BEFORE THE
CLEAN AIR SUBCOMMITTEE OF
THE ENVIRONMENT AND PUBLIC WORKS COMMITTEE
UNITED STATES SENATE

OVERSIGHT: EPA'S PROPOSAL FOR FEDERAL IMPLEMENTATION PLANS TO REDUCE INTERSTATE TRANSPORT OF FINE PARTICULATE MATTER AND OZONE

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July 22, 2010

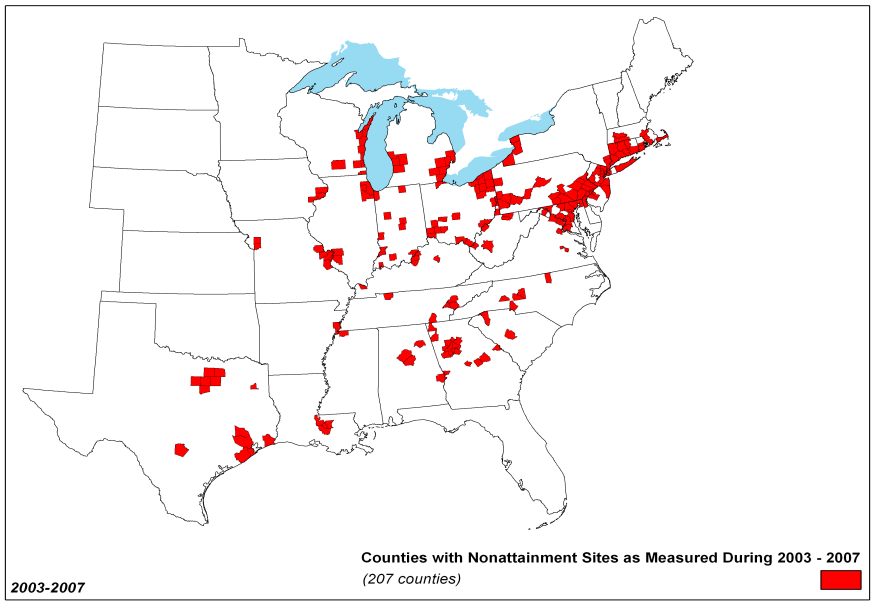
Summary of Testimony

Mr. Chairman, ranking member Vitter, members of the Clean Air Subcommittee of the Senate Environment and Public Works Committee, good morning. My name is Conrad Schneider, Advocacy Director of the Clean Air Task Force. I appreciate the opportunity to speak to you today. Based in Boston, the Clean Air Task Force is a national non-profit, environmental advocacy organization whose mission includes reducing the adverse health and environmental impacts of coal-fired electric generating plants. Our staff and consultants include scientists, economists, MBA's, engineers, and attorneys.

The first thing I want to do is bring you some good news regarding the substantial progress that has been made in reducing power plant sulfur dioxide pollution in the last five years. In 2004, sulfur dioxide emissions nationally were 11 million tons per year. Last year, they had fallen to 5.6 million tons. That is a cut of 50 percent in five years. The cause? A combination of: (1) New Source Review enforcement actions brought by EPA and several states that resulted in requiring sulfur scrubbers on power plants whose owners had illegally extended their useful lives without upgrading their emissions controls to meet Best Available Control Technology ("BACT"); (2) state regulations in nearly two dozen states that required older plants to install modern pollution controls; and (3) compliance with the Clean Air Interstate Rule's (CAIR) requirements. The economic recession did not cause the reductions. Installation of 130 scrubbers did. Health researchers estimate that reductions of this magnitude save tens of thousands of lives per year. And note that these reductions came without any noticeable increase in electricity prices, electricity bills, switching to natural gas, and without raising any reliability concerns whatsoever.

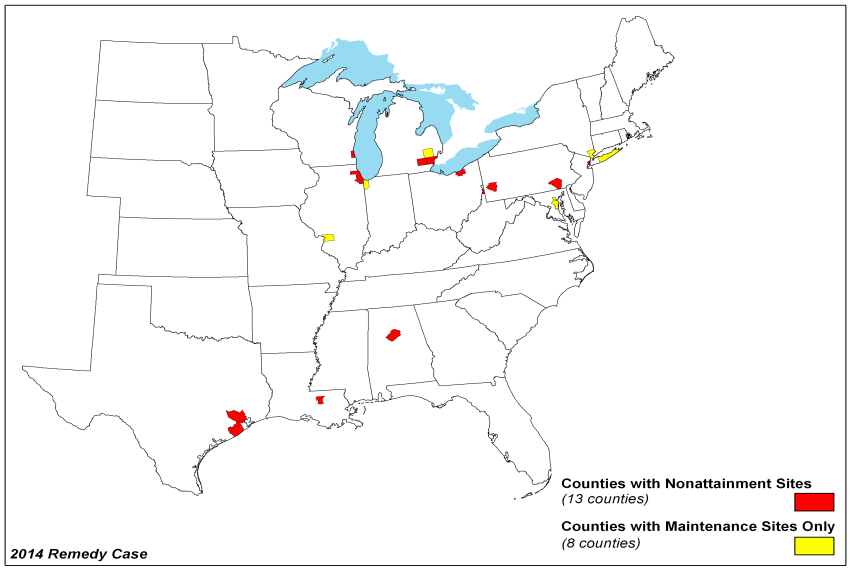
However, continued progress is now in jeopardy because the D.C. Circuit struck down the CAIR rule. Scrubbers have an operation and maintenance cost, so utilities will not run them unless they have to by law. But, even at today's pollution levels, tens of thousands of American lives will be cut short and there are still over 700 coal-fired units in the U.S. operating with no sulfur scrubber in place. It is high time that every coal-fired plant in the U.S. was well-controlled. That is why it is so important for EPA to strengthen and finalize the proposed Transport Rule. First, it will lock in the gains we have made in the last 5 years. Second, the Transport Rule goes further than CAIR in 15 states and brings many if not all nonattainment areas in the East into attainment. Senators Carper and Voinovich, as governors you used to see maps in which your states were full of red (nonattainment) counties. See Map A below.

Map A: Counties Violating Air Quality Standards in the Proposed Transport Rule Region (based on 2003-07 air quality monitoring data)



Under the EPA Transport Rule proposal, almost all the red is gone. See Map B below.

Map B: Counties with Monitors Projected to Have Ozone and PM2.5 Air Quality Problems in 2014 <u>With</u> the Proposed Transport Rule



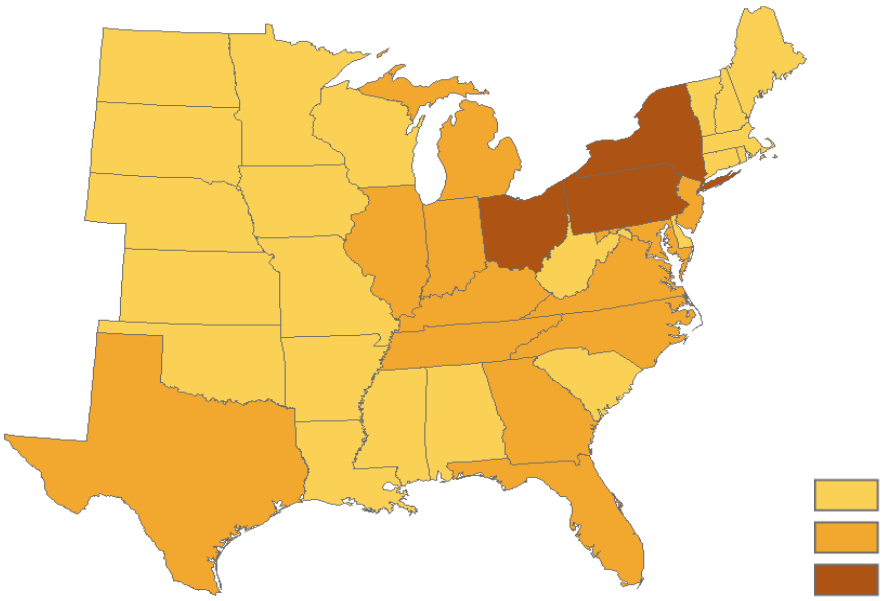
For those areas still projected to be in nonattainment in 2014 under the proposal, EPA has asked for comment on how to finish the job. CATF will be investigating that issue, but,

in general, it appears that some tightening of the Transport Rule sulfur and nitrogen caps can "get the red out" completely.

At a minimum, EPA should complete the analysis it has begun relating to persistent nonattainment areas (wintertime daily PM2.5 areas, sulfur dioxide increases in Texas and Arkansas, and ozone nonattainment or maintenance issues in Houston, Baton Rouge, and New York City). Specifically, we call on EPA to identify sources upwind of persistent daily PM2.5 nonattainment in areas such as Cleveland and Chicago and require necessary additional scrubber installations. As proposed, the rule would require only 14 GW of additional scrubbers, so there is much more that can be done. In addition, EPA should tighten the summer NOx cap in the East and explore additional nitrogen oxide reductions that may be necessary to bring Houston and Baton Rouge into stable attainment with the ozone standard. These additional controls will be required to put those areas within striking distance so that local controls can get them to attainment.

Note that the "war between the states" – that is, between the Northeast and Midwest is largely over. All the states have realized that their pollution contributes to their neighbors' nonattainment. And, somewhat ironically (but not surprisingly), Ohio is among the biggest beneficiaries of the rule with 1,300 saved lives per year, the second most health benefits from the reductions next to Pennsylvania. See map below.

Benefits of Transport Rule by State



Mortality Avoided		Monetized Benefits (billion $)	
Low	High	Low	High
0 to 400	0 to 1,000	0 to 4	0 to 10
400 to 800	1,000 to 2,000	4 to 7	10 to 15
800 to 1,400	2,000 to 3,600	7 to 12	15 to 29

In addition to supporting EPA strengthening and finalizing the Transport Rule, CATF supports passage of S. 2995, the Clean Air Act Amendments of 2010 (CAAA of 2010). Although time in the current session of Congress is running out, CATF has long favored a comprehensive legislative solution to the problem of power plant pollution covering SO2, NOx, power plant toxics as well as carbon dioxide. In producing the proposed Transport Rule to replace the CAIR rule, EPA has done an admirable job in navigating the legal minefield laid for it by the D.C. Circuit. But, we know that just as the Bush CAIR rule was challenged and struck down, so a new set of power plant regulations may founder on the shoals of court challenges and delays. To guarantee the certainty of environmental improvement that the public health and the environment demand and the regulatory certainty that the electric power industry craves, Congress should act now to pass the steep reductions in the three power plant pollutants proposed by the CAAA of 2010.

Introduced on February 4, 2010, the proposed bill would codify stringent, national caps for sulfur dioxide and nitrogen oxides while providing a crucial "backstop" for EPA's regulatory process of setting maximum available control technology ("MACT") standards for power plant air toxics. The bill enjoys broad, bi-partisan support as it is co-sponsored by 9 Democrats, 5 Republicans, and one Independent.

A comparison between the emissions benefits of the proposed CAAA 2010 and EPA's proposed Transport Rule is instructive and demonstrates that the bill would achieve far greater reductions, particularly of sulfur dioxide emissions, and thus deliver greater air quality improvements and health-related benefits. In fact, although it outperforms the Transport Rule in emissions reductions and health benefits in every year, the CAAA of 2010 delivers lower system costs, lower electricity prices, and lower natural gas prices through 2020. CATF performed this analysis based on IPM data contained in EPA's Transport Rule proposal and analysis of the CAAA of 2010 as posted on its website and in the analysis of the bill requested by Senators Carper and Vitter by letter dated April 15, 2010 and provided by EPA on July 16, 2010.

Annual Sulfur Dioxide Emissions, Lives Saved, and Monetized Benefits under Transport Rule vs. CAAA of 2010

	2012	2015	2020	2025	Through 2025
No-CAIR emissions	9.5	8.5	8.4	8.4	121.4
TR emissions	4.8	4.1	4.1	4.0	59.4
CAAA 2010 emissions	3.9	3.4	2.9	2.1	45.3
TR emissions reduced	4.7	4.4	4.3	4.4	62.0
CAAA 2010 emissions reduced	5.6	5.1	5.5	6.3	76.1
TR lives saved	14,883	14,000	13,616	13,933	196,662

CAAA 2010 lives saved	17,773	16,150	17,416	19,950	241,099
CAAA 2010 lives saved over TR	2,890	2150	3,800	6,000	44,420
Valuation of CAAA 2010 over TR	$20 billion	$15 Billion	$27 billion	$42 billion	$312 billion

Importantly, EPA's analysis of the proposed CAAA of 2010 also demonstrates that passage of the bill would result in no noticeable increase in electricity or natural gas prices, no appreciable decrease in coal generation or use, or shifts in coal production or use within coal-producing regions. See table below based on EPA's modeling.

Costs, Electricity Prices, Natural Gas Prices, and Coal Generation under the Transport Rule and the CAAA of 2010 vs. No-CAIR Base Case

	Transport Rule				CAAA of 2010				TR vs. CAAA of 2010			
	2012	2015	2020	2025	2012	2015	2020	2025	2012	2015	2020	2025
Costs (B$2006)	3.7	2.7	2	2.1	-6	-3.3	3.3	5.8	-9.7	-6.1	1.2	3.8
Electricity Price Mills/kWh	3.4	.98	.94	.54	-8.7	-3.1	5.5	12.4	-12.1	-4.1	4.6	12
Natural Gas Price $/MMBtu	.11	.03	.01	.01	-.86	-0.1	.89	.81	-.97	-.13	.91	0.8
Coal Generation 1000 GWh	-9	-18	-15	-11	-67	-250	-403	-414	-57	-232	-388	-403

In its analysis, EPA also estimated the benefits of adopting a tighter nitrogen oxides cap in the east (.9 million tons per year v. 1.3 million tons per year). EPA's analysis suggests that the annual benefits of the tighter cap ($10 billion in 2025) outweigh the annual costs ($1.5 billion in 2025) while producing significant air quality improvements. This analysis should apply with equal force to the Transport Rule, which contains the identical eastern nitrogen oxides cap for a very comparable set of states. Accordingly, the sponsors of the proposed CAAA of 2010 should consider tightening the eastern nitrogen oxides cap during any mark-up of the bill and, similarly, EPA should tighten the nitrogen oxides caps when it finalizes the Transport Rule as EPA's own analysis demonstrates the significant benefits of doing so.

There has been a lot of discussion over the past couple of weeks about a possible Climate title to a Senate Energy bill. The focus now is on a power sector approach. Although, CATF has advocated for economy-wide coverage on a sector-by-sector basis in a Climate bill, given that the end of the session is drawing near, we support the efforts of senators and the White House to craft a meaningful power sector climate bill. However, some

electric utilities apparently are asking that Clean Air Act requirements for non-greenhouse gas pollutants, like today's Transport Rule and next year's power plant toxics rule, be scrapped in exchange for a power sector-only climate bill. To this, we believe you should say "No Deal!" Congress in considering a Climate Bill should lay down a firewall to ensure that there are no Clean Air Act rollbacks with respect to power plant sulfur, nitrogen, or toxics emissions. We must continue to make progress in cleaning up the air as we address climate change and we should not trade off the right of our children to breathe clean air today for that of our grandchildren to inherit a planet without the ravages of global warming. Senator Alexander said it best when he said last week, ""You mean to spew more sulfur, nitrogen and mercury, and less carbon?" he said of such a deal. "That's not my idea of progress."--Sen. Lamar Alexander

Thank you and I would be happy to answer any questions.

Mr. Chairman, ranking member Vitter, members of the Clean Air Subcommittee of the Senate Environment and Public Works Committee, good morning, My name is Conrad Schneider, Advocacy Director of the Clean Air Task Force. I appreciate the opportunity to speak to you today. Based in Boston, the Clean Air Task Force is a national non-profit, environmental advocacy organization whose mission includes reducing the adverse health and environmental impacts of fossil-fuel electric generating plants. Our staff and consultants include scientists, economists, MBA's, attorneys and engineers.

Coal-fired electric power plants are by most measures the nation's largest industrial air polluter. Power plant emissions are the biggest contributor to the single largest environmental risk to public health: death and disease due to inhalation of fine particles. Power plant air emissions cut a broad swath of damage across human health, and the local, regional and global environment. Unhealthy levels of ozone smog; fine particles that shave years off peoples lives and damage lungs; the damage to forests, lakes, bays and crops due to Acid Rain; mercury contamination of fish and wildlife; shrouds of haze blanketing our national parks; contributions to greenhouse gasses; and groundwater contamination from the lack of proper disposal of solid and liquid waste from power plant fuel combustion – these are just some of the major environmental problems associated with the nation's fossil electric generating fleet.

The suite of pollutants from power plants: sulfur dioxide, nitrogen oxides, mercury and other air toxics, and carbon dioxide interact and operate synergistically to damage the environment. For example, global warming will likely increase the incidence and severity of summer smog episodes; acidification of water bodies mobilizes existing deposits of mercury meaning more mercury uptake into the food chain, etc. For these and other reasons (cost-effectiveness, planning certainty for industry, etc.) the problem of power plant pollution demands a comprehensive solution that coordinates the reduction of all four major power plant pollutants.

We commend EPA for its commitment, restated in today's testimony, that it intends to follow the requirements of the Clean Air Act and finalize a stringent Transport Rule as well as propose and finalize additional stringent power plant regulations to address residual nonattainment and significantly reduce power plant hazardous air pollutants. There is no question that EPA should promulgate stringent power plant regulations – including regulations on carbon dioxide consistent with EPA's statutory duty as expressed by the Supreme Court in *Massachusetts v. EPA*.[1] The recent D.C. Circuit decision in *New Jersey v. EPA*[2], vacating the Bush Administration's power plant CAMR rules and other recent D.C. Circuit precedents interpreting the Maximum Available Control Technology (MACT) provision of the Act draw a clear road map for the Agency to set stringent MACT standards for power plant hazardous air pollutants (HAPs).[3] By contrast, the decision in *North Carolina v. EPA* striking down the Clean Air Interstate Rule (CAIR) presents a minefield of legal and technical obstacles that leave EPA's regulatory way forward far less clear.[4] In producing the proposed Transport Rule to replace the CAIR rule, EPA has done an admirable job in navigating that legal minefield. Upon our preliminary review, CATF believes EPA may have proposed a workable framework for detecting and remedying "significant contribution" by upwind sources on

downwind nonattainment areas, although it seems likely that adopting the "direct control" option that forbids interstate trading would reduce the litigation risk associated with the rule. We know that just as the Bush CAIR and CAMR rules were challenged and struck down, so a new set of power plant regulations may founder on the shoals of court challenges and delays. To guarantee the certainty of environmental improvement that the public health and the environment demand and the regulatory certainty that the electric power industry craves, Congress should act now to pass steep reductions in these three power plant pollutants as proposed by the CAAA of 2010.

So, in addition to supporting EPA strengthening and finalizing the Transport Rule, CATF supports passage of S. 2995, the Clean Air Act Amendments of 2010 (CAAA of 2010). CATF has long favored a comprehensive legislative solution to the problem of power plant pollution. While stringent, comprehensive legislative action on power plant pollution would be ideal, CATF also recognizes that the time window for legislative action in the current session of Congress is rapidly closing; therefore, CATF fully supports EPA's efforts to move forward with a strengthened Transport Rule and the other power plant rules that EPA is committed and legally obliged to issue.

CATF opposes a so-called technical "fix" which would give EPA the authority to allow emissions trading in the replacement rule for CAIR without at the same time setting specific emissions caps and dates for sulfur dioxide and nitrogen oxides reductions. The reductions envisioned in the CAIR rule were "too little, too late" to address fully the public health and environmental impacts caused by power plant nitrogen oxides and sulfur dioxide. CATF would also note that the old "war between the states" i.e., between the Northeast vs. the Midwest and Southeast, is largely over. States in each of these regions now agree that deeper reductions than those contained in CAIR will be needed to bring their areas into attainment with ozone and particulate matter air quality standards.

The cost of this bill (see discussion infra) is not too much to pay to save tens of thousands of lives per year, clear the vistas in our national parks, help restore the health of our forests and lakes, cut summer ozone smog, and virtually eliminate the power sector's contribution to mercury contamination in our fish. CATF submits that this represents a small price to pay and many years overdue.

CATF commends the House of Representatives for passing economy-wide climate change legislation which, if enacted, would result in reductions in power sector carbon dioxide. Power plants are the single largest source of CO2 emissions in the United States, representing 41 percent of all CO2 emissions.[5] But, even enactment of the comprehensive carbon dioxide legislation will not appreciably reduce power plant sulfur dioxide, nitrogen oxides, or mercury emissions. This is because bills like Waxman-Markey and Kerry-Lieberman do not target these emissions and will not result in the curtailment or shutdown any appreciable number of coal plants for the foreseeable future. Only installation of specifically-targeted pollution controls – e.g., flue gas desulfurization for sulfur dioxide and acid gas control, selective catalytic reduction for nitrogen oxide emissions, and the addition of activated carbon injection to these technologies for mercury reduction – can result in the level of pollution reductions necessary to achieve

the reductions that public health and the environment demand. And, if under a climate bill existing coal plants are to be retrofitted with post-combustion controls for carbon dioxide capture, it appears that they must virtually eliminate their sulfur, nitrogen, and mercury emissions for those carbon dioxide controls to function properly

Because this hearing is focused on the pollutants addressed in the proposed Transport Rule i.e., sulfur dioxide and nitrogen oxides, CATF will confine our testimony today to the public health, environmental science, and public policy imperatives to reducing the power sector's share of these two pollutants. CATF's views on the necessity of regulating carbon dioxide and other greenhouse gases are expressed in our comments on EPA's proposed "endangerment finding" filed on June 23, 2009[6] and power sector hazardous air pollutants (HAPs) in my July 9, 2009 testimony before this Subcommittee.[7]

The best science available demonstrates the need for steep cuts in these pollutants and the technical feasibility of achieving these reductions:

- National reductions in power plant emissions of sulfur dioxide down to 1.5 million tons per year;
- National reductions in power plant emissions of nitrogen oxides down to 1.2 million tons per year;

I will address the impacts from each of these pollutants in turn and discuss the science that supports these reduction targets:

Sulfur Dioxide

The problems associated with sulfur dioxide include: deadly fine particles, damage from Acid Rain, and the haze that obscures scenic vistas in national parks and our urban areas. Power plants emit about two-thirds of the sulfur dioxide emitted in the U.S. each year.

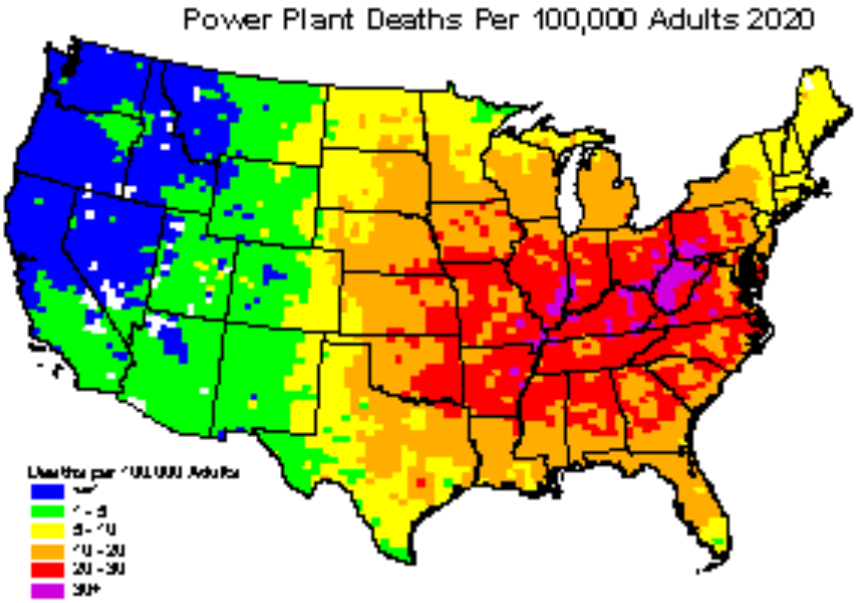
A 1.5 Million Ton Per Year Sulfur Dioxide Emissions Cap will Avoid Tens of Thousands of Particulate-Related Premature Deaths Each Year

The most deadly pollutant resulting from power plant emissions is fine particulate matter. Fine particles, such as those that result from power plant sulfur and nitrogen emissions, defeat the defensive mechanisms of the lung, and can become lodged deep in the lung where they can cause a variety of health problems. EPA's latest review of the scientific literature indicates that short-term exposures can not only cause respiratory (e.g., triggering asthma attacks), but also cardiac effects, including heart attacks.[8] In addition, long-term exposure to fine particles increases the chances of death, and has been estimated to shave years off the life expectancy of people living in our most polluted cities, relative to those living in cleaner ones.[9]

Fine particulate matter may be emitted directly from tailpipes and smokestacks (known as "primary" particulate matter), but the largest proportion of fine particles come from gaseous emissions (called "secondary" particulate matter). Sulfur dioxide emissions

from coal plants contribute the most to secondary particle formation. Sulfur dioxide is chemically altered in the atmosphere after it is released from a smokestack to become a "sulfate" particle. Sulfates include sulfuric acid particles that, when breathed, reach deep into the human lung. Indeed, analysis of the relative toxicity of particles indicates that sulfate particles are among the most toxic.[10] In the East and Midwest U.S., sulfate makes up the largest proportion of the particles in our air—in many regions well over half of the fine particles. Moreover, power plants currently emit two thirds of the sulfur dioxide in the U.S. Therefore, to reduce particulate matter, major reductions in pollution emissions from fossil-fuel power plants are needed.

Thus, the evidence is clear, and has been confirmed independently, fine particle air pollution, and especially those particles emitted primarily by fossil-fuel power plants, are adversely affecting the lives and health of Americans. The importance of these particulate matter-health effects relationships is made clear by the fact that virtually every American is directly impacted by this pollution. People living in the Midwest and Southeast, where the greatest concentrations of coal-fired power plants are located, face the greatest risk. See map below.[11]



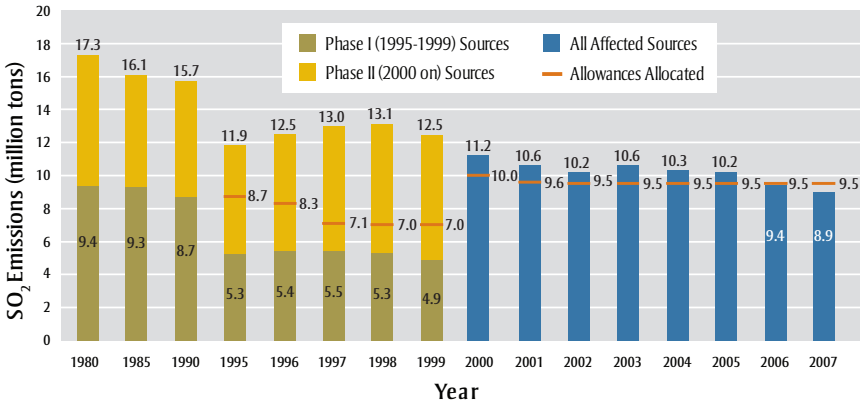
In addition, work by researchers at the Harvard School of Public Health found that the risk from power plant pollution is not evenly distributed geographically.[12] The risk was found to be greatest in relatively close proximity to the power plants: people living within 30 miles of a plant were found to face a risk of mortality from the plant's emissions 2-3 times greater than people living beyond 30 miles do.[13] These "local" impacts suggest that a national "cap and trade" program that allows some plants to escape pollution controls through the purchase of emission credits will not reduce the specific risk posed by those emissions to the surrounding population. This work supports the need for the "birthday bill" provision that requires each facility to meet modern pollution standards by a date

certain. In the Transport Rule, this can be achieved by EPA choosing the finalizing the "direct control" option, which will assure plant-specific emission reductions.

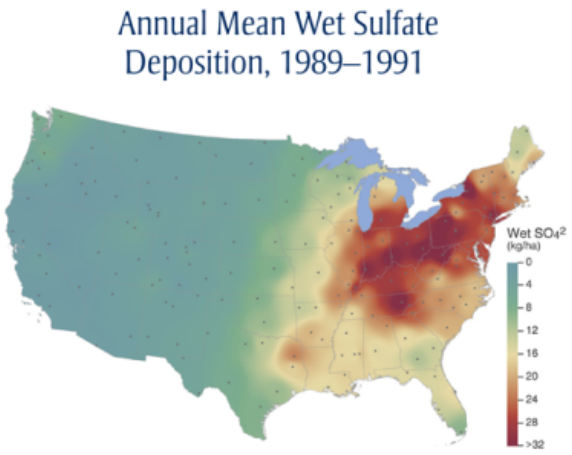
Only a 1.5 Million Ton Per Year Sulfur Dioxide Cap Will Allow Ecosystem Recovery from Acid Rain by Mid-Century

Although sulfur dioxide emissions have been reduced significantly since 1980 through the 1990 Clean Air Act Amendment's Acid Rain program, the program has now surpassed its emissions target[14] – a level that scientists say is far higher than the level necessary to allow for full ecosystem recovery in the Adirondacks and Southern Appalachian mountains.

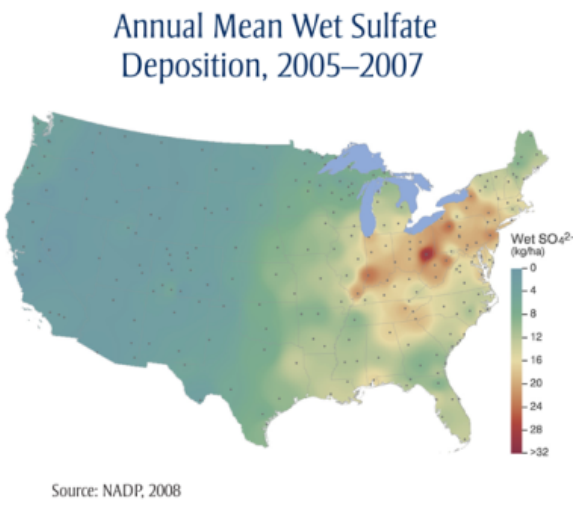
Figure 2: SO_2 Emissions from Acid Rain Program Sources



Source: EPA, 2008



Source: NADP, 2008



It is increasingly well-documented that the problem of Acid Rain has not been solved and that the Acid Rain provisions of the 1990 Clean Air Act Amendments will not be sufficient to solve it. Over 150 years of deposition of sulfur has taken a serious toll on ecosystems. Although sulfur emissions have declined in recent years, they remain very high when compared to historic levels.[15,16,17,18,19]

As a result of this legacy, lakes and streams and the aquatic life that live in them are experiencing the most widespread impact from high concentrations of acidity. The majority of sensitive water bodies are those that are located atop soils with a limited ability to neutralize (or buffer) acidity. Sensitive areas in the U.S. include the Adirondack Mountains, Mid-Appalachians, southern Blue Ridge[20] and high-elevation western lakes.[21] Water bodies are affected not just by the chronic acidification that occurs from cumulative deposition but also by episodic acidification that occurs when pulses of highly acidic waters rush into lakes and streams during periods of snowmelt (from acids that have collected in the snow over the winter) and heavy downpours.

In some places, chronic and episodic acidification together have completely eradicated fish species. For example, acid-sensitive fish have disappeared and/or populations have been reduced in Pennsylvania streams where they formerly occurred in large numbers. Acidification, together with high levels of aluminum leaching, is blamed for the reduction in fish diversity that many Pennsylvania streams have experienced over the past 25-34 years.[22]

Acidic deposition has impaired, and continues to impair, the water quality of lakes and streams in the eastern U.S. in three important ways: lowering pH levels (i.e., increasing the acidity); decreasing acid-neutralizing capacity (ANC); and increasing aluminum concentrations. Many surface waters in New England, the Adirondack region of New York, and the Northern, Central and Southern Appalachian Mountain regions exhibit chronic and/or episodic (i.e., short-term) acidification. Moreover, elevated concentrations of dissolved inorganic aluminum have been measured in acid-impacted

surface waters throughout the East. [23,24,25,26,27]

Damage to Freshwater Marine Ecosystems

High concentrations of aluminum and increased acidity have reduced the species diversity and abundance of aquatic life in many lakes and streams draining acid-sensitive regions in the East. Fish have received the most attention to date, but entire food webs are often negatively affected. For example, in a survey of lakes in the Adirondacks, 346 lakes (24 percent of the total) did not contain fish. These fishless lakes had significantly lower pH and higher concentrations of dissolved inorganic aluminum when compared to those lakes with fish. [28,29,30,31,32,33].

There are important linkages between acidic deposition and other water quality problems. For example, mercury contamination of fish is coupled to surface water acidification through a pattern of increases in fish mercury concentration with decreases in surface water pH. Studies across the eastern U.S. have shown that many surface waters have elevated concentrations of mercury in fish tissue as a result of atmospheric emissions and deposition of mercury. "Biological mercury hotspots" have been identified at five areas in eastern North America.

Emissions targets set in the U.S. thus far have been met or exceeded. Decreases in sulfate have been measured at monitoring sites throughout the Northeast U.S., although many sites in the Southeast U.S. are still showing increases in sulfate deposition. Where there are declines, improvements in acid-base chemistry have also been measured. Fish populations in marginally affected lakes are recovering. Unfortunately, no improvements have been observed in lakes that have been more seriously and chronically impacted by acidification, indicating that deeper cuts are needed. [34,35,36]

Damage to Forest Ecosystems

Acidic deposition has altered, and continues to alter, forest soil by accelerating the leaching of calcium and magnesium and increasing concentrations of dissolved inorganic aluminum in soil waters. At high concentrations, dissolved inorganic aluminum can hinder the uptake of water and essential nutrients by tree roots.

The alteration of soils by acid deposition has serious consequences for acid-sensitive forest ecosystems. Soils that are compromised by acidic deposition are less able to neutralize additional inputs of strong acids, and provide poorer growing conditions for plants and delay the recovery of surface waters. [37,38,39,40,41].

Experimental additions of calcium in terrestrial sites, which mimics reduced acidifying deposition, show that recovery can be achieved. Modeling exercises conducted for three affected watershed in the Northeast US show that at the levels of reductions called for in the CAAA of 2010, chemical conditions would approach recovery thresholds by mid-century. [42,43,44].

What Will it Take to Solve the Problem?

In summary, it is well documented that surface waters in New England, the Adirondacks, and the Northern, Central and Southern Appalachian mountain regions have been adversely impacted by elevated inputs of atmospheric sulfur and nitrogen deposition. Surface waters in these areas exhibit chronically acidic conditions or have low values of acid neutralizing capacity, which make them susceptible to short-term episodic acidification.

The modest decreases in sulfate concentrations and increases in pH and acid neutralizing capacity exhibited in some surface waters is an encouraging sign that impacted ecosystems are responding to emission controls and moving toward chemical recovery. Nevertheless the magnitude of these changes is small compared to the magnitude of increases in sulfate and decreases in acid neutralizing capacity that have occurred in acid-impacted areas following historical increases in acidic deposition.

Despite declines in power plant sulfur emissions due to Acid Rain provisions of the 1990 Clean Air Act amendments, the acidity of many water bodies has not improved.[45] Scientists believe that cuts called for in the 1990 amendments to the Clean Air Act will not be adequate to protect surface water and forest soils of the northeastern U.S.[46]

What will it take to reverse the impacts of nitrogen saturation, ozone and Acid Rain? Work by scientists with the Hubbard Brook Research Foundation found that an additional 80 percent reduction in sulfur from levels achieved by Phase II of the Acid Rain program of the Clean Air Act Amendments of 1990 would be needed to allow biological recovery to begin by mid century in the Northeastern U.S.[47] Model simulations in the Shenandoah project that greater than 70 percent reduction in sulfate deposition (from 1991 levels) would be needed to change stream chemistry such that the number of streams suitable for brook trout viability would increase. A 70 percent reduction would simply prevent further increase in Virginia stream acidification.[48] In the Great Smoky Mountains National Park, two separate ecosystem models have concluded that sulfate reductions of 70 percent are necessary to prevent acidification impacts from increasing. Deposition reductions above and beyond these amounts are necessary to improve currently degraded aquatic and terrestrial ecosystems.[49,50] The Title IV Acid Rain cap under the current Clean Air Act is 8.9 million tons per year.

Meeting a 1.5 million ton per year sulfur dioxide cap that would represent the 75 to 80 percent reduction from current Title IV targets is a precondition for recovery to get a foothold by mid-century. Make no mistake about it; there is no time to waste. Even with deep reductions irreversible damage has already occurred. It will take acid waters many decades to recover once acid inputs are reduced to close to pre-industrial levels; soils and water bodies will take centuries to recover. While recovery may be slow, maintaining emissions at today's level will mean even more irreversible damage and even a longer wait before improvement can be measured. Even tighter targeted cuts may be necessary for sources directly impacting sensitive areas. And, the longer we wait for the reductions to begin, the longer we will await recovery of these precious systems.

A 1.5 Million Ton Per Year Sulfur Dioxide Cap will be Necessary to Regain Pristine Vistas in our National Parks and Wilderness Areas

In the last several decades, visibility – how far you can see on an average day – has declined dramatically, especially in the Eastern half of the United States. In the East, annual mean visibility is commonly one quarter of natural conditions and as little as one-eighth in the summer. One of the greatest casualties of this upsurge in regional haze has been the national parks. Examples of the magnitude of visibility decline due to high air pollution levels are shown below in Acadia National Park and the Great Smoky Mountains National Park. These are actual photographs of vistas in those parks taken on clear days and days on which sulfate particulate matter levels were high.

Acadia National Park on a Clear and a Polluted Day

Great Smoky Mountains National Park on a Polluted and a Clear Day

There is no question that power plants are the major driver of this problem: visibility impairment has tracked closely in parallel with sulfate and electric power production for nearly half a century. Taken together, sulfur, carbon and nitrogen oxide emissions are responsible for about well over 80 percent of this visibility impairment. When these components are assessed for their contribution to the problem, electric power is accountable for about two-thirds of the emissions that lead to regional haze-related visibility impairment in the East, most of which is caused by sulfate.

Half-measures will not solve the problem of visibility impairment in our nation's parks. EPA has set a long-term goal of eliminating man-made haze by 2060. That goal will never be achieved without steeply cutting power plant emissions consistent with the 1.5 million ton per year reduction target in the CAAA of 2010. Indeed, the cuts in sulfur dioxide to date under the Acid Rain program have not led to perceptibly improved vistas. Research shows that visibility improves more rapidly with deeper cuts in sulfate. Thus, we will achieve pristine views in those areas shrouded in a sulfate haze only when the deepest cuts in sulfur dioxide emissions have been achieved.

There is concern about haze from other quarters as well. Research is showing that both haze and particulate matter are depressing optimal yields of crops.[51] Yield decreases in the northeastern United States are estimated to be occurring in the 5 – 10 percent range. In the southeast the decrease in optimal yields for summertime crops is likely higher — about 10–15 percent.

Nitrogen Oxides

The problems associated with nitrogen oxides include the massive health and ecosystem damage due to ozone smog and nitrogen deposition. Power plants are responsible for about one-quarter of the nitrogen oxides emitted in the U.S. each year.

Ground level ozone is a colorless, odorless pollutant that causes respiratory damage ranging from temporary discomfort to long-term lung damage. According to a recent study[52], in the Eastern half of the United states, ground level ozone sends an estimated 159,000 people to emergency rooms each summer; triggers 6.2 million asthma attacks, and results in 69,000 hospital admissions. Many more millions of Americans experience other respiratory discomfort.

Although much of the controversy around ground level ozone in recent years has centered on ozone levels in the Northeast, and the impact of Midwest and Southern emissions on the Northeast, this misses an important part of the story: ***many Midwestern and Southeastern states suffer greater ozone exposures and per capita health impacts than many Northeast states.*** According to a study by the Ohio Environmental Council, in collaboration with the University of Michigan and Harvard University,[53] people in Ohio River Valley communities such as Cincinnati and Marietta, Ohio are often exposed to dangerous levels of ground level ozone as much as 75 percent ***more*** than people in Boston and New York. Ohio River Valley ozone hospital admission rates also track this pattern – with admission rates higher in the Ohio Valley than in the East.

The reason is not hard to discern. There is a high correlation between elevated ground level ozone and proximity to power plants – especially in the Midwest and Southeast where roughly 60 percent of the nation's coal-fired generating capacity is located. In the Ohio Valley area studied, emissions from coal- and oil-fired power plants contribute nearly ***fifty percent*** of elevated ozone levels in the Valley, enough by themselves to cause violations of the federal health standard.[54] Partly out of recognition of this in-region problem, the decades old "war between the states" i.e. the Northeast v. the Midwest and Southeast, is largely over. Today, states in each of these regions recognize that deeper reductions in nitrogen oxides emissions than those contained in the CAAA of 2010 will be necessary to bring their areas into attainment with the new ozone standards.

Crop Losses Due to Ozone Smog

Human health is not smog's only victim. There is strong scientific evidence showing that current levels of ground level ozone are reducing yields, particularly in sensitive species — soybean, cotton, and peanuts from National Crop Loss Assessment Network (NCLAN) studies. Annual crop loss from ozone for soybeans alone in Illinois, Indiana and Ohio has been calculated to fall between $198,628,000 – 345,578,000. Ozone-induced growth and yield losses for the seven major commodity crops in the Southeast (sorghum, cotton, wheat barley, corn, peanuts and soybeans) are costing southeast farmers from $213-353 million annually.[55]

Year-Round Reductions of Nitrogen Oxides will be Necessary to Minimize the Effects of Nitrogen Deposition

Power plant nitrogen emissions deposited on land and water — sometimes at great distances from their original sources —is an important contributor to declining water quality.[56] Estuarine and coastal systems are especially vulnerable. Too much nitrogen serves as a fertilizer, causing excessive growth of seaweed. The result is visual impairment and loss of oxygen. With the loss of oxygen, many estuarine and marine species — including fish — cannot survive.[57]

The contribution of nitrogen from atmospheric deposition varies by watershed. In the Chesapeake Bay, atmospheric nitrogen accounts for 27 percent of nitrogen entering the system.[58] Of that amount, power plants account for about a third.

Nitrogen is also being deposited on ocean surfaces many, many miles away from land. Atmospheric nitrogen accounts for 46 to 57 percent of the total externally supplied (or new nitrogen) deposited in the North Atlantic Ocean Basin.[59]

Reductions Appropriate In Federal Policy

In each of the above areas, the best scientific evidence calls for steep reductions in power plant pollution:

- In the case of sulfur dioxide, capping power plant emissions nationally at 1.5 million tons per year will save tens of thousands of lives per year.
- In addition, reductions in power plant sulfur dioxide emissions at least this deep are a precondition to ecosystem recovery from Acid Rain while dividends in the form of fine particle reduction and reduced haze will result as well.
- In the case of nitrogen oxides, ozone smog health impacts and air quality standard violations will be dramatically reduced by capping emissions of nitrogen oxides at 1.2 million tons per year as will year round nitrogen and Acid Rain impacts.

Fortunately, the technology is at hand to dramatically reduce these power plant emissions and their resultant impacts throughout the nation, at reasonable costs. For example:

- Power sector reductions of sulfur dioxide down to 1.5 million tons per year are readily achievable through a combination of flue gas desulfurization (scrubbing), use of cleaner fuels, and greater commitment to energy efficiency and renewable resources.
- Year round nitrogen reductions down to a cap of 1.2 million tons per year are achievable through selective catalytic and non-catalytic reduction technology, low NOx burners, overfire air, and use of cleaner fuels, and greater commitment to energy efficiency and renewable resources.

Historical Summary of Regulation of Transported Air Pollutants in the East and Midwest

Congress and EPA have been attempting to deal with the problem of transported air pollution across state boundaries in the eastern part of the country for over 30 years. Progress has been made, but it has been slow, and much more work is still needed.

The air pollution transport problem was initially recognized in connection with Acid Rain pollution and Congress responded with Title IV of the Clean Air Act Amendments of 1990. That statute also recognized that ground-level ozone is a regional, and not merely a local, problem. Ozone and its precursors (most importantly, nitrogen oxides or NOx emitted in the warmer months) may be transported long distances across state lines, thereby exacerbating ozone problems downwind. For several decades, ozone transport has been recognized as a major reason for the persistence of the ozone problem, notwithstanding the imposition of numerous controls, both federal and state, across the country. The same transport problem has also been more recently recognized in the context of fine particulate ($PM_{2.5}$) pollution.

The 1977 Amendments to the Clean Air Act (the Act) included two provisions focused on interstate transport of air pollutants: the predecessor to current section 110(a)(2)(D) and section 126. In the 1990 Amendments, Congress strengthened these two provisions to better address interstate transport of air pollutants. Section 110(a)(2)(D)(i)(I) generally requires that state implementation plans (SIPs) for nonattainment areas include adequate provisions prohibiting emissions that contribute significantly to nonattainment

in, or interfere with maintenance by, any other state with respect to any primary or secondary NAAQS. If states do not submit SIPs in a timely or approvable manner, EPA has the authority to make findings of failure to submit or impose FIPs on specific sources in the state that contribute to downwind nonattainment and interference with maintenance. Section 126 authorizes a downwind state (or subdivision) to petition EPA to impose limits directly on upwind sources found to emit pollutants contribute significantly to nonattainment in, or interfere with maintenance by, that state.

The 1990 Amendments also added section 184, which delineated a multi-state ozone transport region (OTR) in the Northeast, required specific additional controls for all areas in that region, and established the Ozone Transport Commission (OTC) for the purpose of recommending to EPA regionwide controls affecting all areas in that region. In 1994, the Northeast OTC states signed a Memorandum of Understanding (MOU) committing to reduce ozone-producing NOx emissions throughout the region. In 1999 through 2002, most of the OTC states achieved substantial NOx reductions through an ozone season cap and trade program for NOx called the OTC NOx Budget Program and administered by EPA, and through NOx emission rate limits from certain coal plants under Title IV of the Act.

Section 126 Petitions

As the initial set of ozone deadlines in the 1990 CAAA approached in the mid-1990's, states at the "end of the tailpipe" of pollution in the eastern U.S. such as Maine and New Hampshire realized that the Clean Air Act set attainment deadlines that preceded those of states upwind of them meaning that those upwind states would not be required to deliver pollution reductions in time to eliminate their significant contribution to their downwind neighbors. Through air quality modeling analysis, Maine and New Hampshire found that they could eliminate their in-state emissions of ozone precursors and still not demonstrate attainment due to pollution transported over the border. While they contemplated pressing "overwhelming transport" petitions seeking relief from all CAA requirements, both states chose the more constructive course of action, filing section 126 petitions rather than face sanctions for failing to file approvable SIPs on time. Notably, Maine and New Hampshire's 126 petitions named not only coal-fired power plants in the Ohio River Valley, they named sources in every intervening state in the Northeast, setting off a "cascade" of eight 126 petitions by the Northeastern states against each of their upwind neighbors as well as against several Midwestern and Southeastern states. EPA proposed action on petitions submitted by the eight northeastern states in 1997 under section 126 of the Act. Each petition specifically requested that EPA make a finding that NOx emissions from certain major stationary sources significantly contributed to ozone nonattainment problems in the petitioning state.[60]

In 1999, EPA partially granted four of those petitions, ruling that electric power plants and other major stationary sources in 13 eastern states were in violation of section 126 and required reductions of NOx emissions of about 500,000 tons (64 FR 28250). However, EPA effectively structured the 126 remedy as a backstop for the NOx SIP Call by limiting its application to affected sources only in the event that EPA failed to finalize

the SIP Call trading program. Because EPA eventually implemented the NOx SIP Call trading program, the section 126 default remedy was never actually applied.[61] Industry's federal court attack on EPA's section 126 rulemaking was largely rejected in Appalachian Power Co. v. EPA, 249 F.3d 1032 (May 15, 2001).

OTAG

Separate from the activity in the OTC, EPA and the Environmental Council of the States (ECOS) formed the Ozone Transport Assessment Group (OTAG) in 1995. This workgroup brought together interested states and other stakeholders, including industry and environmental groups (including CATF). Its primary objective was to assess the ozone transport problem and develop a strategy for reducing ozone pollution throughout the eastern half of the United States.

Notwithstanding significant efforts, the states generally were not able to meet the 1994 statutory deadline for the ozone attainment demonstration and rate of progress (ROP) SIP submissions required under section 182(c) of the Act. The major reason for this failure was that at that time, states with downwind nonattainment areas were not able to address transport from upwind areas. Development of the necessary technical information, as well as the control measures necessary to achieve the large level of reductions likely to be required, was particularly difficult for the states affected by ozone transport.

In response, as an administrative remedial matter, EPA established new timeframes for the required SIP submittals. To allow time for states to incorporate the results of the OTAG modeling into their local plans, EPA extended the submittal date to April 1998. The OTAG's air quality modeling and recommendations formed the basis for what became the NOx SIP Call rulemaking and included the most comprehensive analyses of ozone transport ever conducted. The EPA participated extensively in the OTAG process that generated substantial technical and modeling information on the nature and extent of regional ozone transport.

NOx SIP Call

NOx SIP Call

Based on the findings of OTAG, EPA proposed a rulemaking known as the NOx SIP Call in 1997 and finalized it in 1998 (63 FR 57356). EPA concluded in this rule that NOx emissions in 22 eastern states and the District of Columbia contributed significantly to ozone nonattainment in other downwind states, and required those jurisdictions to revise their SIPs to include NOx control measures to mitigate the significant ozone transport during the summer ozone season (May-September). The EPA established emissions reduction requirements for the covered states and source categories, which essentially established a cap on ozone season NOx emissions in the state. In total, states in the region were required to reduce ozone season NOx by about 1 million tons (representing about a 25% reduction). The affected states were required to submit SIPs providing the specified amounts of emissions reductions. By eliminating these amounts of NOx

emissions, EPA concluded that the control measures would assure that the remaining NOx emissions would meet the level identified in the rule as the state's NOx emissions budget and would not "significantly contribute to nonattainment, or interfere with maintenance by," a downwind state, under section 110(a)(2)(D)(i)(I). The SIP requirements permitted each state to determine what measures to adopt to meet the necessary emissions budget. Consistent with OTAG's recommendations to achieve decreased NOx emissions primarily from large stationary sources in a trading program, EPA encouraged states to consider electric utility and large boiler controls under a cap and trade program as a cost-effective strategy.

The NOx SIP Call was EPA's principal effort to reduce interstate transport of precursors for both the 1-hour ozone NAAQS and the 8-hour ozone NAAQS. The EPA's rulemaking was based on its consideration of OTAG's recommendations, as well as information resulting from EPA's additional work, and extensive public input generated through notice-and-comment rulemaking. EPA has indicated that it believed that requiring NOx emissions reductions across the region in amounts achievable by uniform controls was a reasonable, cost-effective step to take to mitigate ozone nonattainment in downwind states for the ozone standards. It was also EPA's stated goal to ensure that sufficient regional reductions were achieved to mitigate ozone transport in the eastern half of the United States and thus, in conjunction with local controls, enable nonattainment areas to attain and maintain the ozone NAAQS.

In response to litigation over EPA's final NOx SIP Call rule, the federal Court of Appeals for the DC Circuit issued two decisions concerning the NOx SIP Call and its technical amendments. See Michigan v. EPA, 213 F.3d 663 (D.C. Cir. 2000), cert. denied, 532 U.S. 904(2001) (SIP Call); and Appalachian Power v. EPA, 251 F.3d 1026 (D.C. Cir. 2001) (technical amendments). The Court decisions generally upheld the NOx SIP Call and technical amendments, including EPA's interpretation of the definition of "contribute significantly" under CAA section 110(a)(2)(D). The litigation over the NOx SIP Call coincided with the litigation over the 8-hour NAAQS, and due to the uncertainty caused by the latter litigation, EPA stayed the portion of the NOx SIP Call based on the 8-hour NAAQS (65 FR 56245, September 18, 2000). That stay remains in effect, and thus the NOx SIP Call does not address attainment and maintenance problems under the 8-hour ozone standard.

Results

The NOx SIP Call has been a success by any number of measures. Compliance has been almost 100 percent. Prices for 2008 vintage NOx allowances have dropped from a high in 2003 of about $3000/ton at the beginning of the program to a low of $592/ton in 2008. EPA figures show a 43 percent drop in ozone season NOx emissions in the control region from 2003 to 2008 (some of which are likely due to controls installed in anticipation of CAIR, discussed below), while regional ozone levels have shown a 10-14 percent drop. These ozone reductions, combined with $PM_{2.5}$ reductions due to lower NOx emissions, saved an estimated 580-1,800 lives in 2008.

Despite these improvements, ozone levels remained stubbornly high, and many areas continued to be in nonattainment. Furthermore, the NOx SIP Call did not address the problem of transported fine particulates ($PM_{2.5}$) and their precursors, and in 2004 many areas remained in nonattainment of the 1997 PM2.5 NAAQS.

NSR Enforcement Actions

Throughout the 1970's, the State of New York was the focus of concerns about power plant pollution stemming mostly from the discovery of the ecosystem damage caused by Acid Rain in the state's Adirondack Mountains, most of which was attributable to upwind power plant emissions of sulfur dioxide and nitrogen oxides. When it became clear that the Acid Rain program in the Clean Air Act Amendments of 1990 (Title IV) would not deliver sufficient pollution reductions to allow the damaged ecosystems to recover and with new concerns raised by nonattainment with federal particulate matter and ozone ambient air quality standards (also driven in significant part by upwind power plant emissions) and related Clean Air Act deadlines, New York State began to look for other means of reducing transported pollution. Beginning in 1999, the New York Attorney General's office initiated enforcement actions against utility companies owning coal-fired power plants in states upwind of New York as well as in-state power companies for violations of the Clean Air Act's New Source Review provisions. In parallel, after years of investigation, EPA and the U.S. Department of Justice launched the federal Coal-Fired Power Plant Enforcement Initiative.[62] Both EPA and New York had discovered that many power companies had made "major modification(s)" of their electric generating units without upgrading their emissions controls to meet Best Available Control Technology ("BACT") as required by the New Source Review provisions of the Clean Air Act. Some of the enforcement actions were settled via consent order while others were contested and went to trial. Today, notices of violation and administrative orders cover 32 plants in 10 states and have led to unit-specific requirements for dozens of flue gas desulfurization (FGD) and selective catalytic reduction (SCR) installations. CATF worked closely with the New York Attorney General's office to support the original initiative and intervened in several of the federally filed actions including the American Electric Power and Cinergy cases. CATF also helped challenge the Bush Administration's efforts to shield power company misbehavior by weakening the regulations governing the applicability of New Source Review to existing plants. Most of those challenges were successful in limiting damage to the program.

State Power Plant Regulations and Legislation

From its inception in 1996, CATF has advocated for state-level policies to require the clean up of power plant pollution with an initial focus on reducing sulfur dioxide and nitrogen oxides emissions. As a result of our efforts and those of affiliated campaigns, over 20 states have adopted multi-pollutant power plant limits via regulation and/or legislation.[63] Many of these provisions have set the bar for achievable sulfur dioxide, nitrogen oxides, and mercury reductions from existing coal plants. For sulfur dioxide, almost all of them require the installation of flue gas desulfurization either as a direct requirement or through emissions limits and caps that have been met via scrubbing –

since 2004 these state requirements have led to the installation of nearly three dozen FGD installations.

Clean Air Interstate Rule (CAIR)

As a presidential candidate, George W. Bush promised to support a multi-pollutant solution to power plant pollution, including limits on power plant carbon dioxide. However, shortly after his inauguration, Bush abandoned his pledge on carbon dioxide and, through a series of meetings held by Vice-President Cheney with the energy industry, the Administration devised a plan to gut existing Clean Air Act authorities and replace them with a watered-down legislative alternative dubbed "Clear Skies". When by 2005, after intense opposition by the environmental community, including CATF, and many states it became clear the "Clear Skies" had no chance of passage by Congress, the Bush Administration EPA promulgated a series of regulations modeled on "Clear Skies" – the "Clean Air Interstate Rule ("CAIR"), the "Clean Air Mercury Rule" ("CAMR"), and the "Clean Air Visibility Rule" ("CAVR") -- and moved to adopt via regulation the rollbacks of the New Source Review program for existing sources. EPA promulgated the Clean Air Interstate Rule ("CAIR") on May 12, 2005 (70 FR 25162), finding that emissions in certain upwind states resulted in amounts of transported PM2.5, ozone, and their emissions precursors that significantly contributed to nonattainment in downwind states. Those findings were accompanied by air quality modeling, ambient air quality data analyses, and cost analyses.

CAIR required SIP revisions in 28 states and the District of Columbia to prohibit certain emissions of SO2 and/or NOx. EPA decided that achieving the emissions reductions identified would address the states' requirements under section 110(a)(2)(D)(i)(I) of the Act and would help PM2.5 and ozone nonattainment areas in the eastern half of the United States attain the standards. EPA noted that additional local reductions might be necessary to bring some areas into attainment even after significantly contributing upwind emissions were eliminated. EPA concluded that attainment would be achieved in a more certain, equitable, and cost-effective manner with a combination of upwind and local emissions reductions.

CAIR built on EPA's efforts in the NOx SIP Call to address interstate pollution transport for ozone. CAIR was also EPA's first attempt to address interstate pollution transport for PM2.5, and EPA's stated intention was to provide significant air quality attainment, health, and environmental improvements across the eastern U.S. It required significant reductions in emissions of sulfur dioxide (SO2), which contribute to fine particle concentrations, and emissions of NOx, which contribute to both fine particle and ozone problems. Electric power plants (called electric generating units or EGUs in the rule) were found to be a major source of the SO2 and NOx emissions that contribute to fine particle concentrations and ozone problems downwind.

CAIR's emission reductions requirements were based on controls that EPA had determined to be "highly cost-effective" for EGUs under optional cap and trade programs that covered: (1) annual SO2 emissions, (2) annual NOx emissions, and (3) ozone season

NOx emissions. States retained some theoretical flexibility to choose the measures to adopt to achieve the specified emissions reductions, although EPA expected controls to be applied to EGUs under a model trading rule. EPA required the emissions reductions to be implemented in two phases, with the first phase in 2009 and 2010 (for NOx and SO2, respectively), and the second phase for both pollutants in 2015. The regional SO2 emission caps were set at 3.62 million tons in 2010, dropping to 2.53 million tons in 2015. Annual NOx caps were set at 1.51 million tons in 2009 and 1.26 million tons in 2015, while ozone season NOx caps were 568,000 tons in 2009 and 485,000 tons in 2015. EPA estimated that overall power plant emissions in the covered region would be reduced in 2015 by about 48 percent for SO2, and 54 percent for annual NOx; overall 2015 regional SO2 and NOx emissions were estimated to fall by 32 percent and 14 percent, respectively.

CAIR FIPs

When EPA promulgated the final CAIR, EPA also issued a national finding that states had failed to submit SIPs to address the requirements of section 110(a)(2)(D)(i) with respect to the 1997 ozone and PM2.5 NAAQS. States were to have submitted 110(a)(2)(D)(i) SIPs for those standards by July 2000. This action triggered a 2-year clock for EPA to issue FIPs to address interstate transport. In 2006, EPA promulgated FIPs to ensure that the emissions reductions required by the CAIR were achieved on schedule. The FIPs did not limit states' flexibility in meeting their CAIR requirements as all states remained free to submit SIPs at any time that, if approved by EPA, would replace the FIP for that state.

As the control strategy for the FIPs, EPA adopted the model cap and trade programs that it provided in the CAIR as a control option for states, with minor changes to account for federal, rather than state, implementation.

Judicial Invalidation of CAIR

Petitions for review challenging various aspects of the CAIR were filed in the U.S. Court of Appeals for the D.C. Circuit. In North Carolina v. EPA, 531 F.3d 896, *modified on reh'g* 550 F.3d 1176 (D.C. Cir. 2008), the Court granted several of the petitions for review and remanded the rule to EPA for further proceedings. In its opinion, the Court upheld several challenged aspects of EPA's approach, but also found fatal flaws in the rule that were initially deemed significant enough to warrant vacatur of the CAIR and the associated FIPs in their entirety. In December 2008, however, the Court responded to petitions for rehearing and decided to remand the rule without vacatur to maintain the environmental benefits of the rule while EPA worked to remedy CAIR's flaws as identified in the court's opinion.

One major flaw in CAIR involved the way EPA addressed the issue of "significant contribution" under section 110(a)(2)(D). The court emphasized the importance of individual state contributions to downwind nonattainment areas and held that EPA had failed to adequately measure significant contribution from sources within an individual

state to downwind nonattainment areas in other states. Further, the Court noted that EPA had not provided adequate assurance that the trading programs established in CAIR would achieve, or even make measurable progress towards achieving, the section 110(a)(2)(D)(i)(I) mandate to eliminate significant contribution. For these reasons, it concluded that EPA had not shown that the CAIR rule would achieve measurable progress towards satisfying the statutory mandate of section 110(a)(2)(D)(i)(I) and thus EPA lacked authority for its action. Moreover, it emphasized that because EPA was treating the rule as constituting a complete 110(a)(2)(D)(i)(I) remedy, it must actually require the elimination of emissions that contribute significantly to nonattainment or interfere with maintenance downwind.

The Court further rejected the state budgets for SO2 and NOx that were used to implement the CAIR trading programs, finding the budgets to be insufficiently related to the statutory mandate of eliminating significant contribution and interference with maintenance. It also rejected EPA's use of a reduced allocation of Title IV acid rain allowances to implement compliance with CAIR SO2 requirements, holding that the Act did not give EPA authority to terminate or limit Title IV allowances. In addition, the Court found that EPA had failed to give meaning to the "interfere with maintenance" prong of section 110(a)(2)(D)(i)(I), and that EPA had not demonstrated that the 2015 compliance deadline used in the CAIR was coordinated with the downwind state's deadlines for attaining the NAAQS.

EPA's Proposed 2010 Federal Transport Rule

Introduction

On July 6, 2010, EPA released a proposed rule designed to address the transport of interstate pollution that has long hampered states' efforts to deal with nonattainment and maintenance problems in a comprehensive and effective manner. Specifically, EPA's proposal, called "Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone" (the Transport Rule proposal or the proposed TR), would require the reduction of NOx and SO_2 emissions from 32 states in the eastern US to address the contribution of those emissions to nonattainment and maintenance problems associated with the 1997 and 2006 PM2.5 NAAQS and the 1997 ozone NAAQS.

The Transport Rule proposal will, once implemented, completely replace CAIR, which, as mentioned previously, was found unlawful in a variety of respects in 2008 by the US Court of Appeals for the DC Circuit.

Summary of Major Provisions

Major elements of the Transport Rule proposal are summarized below.

Four Separate Emission Control regions—

Annual SO_2—27 states plus DC, split into two groups—
- Group 1 (2012 and 2014 caps)—15 states[64]
- Group 2 (2012 caps only)—12 states + DC[65]

Annual NOx—27 states + DC[66]
Ozone Season NOx—25 states + DC[67]

Regional Emission Caps

(Annual million tons)

Effective Date	2012[68]	2014[5]
Annual SO_2	3.89	2.50[69]
Annual NOx	1.38	1.38
Ozone Season[70] NOx	0.64	0.64[71]

General Scope of EPA Analysis

- EPA examined four emission scenarios in developing the Transport Rule proposal—a 2005 base year using estimated actual emissions; a projected 2012 "no CAIR" base case (used to identify nonattainment and maintenance areas affected by upwind pollution); and projected 2014 "no CAIR" base case and control case based on the proposed TR (the 2014 cases were used to estimate costs and benefits produced by the proposal).

- EPA's analysis covered the 37 states east of the Rocky Mountains (i.e., North Dakota and states south and east).

Calculation of State Budget Caps

Like CAIR, the Transport Rule proposal seeks to implement the required emission reductions through the use of state emission budget caps. However, unlike CAIR, caps in the Transport Rule proposal were not determined on a "top-down" regional basis. Rather, they were built from the bottom up based on the amount of emissions in each state found to be significantly contributing to nonattainment or interfering with maintenance in another downwind state, an amount generally equivalent to that portion of a state's contribution that could be eliminated by controls in that state for a specific cost.

In the Transport Proposal, EPA modified the two-step approach used in CAIR for determining a state's significant contribution to downwind nonattainment. Here, EPA adopted a simple formula for the first step, which quantifies and evaluates an individual state's contribution to downwind nonattainment or maintenance. An upwind state will be subject to the transport requirements if the modeled air quality impact in 2012 from its emissions in the most impacted downwind nonattainment or maintenance site is at least 1 percent of the underlying limit value for the relevant NAAQS.[72] One of the advantages of this 1 percent threshold is that it can be applied to any future revised NAAQS.

If a state's downwind contribution exceeded one or more of these 1 percent NAAQS thresholds, EPA proceeded to the second step, a multi-factor analysis that uses maximum control cost thresholds, informed by air quality considerations, to determine the portion

of the state's contribution that constitutes the "significant contribution" and "interference with maintenance" required to be eliminated. This process is not nearly as simple as the first step. By way of brief summary, EPA developed EGU emission reduction cost curves for each state and pollutant, showing what level of emission reduction could be achieved at different cost levels in 2012 and 2014; then, looking at both cost and air quality factors, EPA identified "breakpoints" (in terms of cost/ton of pollutant reduced) where attainment and maintenance problems are addressed for all or most areas by control technology that can widely deployed at a reasonable cost. EPA settled on a marginal cost of $2000/ton for SO2 (~cost of new scrubber installations) for Group 1 states, but used a lower value of $300-400/ton SO2 for Group 2 states (~cost of operating existing and planned controls), and $500/ton of NOx (~again, the cost of running existing and planned controls year-round). EPA reasoned that substantial reductions have already been obtained from installations made or planned prior to 2012, and that those installations could be operational by 2012 at the lower cost thresholds, eliminating much of the downwind contribution from states other than the Group 1 states (except for continued PM2.5 problems in some areas in the winter as discussed later). For those Group 1 states, a higher cost threshold (with a longer implementation period—2014) was found to be appropriate in order to obtain the larger SO2 reductions needed to address the larger downwind contribution from those states. For ozone season NOx, EPA determined that $500/ton was a reasonable cost threshold for reductions that could be obtained from EGUs by 2012 for many states. However, EPA's analysis shows that at this cost threshold, 1997 ozone NAAQS problems will continue to persist in Houston, Baton Rouge, and New York City. EPA is conducting further analysis on whether additional reductions above the $500/ton threshold are needed from states linked to those downwind areas.[73]

EPA proposes to control only EGU[74] emissions in this rulemaking, as it found that NOx and SO2 emission reductions below the selected cost thresholds were generally not available from other sectors.

The state emissions budgets were calculated by applying the applicable cost thresholds to state-specific EGU data, before accounting for the "inherent variability in power system operations" (see variability discussion later).

Implementation--Proposed Remedy and Alternatives

EPA proposes to implement the emission reductions necessitated by the emissions budgets for the affected states by issuing FIPs directed at EGUs within each state. States, however, are free to meet their budgets by means of their own SIPs. Such SIPs may require reductions from non-EGU sources.[75]

Responding to the DC Circuit's disapproval of various aspects of CAIR related to the trading of emission allowances, EPA is proposing a remedy that involves the use of new allowances created for this rule, and that places restrictions on interstate trading. Title IV acid rain allowances (used in CAIR) may not be used for compliance with the proposed Transport Rule.[76]

EPA calls its proposed remedy the "state budgets/limited trading" option. This option is designed to meet the NC v. EPA court's requirement that a CAA section 110 (a)(2)(D) remedy must eliminate emissions within each state that are significantly contributing to nonattainment or interference with maintenance in any other state.[77]

Under this approach, EPA will issue 4 discrete types of new emission allowances for 4 separate cap and trade programs corresponding to the 4 different control regimes—Group 1 SO2 allowances, Group 2 SO2 allowances, annual NOx allowances, and ozone season NOx allowances. These allowances will be allocated directly to covered EGUs in a given state in an amount equal to the emission budgets for that state. With the exception of units in Group 1 states in 2014 and thereafter, existing units will receive "allowances commensurate with the unit's emissions reflected in whichever total emissions amount is lower for the state, 2009 emissions or 2012 base case emissions projections." For units in Group 1 states, starting in 2014, allocations would be determined in proportion to the unit's share of the 2014 state budget, as projected by IPM modeling. EPA will reserve 3 percent of the allowances in each state budget as a set aside for new units. Allowance allocations generally would be permanent.

Each source must hold allowances sufficient to cover its emissions, and failure to do so is a violation of the Act.[78] A source may only use an allowance issued for a particular control program for compliance with the emission requirements of that specific regime—for example, Group 1 SO2 allowances can only be used to comply with Group 1 SO2 limits, annual NOx allowances cannot be used to comply with ozone season NOx limits.

In general, the proposed "limited trading" option allows sources to bank allowances, to trade them freely with sources in the same state and trading program, and to trade them with sources in the same program in other states, subject to the following primary limitation. EPA proposes to place limits on the total emissions that may be emitted from EGUs in each state. Those limits will be equal to the state's emission budget, plus a "variability limit," calculated on both an annual and a 3-year rolling average basis. This variability limit, proposed by EPA to account for the annual variability in actual EGU emissions (occasioned, e.g., by a nuclear plant outage), will be equal to 10% of a state's budget or 5000 tons for annual NOx, 1700 tons for SO2, and 2100 tons for ozone season NOx, whichever is greater.[79] Starting in 2014, EPA proposes to restrict interstate trading by means of "assurance" provisions designed to assure that a state does not exceed the sum of its budget plus its variability limit.[80] These assurance provisions require an EGU operating in a state where total covered emissions exceed the sum of the state budget plus the variability limit to surrender an allowance to cover each ton of the EGU's emissions that exceed its share of the state's emission budget plus variability limit.[81] EPA asserts that this approach is consistent with the DC Circuit's decision in NC v. EPA, as it believes that this allowance surrender requirement will be adequate to deter sources from exceeding a state's overall emission limit.

EPA also describes two alternate implementation approaches, and requests comments on each. The first alternate remedy—called the "state budgets/intrastate trading" option—is

similar to the proposed remedy, with the significant exception that all interstate allowance trading is prohibited—only trading with other EGUs within the same state is allowed.[82] Under this option, there would be no variability limits and no assurance provisions. Allowance banking would be permitted. In order to address the potential for dominant power companies within a single state from controlling allowance prices in the state's allowance market, EPA proposes to reserve a small number of allowances from the allocations of large covered sources and auction them off directly to small covered sources.

The second alternate remedy is called the "direct control" option, where EPA would assign input-based emission rate limits to individual sources. A company would be allowed to average emissions at its own units within each state to meet the specified in-state rate limits, but there would be no allowances and no trading. To address the potential variability associated with emission rate limits, each state's total EGU emissions would also be capped at a level equal to the sum of the state's emission budget plus its variability limit. EGU emission rates would be set at levels such that, if the units operated at the levels assumed in the state budgets, total emissions from these units would sum to the state budgets. This option would include state variability limits and assurance provisions similar to the proposed option, except that the assurance provisions would commence in 2012 rather than 2014.

Projected Emissions Reductions—

EPA projected overall emission reductions from the Transport Proposal within the control region, assuming in its base case that CAIR requirements are not applicable (since they will disappear with implementation of the new Transport Proposal), as follows—

SO2 reductions from the proposed TR, stated in various ways—
- 60 percent EGU control region reduction from base case (no TR or CAIR) 2012;
- 64 percent EGU control region reduction from base case (no TR or CAIR) 2014;
- 62% EGU control region reduction from 2005 actual emissions in 2012;
- 71% EGU control region reduction from 2005 actual emissions by 2014

Annual NOx reductions from the proposed TR, stated in various ways—
- 35 percent EGU control region reduction from base case (no TR or CAIR) 2012; same in 2014
- 52 percent EGU control region reduction from 2005 actual emissions in 2012; same in 2014

Ozone season NOx reductions from the proposed TR, stated in various ways—
- 14 percent EGU control region reduction from base case (no TR or CAIR) 2012; same in 2014
- 33 percent EGU control region reduction from 2005 actual emissions in 2012; same in 2014

EPA has also projected national EGU emissions for several scenarios in its IPM runs, and CATF has estimated emission reductions as the difference between several base and control cases below:[83]

Projected National EGU Emissions— Base Case, Control Case, and Reductions—

	2012 Base Case	2012 Transport Proposal	2012 EGU Reductions	2015 Base Case	2015 Transport Proposal	2015 EGU Reductions	2020 Base Case	2020 Transport Proposal	2020 EGU Reductions
Annual SO_2	**9.5**	**4.8**	**4.7**	**8.5**	**4.1**	**4.4**	**8.4**	**4.1**	**4.3**
Annual NOx	**3.0**	**2.2**	**0.8**	**3.0**	**2.2**	**0.8**	**3.1**	**2.3**	**0.8**

2012 and 2015 (annual million tons)

Projected Air Quality and Attainment Impacts—

EPA projected that the average reductions in PM and ozone concentrations in 2014 for monitoring sites in the eastern US that are projected to be in nonattainment in the 2014 base case will be—
Annual PM2.5—2.4 *u*g.m3;
24 hour PM2.5—4.3 *u*g/m3;
8 hour ozone—0.3 ppb.

EPA projected the following attainment benefits from the proposed rule as described in the table below:

Nonattainment Projections for the Transport Proposal

	Projected Nonattainment Counties in East	
Annual PM2.5	**2012**	**2014**
Base Case	**32**	**15**
After TR 2014	**--**	**1**
Daily PM2.5	**2012**	**2014**
Base Case	**92**	**54**
After TR 2014	**--**	**17**
Ozone	**2012**	**2014**
Base Case	**11**	**7**
After TR 2014	**--**	**7**

Projected Costs and Benefits—

EPA in its proposed Regulatory Impact Analysis (RIA) of the proposal estimates the projected costs and benefits of the proposed Transport Rule. EPA estimates that the premature deaths avoided in 2014 at 14,000 using the Pope premature mortality study and 36,000 using the Laden study. In terms of monetized benefits in 2014, EPA using its National Academy of Science endorsed benefits methodology finds benefits range from of $110-120 billion in 2014, using Pope premature mortality study ($100-110B of total) to $270-290 billion, using the Laden study. The benefits compared to costs (see below) ratio (i.e., benefits divided by costs) range from 50:1 to 147:1; with annual net benefits (benefits less costs) of $120 to 264 billion, leaving significant "headroom" for further benefit-cost justified strengthening of the rule. EPA identifies other numerous public health and environmental benefits, most of which were not monetized. EPA projected carbon dioxide emissions reduced by the rule in 2014 due to modest retirements and re-dispatch to be 15 MT.

Energy and cost impacts

In addition, EPA's economic analysis of the proposed Transport Rule demonstrates that it will cause no noticeable increase in electricity or gas prices, no appreciable decrease in coal use or generation, and no shifts in coal production between coal producing regions. Specifically, EPA finds that the cost to power sector of complying with the rule will be $3.7B(illion) in 2012 and $2.8B in 2014 (2006$) with social costs in 2014--$2.0B (3 percent discount rate); $2.2B (7 percent discount rate). EPA projects a retail electricity price increase less than 2.5 percent in 2012, and 1.5 percent in 2014 with a projected delivered coal price increase less than 7 percent in 2012, and 4 percent in 2014. EPA projects a decrease in coal use by power sector of only 0.3 percent in 2012, and 0.8 percent in 2014. The projected delivered natural gas price increases less than 1.7 percent in 2012, and 0.5 percent in 2014.

Other Anticipated Power Sector Rulemakings

EPA is considering requiring additional emission reductions in the following areas when it finalizes the Transport Rule. First, EPA states its intention in the proposal to analyze potential upwind contribution to residual 24-hour PM2.5 NAAQS exceedance problems that are concentrated in the winter months. This may result in additional annual NOx and SOx reduction requirements.

Second, EPA notes that its analysis shows that SO2 emissions are expected to increase in states not regulated under the proposed Transport Rule proposal as a result of sources in those states opting to use higher sulfur coals. These projected emission increases vary from state to state. The largest projected increases are in Texas, and EPA projects that emissions increases in Texas will be large enough to exceed the 0.15 *u*g/m3 significant contribution threshold for the annual PM NAAQS; thus, EPA is considering whether Texas should be included in the states subject to the annual SO2 limits.

Finally, EPA is also conducting additional analysis to determine whether additional reductions of ozone season NOx are needed in the final rule to help abate persistent ozone problems in Houston, Baton Rouge and New York City.

Turning to other potential rulemakings, EPA states its intention to propose additional transport proposals as necessary to address upwind transport in connection with future revisions to the ozone or fine PM NAAQS, and specifically states its intention to promulgate a revised ozone NAAQS later this year, and to propose next year a rulemaking addressing any associated needed reduction in transported NOx, with a final rule expected in 2012.

In addition, EPA also notes other future rulemakings that will impact the power sector:

- CAA section 112(d) "MACT" standards, to be proposed by March 2011;
- Revisions to the NSPS for coal and oil-fired EGUs (currently scheduled for proposal at the same time);
- Best available retrofit technology (BART) and regional haze programs to protect visibility.

EPA adds that it will likely "be compelled to respond to a pending petition to set standards for the emissions of greenhouse gases from EGUs under the NSPS program," and further, that under the Johnson memo, "beginning in 2011 new and modified sources of greenhouse gas (GHG) emissions, including EGUs, will be subject to permits un der the PSD program requiring them to adopt BACT for their EGUs."

<u>Aspects of the Transport Proposal that Need Strengthening</u>

Introduction

While CATF believes that the proposed Transport Rule is a good step towards requiring needed air pollution reductions in the US electric power sector, EPA's proposal falls short of producing the amount of cost-effective reductions that are reasonably obtainable and necessary to protect human health and the environment..

Several key points must be kept in mind when evaluating the appropriate level of emission reductions from the power sector. First, the public health and environmental benefits of reductions of NOx and SO2 emissions from power plants are vastly greater than the cost of obtaining those reductions—monetizable benefits literally are several orders of magnitude greater than cost (and many benefits are not monetizable). The Transport Rule proposal achieves estimated benefits of roughly 50 to 150 times greater than costs. In other words, costs would need to increase by at least 50 times before they even approached the level of public health benefits provided (and of course, additional reductions would produce additional benefits). Furthermore, EPA's analysis shows that reductions from the power sector are more cost-effective than reductions available from most other sources; this is especially true for SO2, where power plants are by far the

dominant source. EPA's proposal will save thousands of lives. A tighter regulation could save many more.

Second, the technology to control SOx emissions (flue gas desulfurization or "scrubbers") and NOx emissions (low NOx burners and selective catalytic reduction or "SCR") are well established, effective, reliable and widely available today. At this late hour in the stuggle to reduce transported air pollution, there is simply no good reason not to tightly regulate air emissions from power plants so that each plant employs these controls.

Third, power plants can and have installed these pollution controls without producing significant adverse impacts. The proof is in the pudding—since 2004, power plants in the eastern U.S. have installed over 120 scrubbers, reducing national annual SO2 emissions from 11 million tons in 2004 to less than 6 million tons in 2009. The power sector has accomplished this without impacting electric system reliability or causing economic dislocation. However, more can and must be done—as of 2009, almost 2/3 of US coal-fired units (i.e., over 700) still did not have SO2 scrubbers.

CATF welcomes EPA's stated intention to promulgate a number of rules in the future to require emission reductions from this sector beyond those in the Transport Rule proposal (see earlier discussion). However, often good intentions are not completely realized. Furthermore, the Transport Rule itself should require deeper reductions than proposed. In fact, the Transport Proposal is essentially designed simply to maintain the emission reductions from controls that are already in place or planned to be in place—in effect, the Transport Proposal's 2012 limits are simply nailing down (and in some cases, accelerating) the reductions driven by CAIR. The only additional reductions required by the Transport Proposal are SO2 reductions in 2014 from EGUs in the 15 Group 1 states, and EPA expects that only about 14 GW of scrubber capacity retrofits and less than 1GW of SCR capacity retrofits will need to be installed to comply with these 2014 requirements.[84]

Additional Reductions are Required Under the Proposed Framework for the Rule

According to EPA's own statements and using its own approach to addressing transported air pollution under section 110(a)(2)(D), the Transport Rule proposal does not eliminate all of the projected contribution in upwind states to downwind nonattainment and maintenance problems. EPA's atmospheric modeling shows that even after the TR is implemented:

- several downwind areas (Birmingham, Alabama and Allegheny County, Pennsylvania) will still experience nonattainment or maintenance problems under the 1997 annual PM2.5 NAQQS;
- at least 14 downwind areas will continue experience problems with nonattainment or maintenance of the 24-hour PM2.5 NAAQS, at least in the winter;

- several downwind areas (Houston, Baton Rouge and New York City) will also continue to experience with the ozone NAAQS attainment and maintenance problems; and
- sources in several states that are outside of the proposed control region of the TR will increase emissions following implementation of the rule, as they will be subject only to the much weaker Title IV acid rain restrictions; in fact, the increase in one state (Texas) is large enough to cause it to become a significant contributor to downwind nonattainment and maintenance problems.

These residual nonattainment and maintenance problems can easily be addressed by EPA by requiring deeper reductions while keeping within the framework of the proposal. With respect to PM2.5, Group 2 states have minimal obligations under the current proposal, but there are clearly substantial additional reductions that can be obtained from those states at the $2000/ton cost threshold applicable under the proposal to Group 1 states; thus, all states should be required to meet the Group 1 state requirements. In addition, there are also substantial additional SO2 reductions available at slightly higher costs than $2000/ton; according to EPA estimates, additional reductions of about 500,000 tons of SO2 could be obtained in 2014 by increasing the proposal's SO2 cost threshold to $2400/ton. With respect to ozone, EPA should raise the $500/ton minimum cost threshold in the Transport Rule proposal for requiring ozone season NOx reductions, keeping in mind that EPA found in the 1998 NOx SIP Call that a cost threshold of up to $2500/ton of NOx removed was highly cost-effective. Furthermore, EPA should include an anti-backsliding provision to prevent non-regulated states from increasing transported emissions.

Other Approaches for Procuring Additional Needed Emission Reductions

CATF believes that EPA should consider other approaches to its Transport Rule proposal to secure additional cost-effective emission reductions from the power sector. First, EPA should consider lowering the 1 percent NAAQS contribution threshold. Any measureable contribution to reduced ambient air quality in a downwind state with nonattainment or maintenance problems is significant, and EPA should include all such states with measurable contributions in its control program. Secondly, EPA should raise the artificially low cost thresholds that effectively increase the level of the emission caps and allow thousands of tons of unnecessary and deadly emissions each year. Third, EPA should require other industrial sectors to control their SO2 and NOx emissions. Over a decade ago, EPA's 1998 NOx SIP Call targeted non-EGU stationary sources such as large industrial boilers and turbines and cement plants for NOx emission reductions. EPA should investigate control costs from large industrial sources, and if they are within the range of similar levels of EGU control costs, require the appropriate emission reductions.

Recommended Power Sector Emission Levels

In 2004, CATF submitted several sets of comments on EPA proposed rulemakings that resulted in the final CAIR. In those comments, CATF urged EPA to tighten its proposed

CAIR emission caps substantially, and demonstrated that tighter caps would be cost-effective, would not cause unreasonable energy price spikes, would save substantially more lives and would produce substantially greater benefits to society than EPA's proposed CAIR. Specifically, CATF recommended that EPA reduce the proposed regional emission caps as follows:

- a CAIR region SO_2 cap of 1.84 million tons in 2010, and
- a two phase NOx cap, 1.6 million tons in 2010 and 1.04 million tons in 2012.

Using the same methodology that EPA used to estimate costs and benefits of its

regulatory proposals, CATF estimated the comparative costs and benefits of its preferred alternative to EPA's CAIR proposal as follows:

	EPA CAIR Proposal—2010	**CATF Alternate Control Scenario—2010**	**EPA CAIR Proposal—2015**	**CATF Alternate Control Scenario—2015**
Costs ($Billion)	3.4	9.1	4.1	8.9
Benefits ($Billion)	53	99	77	129
Net Benefits ($Billion)	**50**	**90**	**73**	**120**
Lives Saved	**9600**	**18000**	**13000**	**22000**

Although these comparisons were produced over 5 years ago, CATF believes that they demonstrate that the Transport Proposal, which is similar to CAIR in its ultimate effect, can be substantially tightened while saving more lives and increasing the net benefits of the rule. CATF also believes that our recommended power sector emission limits recommended in 2004 are still achievable and beneficial today, and should be implemented by EPA.

S. 2995, the Clean Air Act Amendments of 2010

In addition to supporting EPA strengthening and finalizing the Transport Rule, CATF supports passage of S. 2995, the Clean Air Act Amendments of 2010 (CAAA of 2010). Although time in the current session of Congress is short, CATF has long favored a comprehensive legislative solution to the problem of power plant pollution covering SO2, NOx, and power plant HAPs. In producing the proposed Transport Rule to replace the

CAIR rule, EPA has done an admirable job in navigating the legal minefield laid for it by the D.C. Circuit. But, we know that just as the Bush CAIR and CAMR rules were challenged and struck down, so a new set of power plant regulations may founder on the shoals of court challenges and delays. To guarantee the certainty of environmental improvement that the public health and the environment demand and the regulatory certainty that the electric power industry craves, Congress should act now to pass the steep reductions in these three power plant pollutants as proposed by the CAAA of 2010. While stringent, comprehensive legislative action on power plant pollution would be ideal, CATF recognizes that the time window for legislative action in the current session of Congress is rapidly closing and; therefore, CATF fully supports EPA's efforts to move forward with a strengthened Transport Rule and the other power plant rules that EPA is committed and legally obliged to issue.

Introduced on February 4, 2010, the proposed Clean Air Act Amendments of 2010 would codify stringent, national caps for sulfur dioxide and nitrogen oxides while providing a crucial "backstop" for EPA's regulatory process of setting maximum available control technology ("MACT") standards for power plant air toxics. The bill, which is also known as the Carper-Alexander "3P" bill (for the three categories of pollutants that it covers) enjoys broad, bi-partisan support as it is co-sponsored by Senators Carper, Alexander, Klobuchar, Collins, Gregg, Kaufman, Graham, Feinstein, Shaheen, Schumer, Lieberman, Snowe, Gillibrand, Dodd, and Cardin. The bill codifies the Clean Air Interstate Rule (CAIR) for 2010 and 2011 and then builds upon the successful Acid Rain program (CAA Title IV) setting for national sulfur dioxide emissions a 3.5 million ton per year cap beginning in 2012 that drops to 2 million tons in 2015 and to 1.5 million tons in 2018. Beginning in 2021, EPA may tighten the annual emissions cap if necessary to meet a number of enumerated air quality objectives. This provision alone warrants support for the bill as it represents the tightest national sulfur dioxide cap ever contained in proposed legislation, will result in tens of thousands of avoided deaths due to power plant-related particulate matter exposure, and is fully reflective of feasible, achievable reductions available through broad deployment of flue gas desulfurization (FGD or "scrubbers") nationwide.

In addition, for nitrogen oxides, the bill would create two regional trading zones, for the East and the West. Beginning in 2012, the eastern NOx cap would be 1.39 million tons per year with a cap of 520,000 tons in the west. Beginning in 2015, the eastern cap would be 1.3 million tons per year with a western cap of 320,000 tons. Beginning in 2020, EPA may tighten the annual emissions cap if necessary to achieve certain enumerated air quality objectives. With respect to power plant toxics (i.e., hazardous air pollutants or "HAPs"), if the court-ordered EPA rulemaking concerning utility MACT is delayed, the bill directs EPA to cut mercury emissions from coal plants by at least 90 percent by 2015.

A comparison between the emissions benefits of the proposed CAAA 2010 and EPA's proposed Transport Rule is instructive. CATF performed this analysis based on data contained in EPA's Transport Rule proposal as posted on its website and the EPA analysis of the bill requested by Senators Carper and Vitter by letter dated April 15, 2010

and provided by EPA on July 16, 2010.[85] A direct comparison between the proposed Clean Air Act Amendments of 2010 and the Transport Rule demonstrates that the bill would achieve far greater reductions, particularly of sulfur dioxide emissions, and thus deliver greater air quality improvements and health-related benefits. The following table[86] compares the national emissions and health benefits of the two proposed policies:

Annual Sulfur Dioxide Emissions, Lives Saved, and Monetized Benefits under Transport Rule vs. CAAA of 2010

	2012	2015	2020	2025	Through 2025
No-CAIR emissions	9.5	8.5	8.4	8.4	121.4
TR emissions	4.8	4.1	4.1	4.0	59.4
CAAA 2010 emissions	3.9	3.4	2.9	2.1	45.3
TR emissions reduced	4.7	4.4	4.3	4.4	62.0
CAAA 2010 emissions reduced	5.6	5.1	5.5	6.3	76.1
TR lives saved	14,883	14,000	13,616	13,933	196,662
CAAA 2010 lives saved	17,773	16,150	17,416	19,950	241,099
CAAA 2010 lives saved over TR	2,890	2150	3,800	6,000	44,420
Valuation of CAAA 2010 over TR	$20 billion	$15 Billion	$27 billion	$42 billion	$312 billion

The comparison makes clear that the proposed CAAA 2010 saves over 44,000 more lives through 2025. This is true for two reasons: first, the CAAA 2010 sulfur dioxide cap is tighter in the Transport Rule region; and, second, the CAAA 2010 is national in geographic scope, meaning that it requires reductions in states that the Transport Rule does not include.

The following table summarizes the costs and other economic impacts from the proposed Transport Rule and the CAAA of 2010:

Costs, Electricity Prices, Natural Gas Prices, and Coal Generation under the Transport Rule and the CAAA of 2010 vs. No-CAIR Base Case

	Transport Rule				CAAA of 2010				TR vs. CAAA of 2010			
	2012	2015	2020	2025	2012	2015	2020	2025	2012	2015	2020	2025
Costs (B$2006)	3.7	2.7	2	2.1	-6	-3.3	3.3	5.8	-9.7	-6.1	1.2	3.8
Electricity Price Mills/kWh	3.4	.98	.94	.54	-8.7	-3.1	5.5	12.4	-12.1	-4.1	4.6	12
Natural Gas Price $/MMBtu	.11	.03	.01	.01	-.86	-0.1	.89	.81	-.97	-.13	.91	0.8
Coal Generation 1000 GWh	-9	-18	-15	-11	-67	-250	-403	-414	-57	-232	-388	-403

The cost of this bill is not too much to pay to save tens of thousands of lives per year, clear the vistas in our national parks, help restore the health of our forests and lakes, cut summer ozone smog, and virtually eliminate the power sector's contribution to mercury contamination in our fish. CATF submits that this represents a small price to pay and many years overdue.

The eastern nitrogen oxide emissions caps under the CAAA of 2010 and the Transport Rule are very similar, while the CAAA of 2010 would result in nitrogen oxide reductions in the west that are not achieved under the Transport Rule. In its analysis, EPA estimated the benefits of adopting a tighter nitrogen oxides cap in the east (.9 million tons per year v. 1.3 million tons per year). EPA's analysis suggests that the annual benefits of the tighter cap ($10 billion in 2025) outweigh the annual costs ($1.5 billion in 2025) while producing significant air quality improvements. This analysis should apply with equal force to the Transport Rule, which contains the identical eastern nitrogen oxide cap for a very comparable set of states. Accordingly, the sponsors of the proposed CAAA of 2010 should consider tightening the eastern nitrogen oxides cap during any mark-up of the bill and, similarly, EPA should tighten the nitrogen oxides caps when it finalizes the Transport Rule as EPA's own analysis demonstrates the significant benefits of doing so. EPA's analysis of the proposed CAAA of 2010 also demonstrates that passage of the bill would result in no noticeable increase in electricity or natural gas prices, no appreciable decrease in coal generation or use, or shifts in coal production or use within coal-producing regions.

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[2] N*ew Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008), *cert denied sub nom*. *Util. Air Regulatory Group v. New Jersey*, 2009 U.S. LEXIS 1329 (U.S. Feb. 23, 2009).
[3] *See e.g., NRDC v. EPA*, 489 F.3d 1364, *reh'g & reh'g en banc denied,* 2007 U.S. App. LEXIS 22229 (D.C. Cir. 2007)(reaffirming the holding in *National Lime,* 233 F.3d 625 (D.C. Cir. 2000) that all HAPs emitted by a listed source category must be regulated).
[4] North Carolina v. EPA, 531 F.3d 896 (D.C. Cir. 2008). See also, Center for Energy and Economic Development v. EPA, 398 F.3d 653 (D.C. Cir. 2005)(striking down the "Regional Haze" rule.)
[5] Available online at: http://www.epa.gov/climatechange/emissions/co2_human.html
[6] Comments of Clean Air Task Force *et al*. submitted on "Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act" 74 Fed. Reg. 18,886 (Apr. 24, 2009), Docket ID No. EPA-HQ-OAR-2009-0171 (June 23, 2009) available online at: www.regulations.gov
[7] http://www.catf.us/resources/testimony/files/20090709-Carper_CAPA_CS_EPW.pdf
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[60] While the test for "significant contribution" is a legal and technical one, the remedy for a section 126 petition is based on equitable principles, meaning that a petitioning state must demonstrate that it has "clean hands" i.e., that it requires the same level of emissions control from its in-state sources as it seeks to impose on its upwind neighbors. See discussion of "State Power Plant Regulation and Legislation" and "NSR Enforcement" infra.
[61] In 2005, North Carolina initiated a section 126 petition against 13 upwind states in the southeast. EPA denied that petition saying that CAIR provided the necessary remedy. The D.C. Circuit in striking down the CAIR rule undermined the justification for EPA's denial of North Carolina's section 126 petition, however, no further action has been taken.
[62] See: http://www.epa.gov/oecaerth/resources/cases/civil/caa/coal/index.html
[63] AL, AZ, CA, CO, CT, DE, GA, IL, LA, ME, MD, MA, MN, MO, MT, NH, NJ, NY, NC, OR, TX, WA, and WI.
[64] The Group 1 SO_2 region consists of: GA, IL, IN, IA, KY, MI, MO, NY, NC, OH, PA, TN, VA, WV and WI.
[65] The Group 2 SO_2 region consists of: DC, AL, CT, DE, FL, KN, LA, MD, MA, MN, NE, NJ and SC.
[66] The annual NOx (and annual SO2) region consists of the combined Group 1 and 2 SO2 regions.
[67] The ozone season NOx region consists of: DC, AL, AR, CT, DE, FL, GA, IL, IN, KN, KY, LA, MD, MI, MS, NJ, NY, NC, OH, OK, PA, SC, TN, TX, VA and WV.
[68] The annual NOx and SO2 limits will be effective January 1, while the seasonal NOx limits will be effective May 1.
[69] The cap was calculated on basis of entire 27 state + DC region, but only Group 1 states must make additional reductions.
[70] For purposes of the cap, the ozone season is the 5 month period from May through September.
[71] EPA states its intention in the Transport Proposal preamble to propose a new transport rule in 2011 (final 2012) to require reductions needed to address significant contribution to nonattainment/maintenance of a revised ozone NAAQS anticipated later in 2010.
[72] Thus, the significant contribution threshold is 0.15 *u*g/m3 for the annual PM2.5 NAAQS, 0.35*u*g/m3 for the 24-hour PM NAAQS, and 0.8 ppb for the 8-hour ozone NAAQS.
[73] States found by EPA to be linked to Houston and Baton Rouge are AL, AR, FL, GA, IL, KY, LA, MS, TN and TX. States linked to NYC are CT, DE, IN, KY, MD, NJ, NC, OH, PA, VA and WV.
[74] An EGU subject to the Transport Proposal is a fossil fuel-fired combustion device serving a generator with a nameplate capacity of more than 25 MWe producing electricity for sale. Certain cogenerators and solid waste incinerators are exempt from the FIP requirements. EPA proposes to allow non-covered units to opt in to one or more of the trading programs.
[75] EPA does not expect that to happen, as it believes that EGU reductions are the most cost-effective, and its modeling is based on EGU reductions.
[76] EPA is investigating the use of existing NOx allowances, but has not authorized their use as yet.

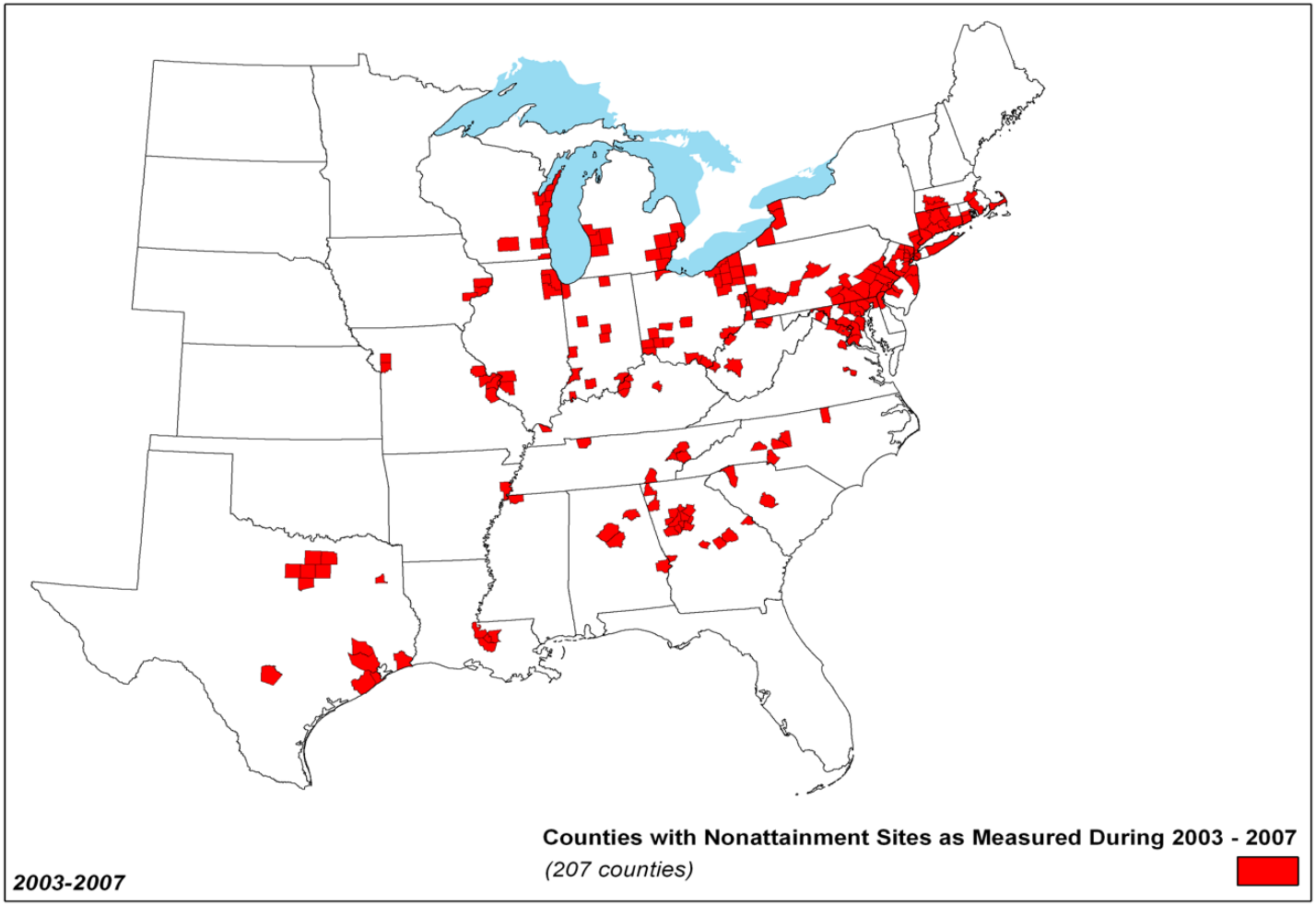
[77] To do this, EPA must measure the level of emissions in each upwind state that are significantly contributing to nonattainment or interfering with maintenance in each other linked downwind state, and eliminate those emissions from sources *within the upwind state*.
[78] One allowance covers one ton of emissions.
[79] The variability of a 3-year rolling average is equal to the annual variability divided by the square root of three.
[80] The assurance provisions will not apply until 2014, so allowance trading is not affected by these provisions in 2012 or 2013.
[81] In effect, this means that a source wishing to acquire out of state emission allowances above its pro rata share of an "exceeding state's" emission budget plus variability limit would need to acquire 2 allowances for every ton of excess emissions—one to surrender under the "assurance provisions," and one to hold to cover its emissions under the general compliance provisions.
[82] Under this option a source could only use for emissions compliance purposes an allowance issued by the state in which it was located. Thus, this option provides a "hard" cap equal to the state budget.
[83] Again, the base cases assume no CAIR and no Transport Rule.
[84] This compares with the actual installation of about 20GW of scrubber capacity by the power sector in each of 2008 and 2009.
[85] See: http://www.epa.gov/airmarkets/progsregs/epa-ipm/transport.html; U.S. EPA, Office of Air and Radiation, "EPA Analysis of Alternative SO2 and NOx Caps for Senator Carper" (July 16, 2010); and http://www.epa.gov/airmarkets/progsregs/cair/multi.html
[86] Although, frustratingly, EPA's analysis of the CAAA of 2010 compared the emissions levels and benefits of the bill to an illogical base case i.e., one assuming the judicially-invalidated CAIR rule is in place, EPA has posted the results of its national Integrated Planning Model (IPM) runs for the No-CAIR base case, the proposed Transport Rule, and the CAAA of 2010 on its website as well as the estimated benefits of the proposed rule in avoided premature deaths. In addition, EPA reported its projected national sulfur dioxide emissions under the CAAA 2010 as part of its analysis affording the ability to compare the two emissions and health benefits of the particulate matter reductions under the two policies.

Clean Air Subcommittee Hearing Oversight: EPA's Proposed Transport Rule

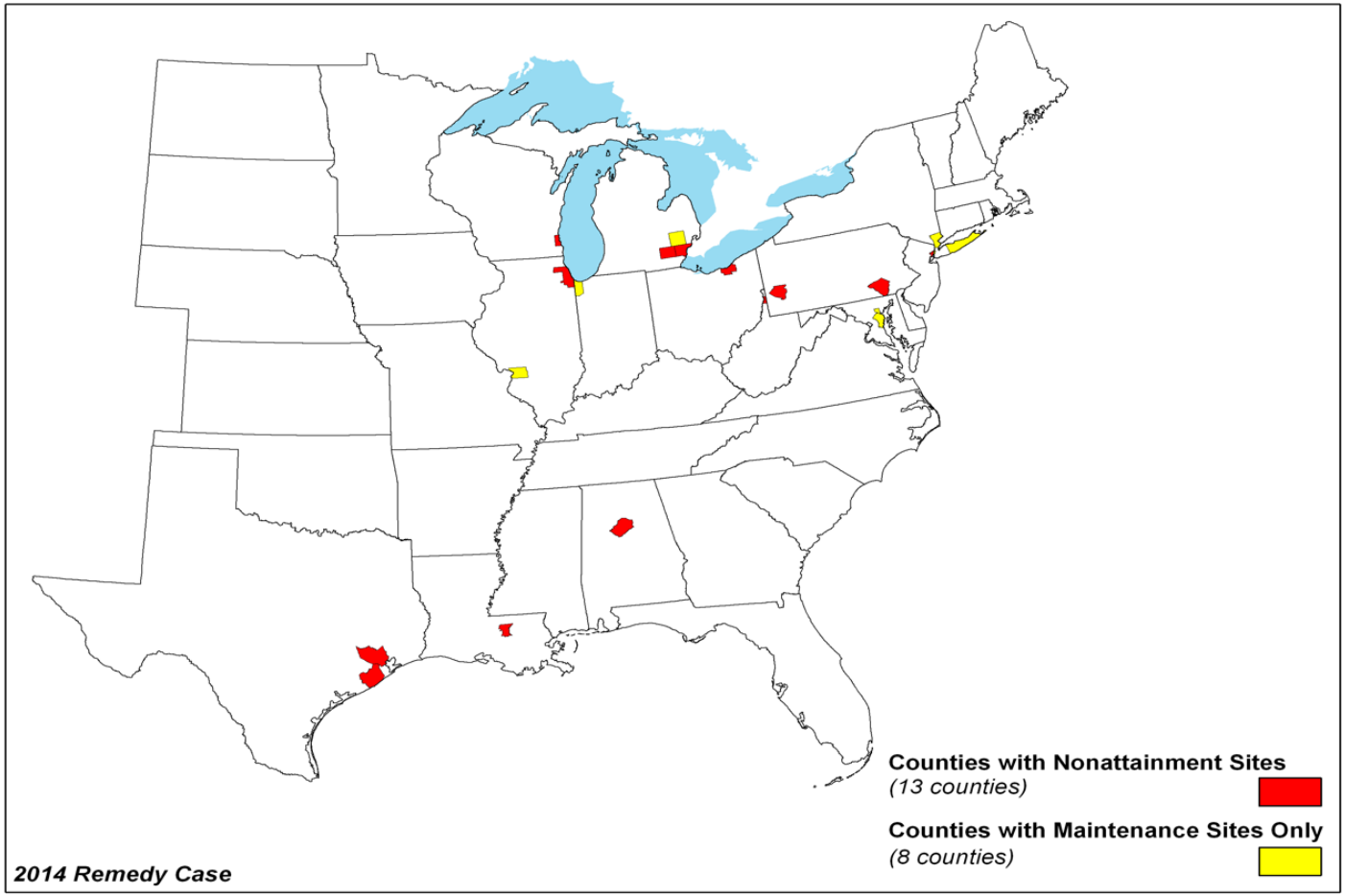
Slides Accompanying Testimony of the Clean Air Task Force

July 22, 2010

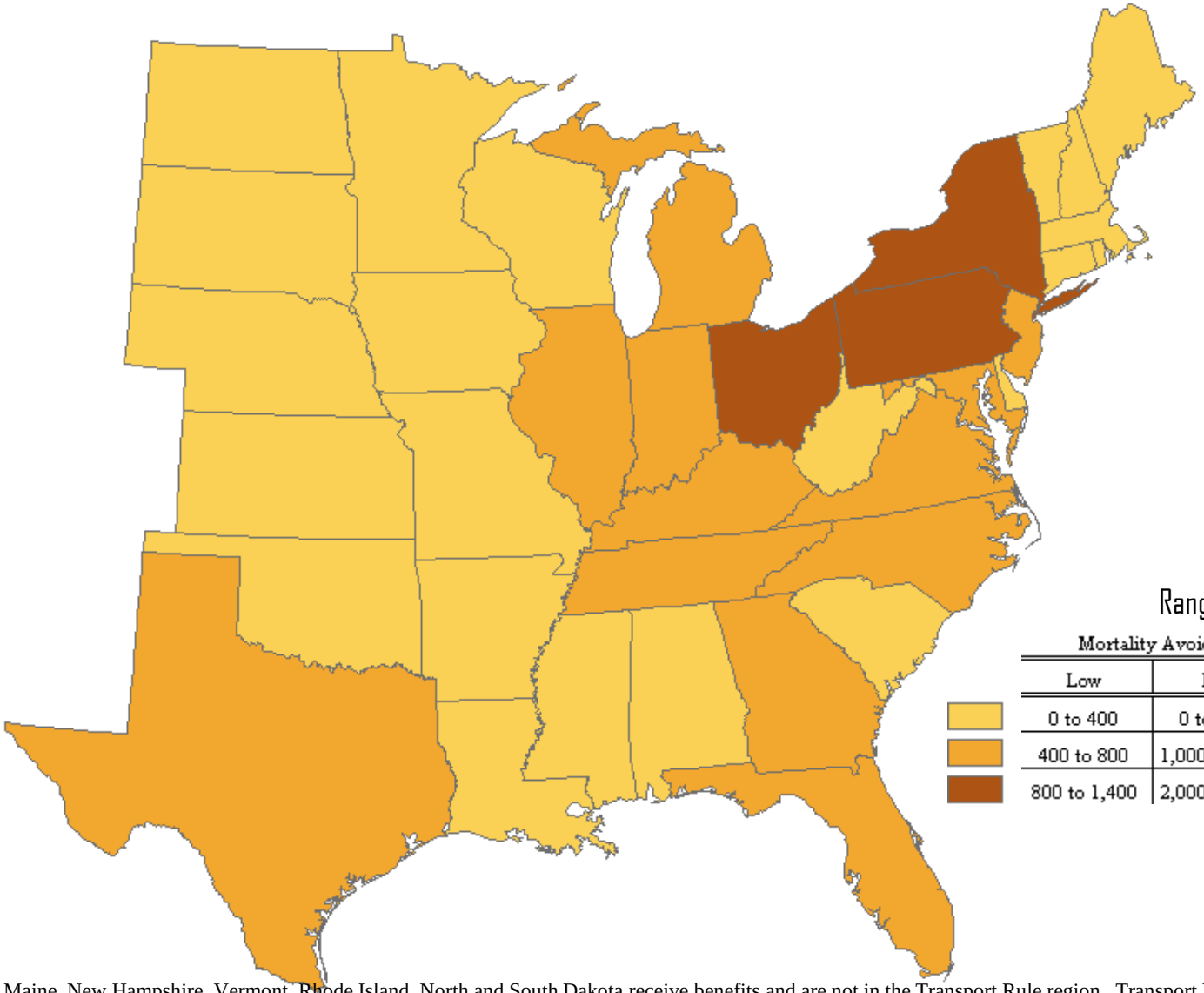
Map A: Counties Violating Air Quality Standards in the Proposed Transport Rule Region (based on 2003-07 air quality monitoring data)



Map B: Counties with Monitors Projected to Have Ozone and PM2.5 Air Quality Problems in 2014 With the Proposed Transport Rule



Billions of Dollars of Health Benefits in 2014



Ranges of Benefits

Mortality Avoided		Monetized Benefits (billion $)	
Low	High	Low	High
0 to 400	0 to 1,000	0 to 4	0 to 10
400 to 800	1,000 to 2,000	4 to 7	10 to 15
800 to 1,400	2,000 to 3,600	7 to 12	15 to 29

Maine, New Hampshire, Vermont, Rhode Island, North and South Dakota receive benefits and are not in the Transport Rule region. Transport Rule RIA, Table A-4 and A-5; mortality impacts estimated using Laden et al. (2006), Levy et al. (2005), Pope et al. (2002) and Bell et al. (2004); monetized benefits discounted at 3%

4

Annual Sulfur Dioxide Emissions, Lives Saved, and Monetized Benefits under Transport Rule vs. CAAA of 2010

	2012	2015	2020	2025	Through 2025
No-CAIR emissions	9.5	8.5	8.4	8.4	121.4
TR emissions	4.8	4.1	4.1	4.0	59.4
CAAA 2010 emissions	3.9	3.4	2.9	2.1	45.3
TR emissions reduced	4.7	4.4	4.3	4.4	62.0
CAAA 2010 emissions reduced	5.6	5.1	5.5	6.3	76.1
TR lives saved	14,883	14,000	13,616	13,933	196,662
CAAA 2010 lives saved	17,773	16,150	17,416	19,950	241,099
CAAA 2010 lives saved over TR	2,890	2150	3,800	6,000	44,420
Valuation of CAAA 2010 over TR	$20 billion	$15 Billion	$27 billion	$42 billion	$312 billion

Costs, Electricity Prices, Natural Gas Prices, and Coal Generation under the Transport Rule and the CAAA of 2010 vs. No-CAIR Base Case

	Transport Rule				CAAA of 2010				TR vs. CAAA of 2010			
	2012	2015	2020	2025	2012	2015	2020	2025	2012	2015	2020	2025
Costs (B$2006)	3.7	2.7	2	2.1	-6	-3.3	3.3	5.8	-9.7	-6.1	1.2	3.8
Electricity Price Mills/kWh	3.4	.98	.94	.54	-8.7	-3.1	5.5	12.4	-12.1	-4.1	4.6	12
Natural Gas Price $/MMBtu	.11	.03	.01	.01	-.86	-0.1	.89	.81	-.97	-.13	.91	0.8
Coal Generation 1000 GWh	-9	-18	-15	-11	-67	-250	-403	-414	-57	-232	-388	-403

“You mean to spew more sulfur, nitrogen and mercury, and less carbon?” he said of such a deal. “That’s not my idea of progress.”

--Sen. Lamar Alexander