIC SERVICE IN NORTH CAROLINA, NCUC DOCKET NO. E-7, Sub 989, at 7 (filed July 1, 2011) (commissioned Jan. 27, 2012); DUKE ENERGY CAROLINAS, LLC, APPLICATION FOR ADJUSTMENT OF RATES AND CHARGES APPLICABLE TO

process among utilities of replacing decades old power plants, noting that in its own fleet many of its coal plants were over fifty years old, and even its nuclear units and many of its natural gas combustion turbines were over twenty-five years old.[277] Its filing noted the major changes in national regulatory and market forces the utilities were now facing, including rapidly falling natural gas prices and the prospect of more stringent federal environmental regulations.[278] Progress Energy also requested a rate increase of 11% in October 2012, which it attributed similarly to the need to modernize its fleet of aging facilities in light of these broader trends; it also noted that this was its first rate increase request in twenty-five years.[279] As of February 2013, Progress announced its agreement to halve this request to just 4.7%.[280] Significantly, both Duke's and Progress's annual CSA compliance reports document that they were well on track to compliance with the CSA caps before making many of these additional investments.[281]

VII. CONCLUSIONS AND LESSONS

A. Results

In short, North Carolina's CSA achieved the benefits of direct and dramatic reductions in air pollutant emissions by its own electric utilities, by TVA, and by other upwind utilities in the future because of North Carolina's legal pressure on EPA to protect downwind states more explicitly in its CAIR. More broadly, it thus

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ELECTRIC SERVICE IN NORTH CAROLINA, NCUC DOCKET NO. E-7, Sub 1026, at 4 (filed Feb. 4, 2013) (commissioned Sept. 24, 2013) [hereinafter DUKE 2013 APPLICATION FOR ADJUSTMENT OF RATES].

277 DUKE 2013 APPLICATION FOR ADJUSTMENT OF RATES, *supra* note 276, at 4. Some of the most expensive costs also were hotly contested: Environmental and consumer groups strongly opposed Duke's decision to build the expensive new Cliffside 6 coal-fired plant, arguing that even with advanced emission control technology it was a far more costly and less environmentally beneficial investment than an equivalent reduction in energy demand by energy efficiency investments (or natural gas or renewable energy investments) would have been. SOUTHERN ENVIRONMENTAL LAW CENTER, NCUC DOCKET NO. E-7, Sub 790, at 9–10, 27–28 (filed Feb. 7, 2007) (commissioned Feb. 28, 2007).

278 DUKE 2013 APPLICATION FOR ADJUSTMENT OF RATES, *supra* note 276, at 4.

279 PROGRESS ENERGY CAROLINAS, INC., APPLICATION FOR ADJUSTMENT OF RATES AND CHARGES APPLICABLE TO ELECTRIC SERVICE IN NORTH CAROLINA, NCUC DOCKET NO. E-2, Sub 1023, at 4–5 (filed Oct. 12, 2012) (commissioned May 30, 2013).

280 John Murawski, *Progress Energy Agrees to Halve Rate Hike*, NEWS & OBSERVER, Feb. 25, 2013, http://www.newsobserver.com/2013/02/25/2707708/progress-energy-agrees-to-halve.html (last visited Nov. 23, 2013).

281 IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2003, *supra* note 85; IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2004, *supra* note 181; IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2005, *supra* note 180; IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2006, *supra* note 183; N.C. DEP'T OF ENV'T & NATURAL RES. & NCUC, IMPLEMENTATION OF THE "CLEAN SMOKESTACKS ACT": A REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION AND THE JOINT LEGISLATIVE COMMISSION ON GOVERNMENTAL OPERATIONS (2007); IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2008, *supra* note 183; IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2009, *supra* note 190; N.C. DEP'T OF ENV'T & NATURAL RES. & NCUC, IMPLEMENTATION OF THE "CLEAN SMOKESTACKS ACT": A REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION AND THE JOINT LEGISLATIVE COMMISSION ON GOVERNMENTAL OPERATIONS (2010); IMPLEMENTATION OF THE CLEAN SMOKESTACKS ACT 2011, *supra* note 183; N.C. DEP'T OF ENV'T & NATURAL RES. & NCUC, IMPLEMENTATION OF THE "CLEAN SMOKESTACKS ACT": A REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION AND THE JOINT LEGISLATIVE COMMISSION ON GOVERNMENTAL OPERATIONS (2013).

became an early state-led driver in the current transition in U.S. energy use from coal-fired generation toward a more primary future reliance on natural gas and other less damaging fuels. The CSA was not the only factor driving this process: Others included political and legal pressures from other downwind states and EPA, and importantly, the rapidly falling price of natural gas as an alternative fuel.[282] Both by example and its early success, however, as well as by successful litigation against TVA and EPA, the CSA played an important role in promoting this transition.

On November 4, 2013, the North Carolina state president of the newly merged Duke Energy Carolinas and Duke Progress Energy, Paul Newton, published a column in the Raleigh (NC) *News & Observer* hailing both the CSA and the broad-based and bipartisan coalition process that produced it, as a "landmark" that not only produced major reductions in air pollution but also triggered far-reaching modernization programs at both utilities: retiring more than twenty-four old coal-fired units, investing far more aggressively in new natural gas facilities instead of coal, and significantly increasing their commitments to energy efficiency and renewable energy. Over the next fifteen years, he said, they now plan to meet more than 30% of projected demand growth through energy efficiency, demand-side management and renewable energy options, and to create a new "Green Source Tariff" for large business customers that want to offset future electric consumption with new renewable energy sources, while still maintaining rates well below the national average.[283]

How was such an innovative and effective law enacted and implemented, particularly in the context of the larger events of 2001–2002? Nationally, during that time George W. Bush's presidency was in full swing, promoting aggressive fossil fuel production and opposing environmental regulation. The September 11 terrorist attack on the World Trade Center and the prospect of war in Iraq dominated the national agenda, marginalizing public attention to the environment and other issues. And an economic recession in the wake of the dotcom bust had seemingly trumped whatever other environmental concerns might have remained. North Carolina was an economically progressive state, but nonetheless a Southern state with a strongly manufacturing-based economy. Like others in that region, North Carolina had prospered for decades on cheap coal-fired electricity and low electric rates. By 2001–2002, it was suffering serious losses of traditional manufacturing industries and jobs to China, Mexico and other countries, and its two investor-owned utilities were among the most influential businesses in the state.

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282 *Cf.* U.S. Energy Information Administration, *27 Gigawatts of Coal Fired Capacity to Retire Over Next Five Years*, http://www.eia.gov/todayinenergy/detail.cfm?id=7290 (last visited Nov. 23, 2013); U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-635, EPA REGULATIONS AND ELECTRICITY: BETTER MONITORING BY AGENCIES COULD STRENGTHEN EFFORTS TO ADDRESS POTENTIAL CHALLENGES (2012).

283 Paul Newton, *Duke Energy Meeting Electricity Needs More Cleanly, Efficiently*, RALEIGH NEWS & OBSERVER, Nov. 5, 2013, at 9A.

B. Success Factors

In retrospect one can identify at least four key factors that influenced the law's successful enactment and implementation: an unusual crosscutting alliance of supporting organizations; a set of stakes that could provide each party to the negotiations with benefits; creative problem solving by key leaders at important junctures; and a good faith, mutually beneficial negotiation process, as well as a number of favorable contextual factors.

The creation of a broad based alliance of political support was one key success factor. Environmental advocacy groups successfully allied themselves with the western North Carolina business community, normally a conservative, Republican, antigovernment region of the state, but in this case a constituency that also shared strong concerns about the effects of air pollution on mountain tourism. The two affected utilities also were open to the initiative for reasons of their own, and the broad and well organized statewide support of the public health and medical communities and parents concerned about asthma also contributed. And the fact that by the end of the negotiations even the Manufacturers and Chemical Industries Council had agreed to the proposal—even if under pressure—allowed the legislature to bless a bill that had already been agreed to by virtually all the key stakeholders.[284]

Essential to the creation of this alliance was a set of stakes that could be negotiated to provide important benefits to each of the key stakeholders. The environmental groups chose to focus their negotiations solely on the air quality provisions and not on the cost recovery issues, and they also accepted the idea of an overall cap rather than the unit by unit technological controls recommended in their 2001 Clean Smokestacks Plan. They did insist, however, that any emissions allowance credits generated by compliance beyond federal requirements—that is, by meeting North Carolina's tighter requirements under the CSA—not be saleable to upwind states and emissions sources to generate extra profits for the utilities. And they wanted leverage to go after upwind pollution from TVA.

The utilities in turn anticipated stronger federal standards in the near future, and were willing to accept the air quality caps so long as they got a cost recovery mechanism and could postpone the uncertainties of a rate hearing process. Their key issues were the details of how the proposed rate freeze would actually come into effect, the timetables for meeting the caps, and the assurance that the caps would be on total emissions rather than plant by plant, leaving them flexibility to make their own decisions about how to control each individual generating unit. They also saw opportunities to finesse legal threats from EPA and environmental groups over NSR, and to save money by getting ahead of the EPA rules by negotiating lower prices from vendors than would be possible once all states had to comply with national rules. And they lobbied hard until the very end of the negotiations—though ultimately unsuccessfully—to retain ownership over emissions credits that might be generated.

The industrial stakeholders wanted the emissions credits to be owned and sold by the utilities and used to reduce their rates, but they too anticipated tougher EPA

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284 The broadest based business lobby organization, North Carolina Citizens for Business and Industry, was divided and therefore neutral, with tourism and mountain businesses favoring the bill. Anderson, *supra* note 84, at 83–84.

regulations in the future, and recognized—perhaps unusually for an industrial lobby group—that any emissions reductions achieved efficiently by the utilities might in turn reduce pressures and costs on the manufacturing and chemical industries to reduce their own emissions.[285] The governor's staff, in turn, was willing to be flexible about the timing of reaching the caps so long as the caps were assured, but they did not support giving the utilities what they considered undeserved benefits in the form of emissions credits.

Given these opportunities to craft a mutually beneficial solution, the skill and creativity of the political leadership that guided the negotiation process was a third key success factor. Initial leadership credit goes to the leaders of all the stakeholder organizations who were receptive, however reluctantly initially, to working together on the issue. The governor also deserves particular credit for intervening at a key moment with a creative solution to the cost recovery issue, and also for making it clear that his staff would lead the negotiations and that he was committed to a successful outcome. Finally, a quiet but important leadership role was played by the executive director of the MCIC group, whose personal history included previous service as head of the state environmental management regulatory agency: he understood far better than most heads of such organizations the technical issues and regulatory tradeoffs between air pollution control by the utilities and by his member businesses, and could thus persuade them to support the final compromise.[286]

None of this might have mattered had not the governor's staff members who led the negotiations also managed to create and maintain a good faith, mutually beneficial negotiation process, with a key legislative drafting role by the widely trusted staff lawyers of the Attorney General's office. Participants in this process noted that the consistent focus was not on the public positions each negotiator stated, but on finding ways to meet their essential underlying organizational needs and interests. In contrast to the gridlocked adversarial politics of the federal Congress in recent years, the CSA provides an example of a case in which stakeholders with different interests were able to negotiate a compromise solution that provided benefits to each participant as well as major benefits to the public.

Finally, several historically contingent factors also contributed to the success of the outcome. One was a decade's prior regional interstate collaboration on the Southern Appalachian Mountains Initiative (SAMI), which produced both sophisticated modeling data supporting state actions to reduce emissions, and widespread bipartisan public concern about the fate of North Carolina's mountain forests, scenic views, and the health effects of air pollution. Another was a widely shared expectation of new EPA regulations that would require further action by the utilities, and possibly by other industries as well: the proposed Clean Air Interstate, Clean Air Mercury, and Regional Haze Rules, further tightening of NO_x standards and SIPs, possible revival of EPA lawsuits for noncompliance with NSR, and others. And finally, there was the fact that the utilities had recently paid off major debts for their nuclear power plants and asbestos liabilities, leaving them with higher profits than allowed and thus facing the potential uncertainties and

285 *Id.* at 90–91, 114–15.
286 *Id.*

administrative burden of a rate-reduction process—thus opening the opportunity for the governor's creative cost recovery proposal.

C. Lessons

What insights, then, does the Clean Smokestacks case offer for other states and for national solutions to environmental policy challenges? It is not likely that it could be exactly replicated in other states, owing to the various unique and serendipitous historical contingencies from which it emerged in North Carolina (the politics, economics and leadership of a particular time and place, and the particular circumstances that allowed for its unique cost recovery mechanism, for instance). It does nonetheless offer broader lessons for initiatives in other states.

First, especially in a period of ideological and partisan acrimony at the national level, and in many states as well, it offers a valuable reminder of what government can accomplish through good faith negotiation to solve a longstanding problem, with serious respect for competing interests and not merely sound bite positions. Many of the specifics are inevitably unique to its particular historical circumstances, but the principles for seeking such solutions are not: building broad and crosscutting alliances, mutual respect for key interests and needs, creative leadership, and good faith negotiation, among others.

Second, it demonstrates that innovative initiatives by state governments can solve long-festering problems within individual states, and can also achieve regional and national leverage. Air pollution from grandfathered coal-fired power plants had continued for three decades without solution. Some possible national solutions had begun to be considered, but North Carolina's CSA was the first state legislation to set fixed, permanent, year-round caps on key pollutants—particularly sulfur, but also its attendant pollutants—at a level stringent enough to force cleanup or retirement of the old coal-fired plants. Both North Carolina's example and its subsequent successful lawsuits against TVA and EPA also played influential roles in forcing similar outcomes throughout the eastern United States. In effect the CSA, along with lawsuits by other downwind states, represents a reversal of the more familiar pattern of environmental federalism: in this case tighter environmental standards by a state were not only taking the lead within its own borders, but also using petitions and lawsuits to pressure the federal government to follow with stronger action against its upwind neighbors.

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