Clean Air After the CAIR Decision: Multi-Pollutant Approaches to Controlling Powerplant Emissions

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Summary

On August 2, 2010, the Environmental Protection Agency (EPA) proposed a new Clean Air Transport Rule to control powerplant emissions of sulfur dioxide (SO_2) and nitrogen oxides (NOx). When finalized, this rule will replace the Clean Air Interstate Rule (CAIR); CAIR, which was promulgated in May 2005, established a regional cap-and-trade program for SO_2 and NOx emissions from electric generating units (EGUs) in 28 eastern states and the District of Columbia. On July 11, 2008, in *North Carolina v. EPA*, the U.S. Court of Appeals for the D.C. Circuit vacated CAIR, saying that it had "more than several fatal flaws." The court subsequently modified its decision on December 23, 2008, however, reversing itself by allowing CAIR to remain in effect until a new rule is promulgated by EPA.

From a policy standpoint, the court's July 2008 decision seriously undermined EPA's approach to clean air over the previous eight years. CAIR was the lynchpin that held together the Bush Administration's strategy for attainment of the ozone and fine particulate National Ambient Air Quality Standards (NAAQS), for achieving reductions in mercury emissions from coal-fired powerplants, for addressing regional haze impacts from powerplants, and for responding to state petitions to control upwind sources of ozone and fine particulates under Section 126 of the Clean Air Act. As discussed in this report, the potential impact on communities attempting to achieve NAAQS and the impact on mercury emissions without CAIR or a similar rule would be substantial; this has prompted some to call for congressional action to address the issue. On February 4, 2010, Senator Carper and 11 bipartisan cosponsors introduced S. 2995, a multipollutant bill that would have replaced the CAIR requirements, and required standards for powerplant emissions of mercury. The bill was not acted on. As of May 2011, legislation addressing CAIR replacement has not been introduced in the 112th Congress.

The D.C. Circuit's July 2008 decision strongly suggested that there is no simple "fix" that will make CAIR acceptable to the court. This left EPA with three clear long-term options: (1) starting anew with a new strategy with respect to mitigating transported air pollution based on the decision; (2) allowing the states to sort out the issue through Section 126 petitions; and (3) seeking new legislation providing EPA with the statutory authority to implement either CAIR in some form, or an alternative. The agency is proceeding with the first of these options with its proposed transport rule, but has indicated that it views congressional efforts to address the issue as "mutually reinforcing."

For Congress, the court decision raises several issues:

- Should Congress consider providing EPA with the authority to implement CAIR or other cost-based, market-oriented approaches to address NAAQS?
- Should Congress consider multi-pollutant legislation as a supplement or substitute for the current regulatory regime, at least for electric generating units?
- Should Congress consider a more comprehensive revision to the Clean Air Act to address the full scope of ozone and $PM_{2.5}$ NAAQS non-attainment and related issues, as well as mercury emissions from coal-fired powerplants, and emerging environmental issues such as climate change?

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Introduction

On July 11, 2008, in *North Carolina v. EPA*,[1] the U.S. Court of Appeals for the D.C. Circuit vacated what was widely regarded as the Bush Administration's most significant environmental measure: the Clean Air Interstate Rule (CAIR).[2] CAIR, promulgated by EPA under the Clean Air Act (CAA)[3] in May 2005, established a regional cap-and-trade program for sulfur dioxide (SO_2) and nitrogen oxide (NOx) emissions from electric generating units (EGUs) in 28 eastern states and the District of Columbia.[4] The basic purpose of the rule was to protect downwind states from pollution generated in other states located upwind. Subsequently, on December 23, 2008, the court modified its decision to allow CAIR to remain in effect while EPA fashions a replacement rule.[5]

For SO_2, the CAIR program reduces emission allowances in the affected upwind states 50% beginning in 2010 and 65% beginning in 2015.[6] SO_2 emissions cause acid precipitation, and SO_2 is also among the pollutants that form fine particles ($PM_{2.5}$) in the atmosphere. Reducing $PM_{2.5}$ concentrations, as CAIR would do, was estimated by EPA to have significant health benefits, eliminating 13,000-22,000 premature deaths annually.

CAIR's NOx cap reduces emissions in the affected states by similar percentages: a first phase in 2009 lowered the emissions cap by 53% and a second phase, in 2015, is to achieve a 61% reduction compared to 2003 levels. NOx contributes to both $PM_{2.5}$ and to the formation of ground-level ozone. Ozone aggravates a variety of respiratory and cardiovascular conditions and causes as many as 2,300 premature deaths annually. Concentrations of the pollutant need to be reduced in most of the states east of the Mississippi, according to EPA.[7]

Importance of the CAIR Decision

From a policy standpoint, the court's decision seriously undermined EPA's approach to clean air under the Bush Administration. CAIR was the lynchpin that held together EPA's strategy for attainment of the ozone and fine particulate National Ambient Air Quality Standards (NAAQS), for achieving reductions in mercury emissions from coal-fired powerplants, for addressing regional haze impacts from powerplants, and for responding to state petitions to control upwind sources of ozone and fine particulate pollution under Section 126 of the Clean Air Act. As discussed in this report, the potential impact of vacating CAIR on communities attempting to

[1] 531 F.3d 896 (D.C. Cir. 2008).

[2] 70 *Federal Register* 25162 (May 12, 2005).

[3] 42 U.S.C. § 7401 et seq.

[4] While virtually all eastern states were affected by the rule, three were subject only to the SO_2-NOx annual caps, and five only to the seasonal NOx cap; the other 20 states and DC were subject to all three caps. See EPA Fact Sheet, p. 3, at http://www.epa.gov/CAIR/pdfs/cair_final_fact.pdf.

[5] 550 F.3d 1176 (D.C. Cir. 2008).

[6] Because EGUs have been using up banked allowances since 2000 and emitting more tons than the current SO_2 cap allows, the actual reduction in SO_2 emissions would ultimately have been 73% below 2003 levels after 2015, according to the agency.

[7] For maps of the affected areas, see CRS Report R41062, *Ozone Air Quality Standards: EPA's Proposed Revisions*, by (name redacted).

achieve NAAQS and the impact on mercury emissions would be substantial, and prompted some (including EPA, state environmental agencies, electric utilities, and environmental organizations) to appeal the decision.

Even though it provides less-than-adequate reductions to achieve full compliance with the NAAQS, CAIR would have substantial benefits for the communities affected. In 2005, EPA, in response to congressional requests, conducted a multi-pollutant regulatory analysis, including the estimated costs and benefits of CAIR, the Clean Air Mercury Rule (CAMR), and the Clean Air Visibility Rule (CAVR).[8] Although its analysis combined all three rules, the vast majority of the costs and benefits quantified were for CAIR. **Table 1** summarizes the results of that analysis. As indicated, the benefit-to-cost ratio ranged from 20 to 1, to 27 to 1. The primary benefit identified was the avoidance of premature mortality, but 10 other categories of health impacts were also identified by the agency, including (annually in 2020) the avoidance of 29,000 non-fatal heart attacks, 510,000 cases of respiratory symptoms, 360,000 cases of asthma exacerbation, 2 million work loss days, 430,000 school absence days, and 12 million minor restricted activity days.

Table 1. Costs and Benefits of Reducing Emissions Under CAIR/CAMR/CAVR

	2010 Estimate	2015 Estimate	2020 Estimate
Annual Costs (billions, 1999$)	$2.7	$4.4	$6.1
Annual Benefits[a] (billions, 1999$)	$62-$73	$91-$106	$120-$140
Annual premature mortality avoided (people)	13,000	18,000	22,000

Source: U.S. Environmental Protection Agency, Office of Air and Radiation, *Multi-Pollutant Regulatory Analysis: CAIR/CAMR/CAVR (The Clean Air Interstate Rule, the Clean Air Mercury Rule, and the Clean Air Visibility Rule),* October 2005, p. 26.

a. Quantified benefits from SO_2 and NOx reductions only; benefits from Hg or CO_2 reductions not estimated by EPA.

Background

The Clean Air Act envisions a mix of state and federal authorities to reduce air pollution. For those pollutants subject to NAAQS,[9] it established a partnership in which the federal government sets uniform national air quality standards and the states develop State Implementation Plans (SIPs) identifying the measures they will take to attain the standards.

In 1997, when EPA finalized new NAAQS for both $PM_{2.5}$ and ozone,[10] it set in motion the SIP process under Section 110 of the act. Most states already had SIPs demonstrating how they would attain less stringent ozone and PM standards, but the promulgation of the revised ozone NAAQS

[8] U.S. Environmental Protection Agency, Office of Air and Radiation, *Multi-Pollutant Regulatory Analysis: CAIR/CAMR/CAVR (The Clean Air Interstate Rule, the Clean Air Mercury Rule, and the Clean Air Visibility Rule),* October 2005.

[9] NAAQS pollutants (also called "criteria pollutants") are pollutants that "may reasonably be anticipated to endanger public health or welfare" in the EPA Administrator's judgment, and whose "presence ... in the ambient air results from numerous or diverse mobile or stationary sources.... " CAA Section 108(a)(1); 42 U.S.C. § 7408(a)(1). EPA has identified six such pollutants: ozone, particulate matter, carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead.

[10] 62 *Federal Register* 38652-38896 (July 18, 1997). The standards became effective September 16, 1997.

and the new $PM_{2.5}$ NAAQS meant that the SIPs of most states were no longer adequate to bring those states into attainment by the statutory deadlines. Under Section 110(k)(5) of the act, if EPA finds a SIP inadequate, it must require the affected state to submit a revised SIP that includes sufficient measures to bring that state into compliance. This is known as a "SIP Call."

In the case of both the ozone and the $PM_{2.5}$ NAAQS, the process of developing effective compliance strategies is complicated by the problem of transported air pollutants. Many states cannot attain the standards unless upwind states reduce their pollution. The act recognizes this and requires that those upwind states control major sources of pollution that affect other states: under Section 110(a)(2)(D), SIPs must include adequate provisions to prevent sources within a state from contributing significantly to nonattainment in downwind states.

Finding that interstate transport of SO_2 and NOx contributes significantly to ozone and $PM_{2.5}$ nonattainment in the majority of eastern states, EPA issued the Clean Air Interstate Rule (CAIR) in March 2005 to mitigate the problem. CAIR was based on a series of determinations by EPA with respect to pollution transport, cost-effective pollution control, and compliance feasibility. These determinations were made within the State Implementation Plan process of Sections 110(k)(5) and 110(a)(2)(D) of the Clean Air Act.

Significant Contribution

The pivotal findings by EPA in the rule were that SO_2 and NOx emissions from 23 states and the District of Columbia contribute to unhealthy levels of fine particles in downwind states, and NOx emissions in 25 eastern states and the District of Columbia contribute to unhealthy levels of ozone in downwind states. These determinations defined the geographic scope of the rule.

EPA conducted a series of modeling runs to determine the contribution various upwind states are projected to make to areas in the eastern United States projected by EPA to be in nonattainment in 2010 and 2015. For ozone nonattainment, a "significant contribution" was defined by EPA as the product of three factors: (1) the actual amount of transported pollution from upwind states that contributes to nonattainment in downwind states; (2) how often contributions over specific thresholds occur; and (3) the comparative amount of the upwind transported contribution to the total nonattainment situation in the downwind area.[11] For the ozone NAAQS, EPA modeled the emissions impact of the 31 states east of or bordering the Mississippi River on 40 eastern downwind counties projected by EPA to be in nonattainment in 2010. States whose maximum contribution was estimated at less than 2 parts per billion (ppb)[12] and/or that contribute less than 1% to total nonattainment were screened out. After evaluating the remaining eastern states on the three criteria, 25 states and the District of Columbia were found to make a significant contribution to nonattainment.[13] These states constitute the region covered under the CAIR seasonal NOx cap.[14]

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[11] Environmental Protection Agency, *Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule); Revisions to Acid Rain Program; Revisions to the NOx SIP Call; Final Rule*, 70 *Federal Register* 25162-25405 (May 12, 2005), p. 25246 (hereinafter cited as *Clean Air Interstate Rule*).

[12] The ozone NAAQS, at the time, was 0.08 parts per million, which, allowing for rounding, was 85 ppb. It was reduced to 75 ppb by a rule promulgated in March 2008, but EPA agreed to reconsider that action in September 2009. The agency subsequently proposed to reduce the primary ozone NAAQS to somewhere in the range of 60 to 70 ppb (75 *Federal Register* 2938, January 19, 2010).

[13] For modeling purposes, the District of Columbia's emissions were combined with those of Maryland. *Clean Air*

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For the $PM_{2.5}$ NAAQS, EPA modeled the emissions impacts of 37 eastern states on 62 eastern downwind counties projected by EPA to be in nonattainment in 2010.[15] Because the controlling 1997 $PM_{2.5}$ NAAQS is an annual standard, EPA considered only two of the three factors in determining significant contribution: actual amount of transported pollution and comparative amount.[16] In the proposed rule, EPA suggested that the threshold for determining significant contribution be 0.15 micrograms per cubic meter ($\mu g/m^3$)—1% of the annual standard of 15 $\mu g/m^3$. In the final rule, EPA settled on 0.2 $\mu g/m^3$ as the threshold.[17] Based on that threshold, EPA found 23 states and the District of Columbia were projected to contribute significantly to 2010 $PM_{2.5}$ nonattainment. These states constitute the region covered under CAIR's annual NOx and SO_2 caps.

Regional Cap/State Budget

With a determination of significant contribution, CAIR moved toward developing a cost-effective remedy. Arguing a need to base its remedy on "highly cost-effective reductions," EPA examined the potential balance of local control to interstate controls along with the availability and timing of cost-effective pollution control measures in upwind states. Projecting nonattainment areas in 2010, EPA concluded in the proposed rule that for many $PM_{2.5}$ nonattainment areas:

> it would be difficult, if not impossible, to reach attainment unless transport is reduced to a much greater degree and over a much broader regional area than by the simultaneous adoption of local controls within specific nonattainment areas. In addition, we found that much of the air quality improvement that did occur in downwind areas with this strategy was due to reductions in transported sulfate attributable to upwind SO_2 emissions.[18]

EPA conclusions with respect to ozone nonattainment areas were less dramatic, but still significant enough for EPA to conclude that further regional reductions were warranted.[19]

Calling for a combination of local and interstate transport control, EPA's CAIR rulemaking developed criteria for determining "highly cost-effective" transport control levels. SO_2 and NOx are emitted by a variety of sources. Sulfur dioxide is primarily emitted by stationary sources, particularly coal-fired electric generators (69% of the total SO_2 emissions in 2003) and industrial combustion (14% of the total in 2003).[20] In the case of nitrogen oxides, mobile sources are the

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Interstate Rule, p. 25249.

[14] In addressing the effect of interstate transport on ozone pollution, CAIR established a summer season ("seasonal") cap on emissions, because ozone forms primarily through atmospheric reactions among NOx and other pollutants in the presence of sunlight and warm temperatures.

[15] *Clean Air Interstate Rule*, p. 25247.

[16] Environmental Protection Agency, *Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Interstate Air Quality Rule); Proposed Rule* (69 *Federal Register* 4566-4650), p. 4608. (Hereafter cited as *Proposed Interstate Air Quality Rule*.) Note: EPA changed the name of the rule from the Interstate Air Quality Rule (IAQR) to the Clean Air Interstate Rule (CAIR) between the time of proposal and the rule's promulgation.

[17] *Clean Air Interstate Rule*, p. 25246.

[18] *Proposed Interstate Air Quality Rule*, p. 4582.

[19] Specifically, EPA modeling indicated that from 22% to 96% of projected 2010 nonattainment of the eight-hour ozone NAAQS is due to transported pollution, depending on the specific area. *Proposed Interstate Air Quality Rule*, p. 4584.

[20] Based on EPA data for 2003. See http://www.epa.gov/ttn,chief/trends/. The website provides data through 2008, but (continued...)

primary source (55% of the total in 2003), although stationary sources, particularly electric generators (22% of the total in 2003) and industrial combustion (14% of the total in 2003), make substantial contributions to the overall totals. Generally arguing that electric generators provided the most cost-effective emission reduction source and that data were lacking on other stationary sources, EPA focused on reductions from electric generators to determine emission caps. In contrast, for an earlier regional cap-and-trade program (the NOx SIP Call, promulgated in the late 1990s), large industrial combustion sources were included in EPA's cost-effectiveness calculations.

Focusing on electric generators greater than 25 megawatts (MW), EPA developed a threshold for controlling transported pollutants by comparing the average and marginal costs of other SO_2 and NOx regulatory actions, along with other factors. Finding the electric generating control technologies to be "highly cost-effective," EPA determined the final regionwide caps for affected states by assuming these control technologies were installed on electric generators.

Based on the assumption that states would solely target electric generators for control, EPA proceeded to determine the appropriate individual statewide emission budgets. Under the SIP process, states are not required to adopt an electric-generator-only strategy in complying with their emissions budgets; however, they must do so if they choose to participate in the EPA-sponsored regional trading program set up under the model rule.

Interaction with the Title IV Program

Since 1990, EPA has been implementing a regional cap-and-trade program to control SO_2 emissions that cause acid rain under Title IV of the Clean Air Act. Because the Title IV program is both statutory and successful, EPA felt it needed to protect the program, thus limiting its ability to suggest alternative allocation schemes for emission allowances under CAIR.[21] Based on the assumption that states would solely target electric generators for control, EPA proceeded to determine CAIR's appropriate statewide emission budgets by melding CAIR's allocation scheme into the existing Title IV acid rain program. With both programs based on electric generators, one effect of this allocation scheme is to continue the grandfathering of pre-1990 existing plants under CAIR.[22] EPA recognized this, but argued that maintaining the integrity of the Title IV program prevented it from pursuing alternative allocation schemes that might have provided relief to newly constructed sources.

Interaction with the NOx SIP Call

EPA's other regional cap-and-trade program, designed to control NOx emissions, is the Ozone Transport Rule, which EPA finalized on October 27, 1998,[23] and which the D.C. Circuit Court of

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EPA's CAIR decisions were based on earlier data.

[21] *Clean Air Interstate Rule*, p. 25229.

[22] Under Title IV, pre-1990 existing plants are allocated allowances to pollute based on a specified emission rate times their historic average fuel consumption. New (post-1990) facilities are not allocated any allowances: they must purchase allowances in EPA auctions or from pre-1990 plants that are using fewer allowances than they were allocated.

[23] Environmental Protection Agency. *Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone*. Rule. 63 *Federal* (continued...)

Appeals upheld (with some modifications) on March 3, 2000.[24] The rule required 21 eastern states[25] and the District of Columbia to submit state implementation plans (SIPs) to address regional transport of ozone under the 1997 1-hour ozone standard, which is why the rule is known as the NOx SIP Call. As issued, the rule called for increased controls on NOx, focusing particularly on emissions from electric utilities and large combustion sources. To achieve the necessary reductions, EPA stipulated emission budgets for each of the affected states, with each state free to decide on what controls to use to maintain emissions within those budgets. EPA also encouraged the formation of a regional cap and trade program to implement the NOx reductions through a model program, which all participating states agreed to join.

Unlike EPA's approach with the SO_2 program and despite its emphasis on using NOx SIP methodology in developing CAIR, the annual CAIR NOx cap-and-trade scheme differs significantly from the NOx SIP Call in terms of the state budget determined and the scope of participants. EPA's choice of focusing only on electric generators runs counter to the cost-benefit analysis, the recommendations of the Ozone Transport Assessment Group (OTAG), and EPA's NOx SIP Call.[26] OTAG's recommendations to EPA with respect to the NOx SIP Call called for NOx controls on large and medium non-utility stationary sources in addition to controlling utility sources. In the final NOx SIP Call, EPA calculated state emission budgets based on five sectors: electric utility, nonutility sources, area sources, nonroad engines, and highway vehicles. Budgets were based on cost-effective reductions, with substantial reductions required from electric generators and from nonutility sources. Indeed, EPA used a 70% reduction requirement for large industrial facilities and Reasonably Available Control Technology (RACT) control (generally 25%-50%) for smaller sources.[27] In CAIR, arguing a lack of data, EPA generally released the other stationary source components from the rule. EPA notes it had sufficient data in 1997 to propose a NOx SIP Call that included these sources, but argues it didn't have sufficient data in 2005 to include these sources in CAIR because of the increased geographic scope of CAIR and its inclusion of SO_2.[28]

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Register 57356-57538 (October 27, 1998).

For the rule as proposed, see Environmental Protection Agency. *Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone*. Notice of proposed rulemaking. 62 *Federal Register* 60317-60421 (November 7, 1997).

[24] Michigan v. U.S. EPA, 213 F.3d 663 (D.C. Cir. 2000).

[25] There were 22 states included in the original rule: Alabama, Connecticut, Delaware, Georgia, Illinois, Indiana, Kentucky, Massachusetts, Maryland, Michigan, Missouri, North Carolina, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, Wisconsin, and West Virginia. In ruling on the applicability of the Ozone Transport Rule under the 1-hour ozone standard, the court removed one state (Wisconsin) and parts of two others (Missouri and Georgia) from the scope of the rule, but left its requirements in place for the other 19 states.

[26] OTAG was created by EPA and the 37 easternmost states under the 1990 Clean Air Act Amendments to recommend ways of reducing ozone transport in the northeastern part of the country. Final recommendations were made in 1997.

[27] Specifically, for utility sources, EPA used a NOx emission rate of 0.15 lb. NOx/mmBtu to determine budget allocations. For area sources, EPA assumed no new controls. For nonutility sources, EPA used a 70% reduction requirement for large sources, and RACT controls (generally 25%-50%) for smaller sources. EPA calculated the highway vehicle budget by assuming implementation of existing SIPs, along with the following federal measures: national low emission vehicle standards, 2004 heavy-duty engine standards, and revisions to emissions test procedures. Finally, EPA calculated the budget for nonroad engines assuming implementation of existing SIPs, along with the following federal measures: federal small engine standards (Phase II), and 1997 proposed nonroad diesel engine standards. See proposed Ozone Transport Rule and Appendix B (OTAG Recommendations), 62 *Federal Register* 60318-60420 (November 7, 1997).

[28] *Clean Air Interstate Rule*, p. 25214.

The Court's Decision

No fewer than 32 petitions for review of CAIR were consolidated in *North Carolina v. EPA*. On July 11, 2008, the D.C. Circuit found several of the key challenges valid. Noting that EPA regards CAIR as one integrated action, the court decided against voiding only the successfully challenged portions. Rather, it vacated the entire rule (and its associated Federal Implementation Plan) and remanded it to EPA.

With regard to North Carolina's challenges, the court ruled that CAIR's emissions trading program for SO_2 and NOx violates CAA Section 110(a)(2)(D)(i)(I). This provision addresses downwind states, such as North Carolina, whose achievement of NAAQS is interfered with by emission sources in upwind states. It requires SIPs to—

> prohibit[], consistent with the provisions of [CAA Title I, governing stationary sources of emissions], any source or other type of emissions activity within the State from emitting any air pollutants in amounts which will ... contribute significantly to nonattainment in, or interference with maintenance by, any other State with respect to any [NAAQS].

The court found the CAIR trading program unlawful in assuring only that no *entire region* will "contribute significantly," while Section 110(a)(2)(D)(i)(I) requires that *each state's* sources not "contribute significantly." (For similar reasons, the court noted that the NOx SIP Call's emissions trading program might have been judicially invalidated, had this argument been raised in the case challenging the program.[29]) The court also found unacceptable that CAIR attributed no significance to the "interference with maintenance" prong of Section 110(a)(2)(D)(i)(I) independent of the "contribute significantly to nonattainment" prong. As CAIR would have it, only states that satisfy the nonattainment prong can also satisfy the maintenance prong, rendering the latter a nullity. North Carolina's final successful argument was that CAIR's 2015 deadline for upwind states to eliminate their "significant contribution" to downwind nonattainment again ignores Section 110(a)(2)(D)(i)(I). That provision requires compliance "consistent with ... [Title I]," which imposes compliance deadlines for downwind states in 2010. Finally, the court elected not to pass judgment on the lawfulness of the NOx Compliance Supplement Pool (200,000 extra allowances as a reward for early reductions), though suggesting that EPA would need to revise it on remand.

As to the challenges by electric utility companies, the court agreed first that EPA had improperly set states' budgets for SO_2 and NOx in the CAIR emissions trading program. For example, in basing the budgets on the number of allowances that a state's EGUs receive under the CAA's acid rain program (Title IV), the budgets fail to track the requirements of Section 110(a)(2)(D)(i)(I) above. Second, the court found EPA's use of adjustment factors that gave smaller budgets to states with mostly natural-gas- or oil-fired EGUs to be inconsistent with Section 110(a)(2)(D)(i)(I) as well, and thus arbitrary and capricious. Third, the court agreed with the utilities that EPA's effort to reconcile CAIR's regulation of SO_2 with the existing program for trading SO_2 allowances under Title IV was unlawful. The court found nothing in Section 110(a)(2)(D)(i)(I) or other law giving EPA authority to, as CAIR proposed, remove some Title IV allowances created by CAIR from the Title IV market. Fourth, the court approved Minnesota Power's argument that EPA had

[29] Michigan v. EPA, 213 F.3d 663 (D.C. Cir. 2000). It is too late now to challenge the 1998 NOx SIP Call rule. CAA Section 307(b), 42 U.S.C. Section 7607(b), requires that petitions for review of the rule be filed within 60 days after the rule is promulgated in the *Federal Register*.

overstated the state's downwind contribution to $PM_{2.5}$ (thereby pushing the state over the threshold for inclusion in CAIR). The argument, said the court, requires a response from EPA on remand.

North Carolina v. EPA is an immersion in regulatory program detail involving little in the way of broad legal principles. The court simply juxtaposed what the CAA (chiefly, Section 110(a)(2)(D)(i)(I)) requires and what CAIR said, and in several key respects found the latter deficient. Nor did the court feel obliged to defer to EPA's views, possibly because it saw the CAA (chiefly, Section 110(a)(2)(D)(i)(I)) as speaking unambiguously to many of the issues raised by petitioners.

In response to the court's decision, EPA requested reconsideration. Alternatively, EPA requested that the CAIR rule be allowed to continue in effect while the agency developed a replacement program that satisfied the court's July 2008 decision. On December 23, 2008, the court adopted the latter, leave-the-rule-in-effect course, noting that vacating the old rule would defeat protection of the environmental values that the rule was designed to preserve.[30] The court did not impose a specific deadline on EPA's development of the replacement rule. But it did say that it was not granting an indefinite stay of its July 2008 decision—that in the event EPA does not modify CAIR consistently with that decision, petitioners may sue again. The agency has, since then, begun development of a Clean Air Transport Rule to replace CAIR. The replacement rule was proposed in July 2010, and EPA has indicated that it will finalize the rule by summer 2011.

The Proposed Clean Air Transport Rule

On July 6, 2010, EPA proposed a replacement for CAIR, the Clean Air Transport Rule.[31] The transport rule would leave the CAIR Phase 1 limits in place and would set new limits replacing CAIR's second phase in 2012 and 2014, up to three years earlier than CAIR would have.

The proposed transport rule would build on the reductions already achieved by the CAIR Phase I rules.[32] It would establish a second and third phase of reductions in 2012 and 2014, with particular emphasis on SO_2—emissions of which would decline to 3.8 million tons (62% below 2005 levels) in 2014. The proposed rule would cover 31 Eastern, Midwestern, and Southern states and the District of Columbia, adding three new states (Oklahoma, Kansas, and Nebraska) to the 28 covered by CAIR. The rule would allow unlimited trading of allowances within individual states, but it would limit interstate trading in order to comply with the D.C. Circuit's ruling. In order to insure that the rule is implemented quickly, EPA proposed a Federal Implementation Plan (FIP) for each of the states: the FIP specifies emission budgets for each state based on controlling emissions from electric power plants. States may develop their own State Implementation Plans

[30] 550 F.3d 1176 (D.C. Cir. 2008).

[31] The proposal appeared in the *Federal Register* August 2, 2010. The rule, a Fact Sheet, a Regulatory Impact Analysis, and an overview presentation can be found on EPA's website at http://www.epa.gov/airtransport/actions.html#jul10.

[32] The CAIR Phase 1 rules already appear to be having substantial effects. On August 11, 2010, EPA reported that emissions of SO_2 had declined sharply in both 2008 and 2009: in the latter year, emissions from fossil-fueled power plants in the lower 48 states (at 5.7 million tons) were 44% below 2005 levels. NOx emissions from the same sources declined to 1.8 million tons in 2009, a decline of 45% compared to 2005. Further reductions of both SO_2 and NOx can be expected as Phase 1 takes effect. Data are from EPA's "2009 Acid Rain Program Emission and Compliance Data Report," August 11, 2010, at http://www.epa.gov/airmarkets/progress/ARP09.html.

and choose to control other types of sources if they wish, but the federal plan will take effect until the state acts to replace it.

The proposed transport rule responds to the Court's decisions in four areas. First, the methodology used in the proposal to measure each state's significant contribution to non-attainment in another state uses state-specific data to emphasize air quality considerations, along with consideration of cost impacts. Second, the state budgets for SO_2 and NOx (both annual and seasonal) are linked directly to the data measurements of that state's significant contribution to non-attainment downwind and interference with maintenance of downwind state attainment. Third, the proposed compliance deadlines are coordinated with the CAA's compliance deadlines for the appropriate NAAQS.

Fourth, and perhaps most important, the proposal outlines a "preferred option" to allow affected entities to use intrastate trading and limited interstate trading in their compliance strategies, beginning in 2014. This last response is an attempt by EPA to preserve at least some of the compliance flexibility and cost savings of emissions trading in the transport rule while addressing the concerns of the court. Under the limited interstate trading option, EPA would conduct an air quality assessment of a state's emissions level at the end of each year. If a state's emissions were below its budget, EPA would do nothing as the state would be considered in compliance. If a state's emissions were above the budget because of substantial interstate buying of emission reductions by some of its entities, then EPA would investigate which entities within the state were responsible for the overage, and require those affected entities to surrender sufficient credits to offset the overage. Apparently, EPA is not sure this limited approach to interstate trading will satisfy the court and has included two alternative approaches in its proposed rule that would not allow any interstate trading.

EPA expects to finalize the rule in the summer of 2011. The agency also stated an "ongoing commitment" to consider upwind contributions of pollution to nonattainment when implementing any future NAAQS revisions. Because the agency is near finalizing more stringent ambient air quality standards for ozone (currently expected by the end of July 2011), and $PM_{2.5}$ (expected to be proposed in 2011, as well), it stated its intention to propose another transport rule in the summer of 2011 to address any additional emission reductions needed to meet those new standards.

Issues

Problems Facing Nonattainment Areas

Whatever path EPA chose to follow, the areas designated nonattainment for ozone and $PM_{2.5}$—a significant portion of the eastern United States—face choices of their own. As of June 2008, 132 million people in 293 counties lived in areas designated nonattainment for the ozone standard. Seventy percent of the total (about 93 million people) lived in the eastern half of the country, where EPA had identified CAIR as a key step toward improving ozone air quality.

Under the fine particle ($PM_{2.5}$) standard, 208 counties with a combined population of more than 90 million were designated nonattainment. Except for Los Angeles and the San Joaquin Valley in California, virtually all of these people and counties were in areas where air quality will be improved by implementation of CAIR. As with ozone, EPA identified CAIR as a key component

of State Implementation Plans to attain the $PM_{2.5}$ standard. EPA estimated that about half of the SIPs had been submitted by July 2008, with the remainder expected in the months to follow.[33] The court decision added uncertainty to this process, causing states to reconsider plans already submitted and those pending submission.

Further complicating issues associated with achieving attainment of the $PM_{2.5}$ NAAQS promulgated in 1997, the EPA promulgated revisions to the NAAQS for particulate matter on October 17, 2006,[34] primarily a tightening of the 1997 standard for $PM_{2.5}$. The tightening of the $PM_{2.5}$ standards[35] increased the number of areas in nonattainment, and will likely mean that areas already designated nonattainment under the 1997 standard will need to adopt more stringent control measures to reach attainment. SIPs for the new 2006 PM NAAQS will be due in April of 2012; under the CAA, states are required to meet the new standard "as expeditiously as practicable," but no later than five years from the date of final nonattainment designations—April 2014. Given the historical delays in implementing the 1997 standards, some stakeholders have advocated leapfrogging to implementation of the 2006 standards instead.

Similarly, for ozone, EPA strengthened the NAAQS in March 2008. This set in motion a new round of nonattainment area designations and SIP revisions, even though 293 counties had not attained the old standard, with most SIPs to attain that old standard still under review by EPA.

States are required to submit SIPs to EPA outlining their strategy for complying with the $PM_{2.5}$ and ozone NAAQS, including provisions to prevent sources within their states from contributing significantly to nonattainment in downwind states. Under the Administration's approach to the SIPs, implementation of CAIR would have met the interstate transport (downwind state) provision of Section 110(a)(2)(D). The remand of CAIR could mean that SIPs from downwind states would be inadequate if they assumed the CAIR reductions in interstate transport of pollutants. SIPs from upwind states, on the other hand, could be inadequate if they don't prevent downwind nonattainment: the Clean Air Act makes clear that states are to impose controls on stationary sources of pollution that contribute significantly to downwind nonattainment or interfere with the maintenance of air quality standards in other states. This provision of the statute has been widely disregarded in the past, with little EPA effort (other than regional cap-and-trade programs) to address it. This reluctance to act can be challenged through Section 126 petitions.

Section 126 Petitions

Under Section 126 of the Clean Air Act,[36] which addresses interstate pollution abatement, any state or political subdivision may petition the EPA Administrator for a finding that a major source or group of sources is violating the act's prohibition of emissions contributing significantly to nonattainment or interfering with the maintenance of attainment in another state.[37] EPA has 60

[33] States were required to submit SIPs for the 1997 $PM_{2.5}$ NAAQS by April 2008 (three years after the effective date for the final geographic nonattainment designations).

[34] 71 *Federal Register* 61143-61233 (October 17, 2006). See CRS Report RL34762, *The National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM): EPA's 2006 Revisions and Associated Issues*, by (name redacted) and (name redacted).

[35] The new daily standard averaged over 24-hour periods is reduced from 65 $\mu g/m^3$ to 35 $\mu g/m^3$. 71 *Federal Register* 61143-61233 (October 17, 2006).

[36] 42 U.S.C. § 7426, or visit http://www.epa.gov/air/caa/caa126.txt.

[37] The prohibition is found in CAA Section 110(a)(2)(D)(i).

days to make a finding in response to such a petition. If the Administrator found that out-of-state sources were significantly contributing to an area's nonattainment, the out-of-state sources would have to shut down within three months unless EPA imposed emission limits and a compliance schedule of not more than three years.

EPA has never granted a Section 126 petition in the manner outlined by the statute. Most recently, it denied a 2004 petition from the State of North Carolina, arguing in part that CAIR was a better mechanism for addressing the interstate transport of pollution to which North Carolina was subject than was the state's petition under Section 126. North Carolina challenged this denial in court.[38] Its challenge was initially stayed pending the outcome of the CAIR suit, but with the decision in that suit, the challenge was reactivated. Oral argument was scheduled for March 12, 2009, but as that date approached, EPA asked the D.C. Circuit to remand the North Carolina petition to the agency for reconsideration, a step the court agreed to on March 5, 2009.

A decision in favor of North Carolina's Section 126 petition might be expected to bring on additional Section 126 petitions from other states. Indeed, in December 2008, Delaware petitioned the agency under Section 126 to impose emission controls on electric generating units in nine other states.

Impetus for Multi-Pollutant Legislation

The remand of CAIR and the vacating and remand of a companion rule targeting mercury (the Clean Air Mercury Rule, CAMR)[39] have raised again the argument for a multi-pollutant strategy with respect to the electric utility industry—a framework based on a consistent set of emissions caps, implemented through emission trading. Such an approach would not resolve all the issues surrounding CAIR, particularly if limited to the electric utility industry, and would raise issues of its own: How stringent should the emission caps be? What is an appropriate schedule for their introduction? How should they relate to existing CAA provisions? Should carbon dioxide be included with SO_2, NOx, and mercury control programs?

In the 110th Congress, there were several bills introduced in Congress to impose emission caps on electric utility emissions of these four pollutants.[40] The vacating of CAIR increased the focus on this legislation, but the court's December 23, 2008, ruling eliminating the vacatur lessened interest in such an approach. In the 111th Congress, Senator Carper, with a bipartisan group of 15 senators, sponsored S. 2995, a bill addressing electric generating unit emissions of two pollutants (SO_2 and NOx) through cap-and-trade programs, and a third (mercury) through imposition of Maximum Achievable Control Technology limits.

Complicating the matter during the 111th Congress was the decision of the Obama Administration and the congressional leadership to move forward with legislation to control greenhouse gas (GHG) emissions economy-wide. Since electric generating units account for about 40% of U.S. emissions of carbon dioxide, the principal GHG, legislation separately addressing three other pollutants from the same category of sources seemed unlikely.

[38] Sierra Club v. EPA, No. 06-1221 (D.C. Cir. filed June 23, 2006).

[39] New Jersey v. EPA, 517 F.3d 574 (D.C. Cir. 2008).

[40] For a comparison of legislation, see CRS Report RL34018, *Air Quality: Multi-Pollutant Legislation in the 110th Congress*, by (name redacted) and (name redacted).

Thus, no action was taken on S. 2995. As of May 2011, similar legislation has not been introduced in the 112th Congress.

Conformity and Sanctions

The Clean Air Act does not impose formal penalties on nonattainment areas for failing to attain air quality standards. Rather, it penalizes areas that fail to submit and implement adequate plans—plans that identify emission control measures that, when modeled, show that the area will have reduced emissions sufficiently to reach the standards. Many of the most recent SIPs have, with EPA's approval, counted on the reductions projected from implementation of CAIR. As noted earlier, in the CAIR proposal, EPA stated: "(I)t would be difficult, if not impossible, to reach attainment unless transport is reduced to a much greater degree and over a much broader regional area than by the simultaneous adoption of local controls within specific nonattainment areas."[41] Without CAIR, these SIPs would no longer have demonstrated attainment.

Thus, as EPA began work on a CAIR replacement rule (the "Clean Air Transport Rule"), a major consideration has been whether the reductions it requires will be sufficient for most ozone and particulate matter nonattainment areas to reach attainment. Further complicating this question, EPA agreed over the course of 2009 to reconsider the NAAQS for ozone, proposing to further strengthen it in a *Federal Register* notice January 19, 2010.[42] Also, as a result of decisions by the D.C. Circuit Court of Appeals, the agency has reconsidered both the SO_2 and particulate matter NAAQS: the SO_2 standard was strengthened June 22, 2010. Nonattainment areas are to be designated by June 2012. The review of the PM NAAQS is still ongoing; a proposal is expected later in 2011.[43] A strengthening of any of these standards has implications for the Clean Air Transport Rule.

Mercury Emissions

Although CAIR applied only to SO_2 and NOx, EPA has made clear since it proposed the rule in 2003 that it expected the scrubbers and NOx controls installed for CAIR compliance to be the means by which most electric utilities would reduce mercury emissions. The agency did promulgate a Clean Air Mercury Rule (CAMR) at the same time as CAIR, through which it would have established a cap-and-trade program for EGU mercury emissions. But CAMR was vacated by the D.C. Circuit in February 2008.[44] Without CAIR, the agency would be left with no controls on mercury emissions from powerplants.

Coal-fired powerplants are responsible for about half of total U.S. emissions of mercury, according to EPA, and are, by far, the largest uncontrolled mercury emission source. Mercury

[41] *Proposed Interstate Air Quality Rule*, p. 4582.

[42] 75 *Federal Register* 2938. In this January *Federal Register* notice, EPA proposed to set the primary NAAQS somewhere in a range of 60 to 70 parts per billion, versus the 2008 standard of 75 ppb. When CAIR was promulgated in 2005, the ozone NAAQS was 0.08 parts per million, which, due to rounding, allowed areas with readings as high as 84 ppb to be considered in attainment of the standard. For additional information on the ozone NAAQS, see CRS Report R41062, *Ozone Air Quality Standards: EPA's Proposed Revisions*, by (name redacted).

[43] For additional information on these standards, see CRS Report R41563, *Clean Air Issues in the 112th Congress*, by (name redacted), Table 1.

[44] New Jersey v. EPA, 517 F.3d 574 (D.C. Cir. 2008).

pollution is widespread; it deposits in water bodies where it is converted to methylmercury and is taken up in the food chain.[45] The Clean Air Act requires that major sources of mercury meet standards based on EPA's determination of the Maximum Achievable Control Technology (MACT) available to such sources. EPA sought to avoid imposing MACT on coal-fired powerplants by substituting the CAIR and CAMR control programs, which it argued would produce more cost-effective controls.[46]

EPA could have appealed the court's ruling: under the Bush Administration, on October 17, 2008, it petitioned for certiorari to the Supreme Court.[47] But the Obama Administration withdrew the petition in early February 2009, announced that it will proceed with the development of MACT standards,[48] and subsequently reached a consent agreement under which it would propose MACT standards for electric generating units (EGUs) by March 2011 and finalize them by November of the same year. The proposed standards were released on March 16, 2011. In general, they require a 91% reduction in uncontrolled mercury emissions from powerplants.[49]

Impact on Regional Haze Rule

Section 169A(a)(1) of the CAA sets "as a national goal the prevention of any future, and the remedying of any existing, impairment to visibility" in designated "class I areas" (e.g., national parks and wilderness areas).[50] It requires 26 categories of major stationary sources of pollution—including EGUs—in existence on the date of the section's enactment (1977), but not more than 15 years old as of that date, to install "best available retrofit technology" (BART) if the state determines the source may reasonably be anticipated to cause or contribute to any impairment of visibility in any class I area. In 2005, EPA made a final determination to exempt EGUs subject to the CAIR trading program from the Section 169A visibility BART program.[51] With the CAIR rule in limbo, states have had to submit proposed SIPs to EPA without knowing the ultimate disposition of CAIR. On January 9, 2009, the EPA published a notice finding that 37 states, the District of Columbia, and the Virgin Islands failed to submit all or a portion of their regional haze SIP.[52] Failure to make BART determinations was one of the requirements some states failed to include.

[45] Forty-eight states have fish-consumption advisories for mercury in their freshwater lakes and/or rivers (23 of these advisories cover every water body in the state); and 13 states have statewide mercury advisories in their coastal waters. About 60% of the U.S. coastline (excluding Alaska) is under fish consumption advisories for mercury. See U.S. EPA, Office of Water, "Fact Sheet: 2005/2006 National Listing of Fish Advisories," July 2007, pp. 4-5, at http://www.epa.gov/waterscience/fish/advisories/2006/tech.pdf.

[46] For additional information on CAMR, see CRS Report RS22817, *The D.C. Circuit Rejects EPA's Mercury Rules: New Jersey v. EPA*, by (name redacted) and (name redacted).

[47] 77 U.S.LW 3253 (No. 08-512).

[48] Withdrawal of EPA's petition for certiorari left a separate petition filed by the Utility Air Regulatory Group before the Court. The Court denied that petition, February 23, 2009.

[49] For a link to the proposed rule as well as explanatory material, see U.S. EPA, "Reducing Toxic Air Emissions from Power Plants," at http://www.epa.gov/airquality/powerplanttoxics/actions.html.

[50] 42 U.S.C. § 7491(a)(1).

[51] 70 *Federal Register* 39137 (July 6, 2005).

[52] Environmental Protection Agency, "Finding of Failure to Submit State Implementation plans Required by the 1999 Regional Haze Rule," 74 *Federal Register* 2392 (January 15, 2009).

Conclusion

The *North Carolina v. EPA* decision left EPA's strategy for achieving attainment of the ozone and $PM_{2.5}$ NAAQS in serious disarray. CAIR was the lynchpin that held together EPA's strategy for attainment of the ozone and fine particulate NAAQS, for achieving reductions in mercury emissions from coal-fired powerplants, for addressing regional haze impacts from powerplants, and for responding to state petitions under Section 126 of the Clean Air Act with respect to the ozone and fine particulate NAAQS.

The D.C. Circuit, on EPA's motion, reversed its decision to vacate CAIR while EPA is developing a replacement rule. The court, however, left the substantive requirements of its July 2008 decision fully intact. That decision strongly suggests that there is no simple "fix" that would make CAIR acceptable to the court. This left EPA with three clear options: (1) starting over with a new strategy to mitigate transported air pollutants based on the decision; (2) allowing the states to sort out the issue through Section 126 petitions; or (3) seeking new legislation providing EPA with the statutory authority to either implement CAIR in some form, or an alternative. EPA is proceeding with the first of these options and expects to propose a new Clean Air Transport Rule in April 2010.

For Congress, the decision raises several issues:

- Should Congress consider providing EPA with the authority to implement CAIR or other cost-based, market-oriented approaches to address NAAQS?
- Should Congress consider multi-pollutant legislation as a supplement or substitute for the current regulatory regime, at least for electric generating units?
- Should Congress consider a more comprehensive revision to the Clean Air Act to address not only ozone and $PM_{2.5}$ NAAQS non-attainment, but also mercury emissions from coal-fired powerplants, and emerging environmental issues such as climate change?

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