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OVERSIGHT: ENVIRONMENTAL PROTECTION AGENCY'S CLEAN AIR REGULATIONS—ONE YEAR AFTER THE CAIR AND CAMR FEDERAL COURT DECISIONS

HEARING

BEFORE THE

SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

JULY 9, 2009

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OVERSIGHT: ENVIRONMENTAL PROTECTION AGENCY'S CLEAN AIR REGULATIONS—ONE YEAR AFTER THE CAIR AND CAMR FEDERAL COURT DECISIONS

THURSDAY, JULY 9, 2009

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY,
Washington, DC.

The subcommittee met, pursuant to notice, at 10 a.m. in room 406, Dirksen Senate Office Building, Hon. Thomas R. Carper (chairman of the subcommittee) presiding.

Present: Senators Carper, Alexander, Vitter, and Voinovich.

OPENING STATEMENT OF HON. THOMAS R. CARPER, U.S. SENATOR FROM THE STATE OF DELAWARE

Senator CARPER. The hearing will come to order.

I want to welcome you one and all to this room this morning. We will be joined by a number of our colleagues throughout the morning. I expect we will have a vote, maybe a vote around 11 or 11:30.

I appreciate the presence of our guests and especially those of our witnesses, and we thank you not only for your attendance, but for your preparation for this hearing. I look forward to hearing your statements, your comments, and then to your responses to the questions that we might raise.

Senator Voinovich, good morning. You are welcome.

Today's oversight hearing, as you know, is focused on Environmental Protection Agency's clean air regulations in light of 1 year passing since the CAIR and the CAMR court decisions. Senators will have 5 minutes for their opening statements, and then I will recognize each of our panels of witnesses.

Ms. McCarthy, you are our first panel in its entirety, along with Mr. Stephenson. Welcome to both of you.

Each witness will have 5 minutes or so to offer his or her statement to our committee. And following your panelist statements, we will have two rounds of questions.

Today's hearing will continue the attention that the Environment and Public Works Committee is giving all this month to the issue of cleaning up our Nation's air and moving toward a clean energy economy. Today, we are shifting the focus from greenhouse gases to some of the other major pollutants emitted by our Nation's fossil fuel power plants: sulfur dioxide, nitrogen oxide and mercury. These pollutants are silent killers, causing serious health problems

such as asthma, chronic bronchitis, cancer, children born with brain defects, and even death itself.

More than 24,000 Americans die each year from sulfur dioxide emissions alone. Unfortunately, many of our fellow Americans are exposed to these pollutants every day. Six out of 10 Americans, more than 186 million people in all, live in areas where air pollution levels endanger their lives. And these pollutants know no State boundaries. Pollution in one State easily moves to another, making it very difficult to reduce these pollutants through State regulation alone.

Fortunately, we have the technology to make the reductions necessary to protect our health and grow our economy at the same time. Now, we have to find the right incentives for utilities to make the right investments and implement this new technology.

Since coming to the Senate 8 years ago, I have tried to provide these industry incentives through multi-pollutant legislation, but every year I have been told that the technology doesn't exist or it is too complicated, or maybe we should just let the EPA handle it. So we have been here before. And despite claims that action would cripple our economy or the technology did not exist, Congress amended the Clean Air Act in 1990 and implemented the first cap-and-trade program for sulfur dioxide power plant emissions, known as the Acid Rain Program. We did so at the urging, I believe, of former President George Herbert Walker Bush.

Since then, it has been one of the most successful environmental programs in our Nation's history. Not only have we had 100 percent utility compliance, we also obtained greater emission reductions at a faster rate than we expected, at a quarter of the cost. Let me just say that again. Not only did we get 100 percent utility compliance, we did so achieving greater emission reductions at a faster rate than we expected at about one-quarter of the cost.

Still, 19 years later, Congress has not made any significant changes to the Clean Air Act, and the EPA has had difficulties tightening and broadening power plant emission reductions. Recent EPA attempts to regulate sulfur dioxide, nitrogen oxide and mercury emissions have been thrown out of courts, and each decision has limited the agency's policy choices of how to reduce these pollutants.

I have faith that the EPA can write new and stronger rules to regulate these pollutants, and I look forward to hearing how Ms. McCarthy and her colleagues expect to do that. But I am afraid that such regulations will be mired in the courts for years to come.

Delays result in business uncertainty, more air pollution, and more costly reductions in the future. This is why I believe, as does my friend and colleague, our friend and colleague from Tennessee, Senator Lamar Alexander, that we can no longer wait for clean air. Together, we are working on legislation, we call it a 3P bill for three pollutants, that would reduce emissions of sulfur dioxide, nitrogen oxide, and mercury.

We want legislation that does not allow backsliding on pollution reduction and that provides business and environmental certainty. And we will extend the Acid Rain Program to include stronger sulfur dioxide reductions and a national nitrogen oxide cap-and-trade program.

We agree that cap-and-trade should not be used for toxins. So we are putting a plant by plant cap on mercury emissions. We hope to introduce legislation in the next several weeks, and we respectfully seek your input this morning on this effective, efficient and doable plan for clean air.

I sincerely hope that today's hearing will serve as a reminder that we cannot forget the other Ps, those other Ps, SO_x, NO_x and mercury as we work on our climate itself.

And with that, I would like to welcome and to introduce to one and all the Ranking Member of our Subcommittee, Senator David Vitter from Louisiana.

David.

Senator VITTER. Thank you very much, Mr. Chairman, and thank you for calling and leading this hearing.

I am really eager to hear as much of the testimony as possible, and ask a few questions, so I will submit my opening statement for the record in that spirit.

Thank you all for being here.

[The prepared statement of Senator Vitter was not received at time of print.]

Senator CARPER. Thanks very much. Thanks very much for joining us.

Senator Voinovich, a man who's thought a little bit about these issues, I know from personal experience.

OPENING STATEMENT OF HON. GEORGE V. VOINOVICH, U.S. SENATOR FROM THE STATE OF OHIO

Senator VOINOVICH. Well, I missed being your Ranking Member, but I am, as you know, over on another committee, and I am so pleased Senator Vitter has taken my place as Ranking Member of this committee. But I must say that I am very interested in what this committee does.

Senator CARPER. And we are delighted that you are.

Senator VOINOVICH. Thanks for holding the hearing. I want to thank the witnesses for being here today, and I look forward to their testimony.

Today's panel does include Chris Korleski, Director of the Ohio Environmental Protection Agency, and I am glad that Chris is here. He has done an outstanding job in Ohio. Unfortunately, I may not be able to hear the testimony of the second set of witnesses because I have the Homeland Security appropriations bill on the floor.

Last year, the U.S. Court of Appeals for the D.C. Circuit vacated the clean air interstate CAIR and the clean air mercury rule, CAMR. The decisions undercut years of work and unraveled the Bush administration's attempt to implement a comprehensive air quality strategy to meet the combined goals of bringing much of the country into attainment with the ozone and fine particulate matter national ambient air standards, NAAQS; achieving reductions in mercury emissions from coal-fired power plants; addressing regional haze impacts from power plants; and responding to State petitions to control upward sources of ozone and fine particulate matter under section 126 of the Clean Air Act.

Generally, the CAIR implemented a cap-and-trade program to provide significant reductions in sulfur dioxide, NO_x, and emissions from fossil fuel-powered utilities across 28 eastern States and the District of Columbia. And CAMR sought to usher in phased reductions in mercury emissions in a manner that was consistent with the development of technologies.

CAIR and CAMR were an attempt to avoid piecemeal implementation of multiple emissions control obligations and to attain air quality standards in a cost-effective manner. Among other things, coordinating the compliance obligations of all three pollutants, SO_x, NO_x, and mercury, promoted efficiency enabling many companies to meet a substantial portion of mercury emission reduction obligations through the co-benefits achieved by installing pollution controls for NO_x and SO_x.

Indeed, CAIR and CAMR, combined with clean air viability, were viewed as one of the most effective set of environmental regulations in history. In 2005, EPA estimated the cost-benefit ratio of these three rules to be greater than 20 to 1, with most of the benefits coming from the CAIR rule. And while there were differences of opinion on how CAIR should be implemented, and there is a difference as the Chairman of the committee just mentioned that he wants to raise the percentages, the fact is that the rule was generally supported by much of the regulated community, affected States, environmental groups. Indeed, the Natural Resources Defense Council intervened on EPA's behalf in support of the rule. There was a coming together there.

Now, the rules have been vacated. There is no comprehensive and cost-effective policy to address NAAQS compliance, untangle the complicated web of overlapping and redundant regulations affecting power plants, and to bring about public health benefits we had hoped to achieve.

The situation is precisely what I feared, and is why Senator Inhofe and I worked so hard to move Clear Skies through this Congress, the last Congress. As most of you recall, Clear Skies was more or less the legislative equivalent of CAIR and CAMR, and while Clear Skies did not go far enough, as I said, for some, passing the legislation would have at least locked into law emissions reduction requirements.

Now, we are uncertain and we have a chaotic situation, and I believe it is incumbent on us to fix it. As you will hear today from several witnesses, without additional legislative authority, a comprehensive, uniform region-wide trading program cannot be developed. That is why Senator Inhofe and I intend to reintroduce a bill from last Congress that allows EPA to move forward with replacement of CAIR that ensures trading will be an essential element of that plan and that certainty can be restored to the emissions markets.

In regard to mercury, we are faced with a question of what is the appropriate level of control for mercury emissions. When we debated mercury controls previously, reasonable people disagreed as to what technology could deliver. Thank goodness that since that time, we have seen some improvement in technology dealing with mercury, and I am sure the witnesses may mention that.

I understand that good progress has been made in advancing those technologies they mentioned. However, it is less clear that a 90 percent control requirement can be met on a consistent and reliable basis for all plants. We might have to look at the kind of coal that is being burned at those plants if we are going to set requirements for it.

So overall, I am anxious to hear from the witnesses and to see if we can't bring some certainty back to the table and let folks know where they stand so that we can move forward and eliminate, as I say, the chaos that is out there today. I just wish that we had been able to do that last year. We would have been farther ahead in terms of reducing NO_x, SO_x and mercury.

Thank you, Mr. Chairman.

Senator CARPER. Thank you, Senator Voinovich.

I agree with a good deal that Senator Voinovich has said. I especially agree with his comment. I wrote it down. It is incumbent on us to fix this, and indeed it is. And I am very hopeful that we will.

Again, welcome to our first panel of our two guests. On my left, your right, Regina McCarthy. And we welcome you as the EPA Administrator for Air and Radiation. You have been in your post now I think for about a month, and probably it seems like about a year, but we are delighted that you have been confirmed and you are before us today as the Air Administrator.

And alongside of her we have no stranger to this committee, John Stephenson. Mr. Stephenson is the Director of Natural Resources and Environmental team for the Government Accountability Office and has come before our committee a number of times. We welcome you back again today.

Each of you will have roughly 5 minutes to complete your opening statement. The full content of your written statements will be included in the record.

And before I forget it, I am just going to ask unanimous consent that a modified statement from Steve Corneli be submitted to the committee. And I would ask unanimous consent at this time. Without objection, that will be the case.

[The referenced document was not received at time of print.]

Senator CARPER. And with that, let me just recognize Ms. McCarthy and ask you to proceed. Again, your full statement will be made a part of the record. Thank you.

STATEMENT OF REGINA McCARTHY, ASSISTANT ADMINISTRATOR, OFFICE OF AIR AND RADIATION, U.S. ENVIRONMENTAL PROTECTION AGENCY

Ms. MCCARTHY. Chairman Carper, Ranking Member Vitter, Senator Voinovich, I really want to appreciate and thank you for inviting me here today to testify on the work that we are going to do together to mitigate the impacts of emissions from power plants.

During my confirmation process about a year ago, no actually it was just about a month ago, I appreciated the opportunity to discuss our shared concerns about public health and environmental effects of air pollution from power plants. I agree with statements already made by Senator Carper and others that power plant emissions of NO_x, SO_x, mercury and other pollutants are significant

concerns, and I am grateful for the Senator's leadership on this important issue, and I look forward to working on this together.

As I stated at my confirmation hearing back in April, I care deeply about these issues, and I take my responsibility to protect our health and our environment very seriously. For over a generation, we have been hoping and expecting to significantly reduce emissions from power plants that cause impacts like premature deaths, childhood asthma and acid rain.

We have made great progress since 1970, but we have a long way to go. And now we also face the daunting challenge that is posed to us by climate change. We now have both a great responsibility as well as an interesting and equally large opportunity to re-shape and coordinate our approach to reducing air pollution from power plants.

Administrator Jackson has made it clear to me that we need to move forward both smartly and aggressively on the regulatory side to meet our mission as science and the law demands, and in ways that make sense, that offer flexibility without sacrificing human health or environmental protection, and that are also cost-effective.

"Aggressively" means we listen to the scientists and we protect public health and the environment as much as we can and as soon as we can, and I know you share these goals as well.

Recently, I took the first step in implementing this approach by issuing a notice of EPA's intent to collect information about toxic air emissions that are being generated and emitted from power plants. This data collection is necessary for us to set smart and aggressive maximum achievable control technology standards for utilities. Until we analyze this data, I cannot tell you how the MACT standard will come out. But what I can tell you is that there are some coal-fired power plant boilers that have already reduced their mercury emissions by 90 percent or more. But I will leave that further discussion to my good colleague from GAO who will provide you information from his study.

And I can tell you that the MACT program requires that controls will be installed in existing sources within 3 years after the final rule has been issued, with the possibility of an extension of another year for specific sources only under limited circumstances.

At the same time as we are working on the MACT standard, we are also working to address the problem of interstate transport of SO_x and NO_x emissions and the resulting fine particulate in ozone pollution across the Eastern U.S. We are developing a new approach, one that fits within the framework of the 2008 court decision that remanded the Clean Air Interstate Rule, so that we can reduce regional interstate transport of these long distance pollutants, while guaranteeing that each downwind non-attainment area is getting the reductions it is entitled to under the law. We told the court that we would take 2 years.

We are moving aggressively to meet that commitment in hopes of proposing a rule in early 2010, with finalization in early the following year. It is an aggressive schedule, but we know it is important. We understand the need for certainty.

There are other rules EPA is working on as well to affect power plants, and we are using also our non-regulatory tools to reduce

emissions by reducing energy demand through conservation, energy efficiency, and the development of renewable resources.

The future of our power industry wouldn't also be complete if I didn't talk about the need for reducing greenhouse gas emissions. And as Administrator Jackson has indicated, the best way to do that is through comprehensive energy legislation, and we are looking forward to working with you on that as well.

But to sum up, we are working hard to understand the regulatory challenges before us, to coordinate those challenges, to work with industry, with environmental constituents and other groups to make sure that we do move forward aggressively and smartly on our regulatory obligations in ways that provide certainty so that investments can be made once again in this area, and we can successfully meet our environmental and public health challenges moving forward.

In closing, I want to thank Senator Carper and other members of the committee for beginning another chapter in this discussion. We look forward to working with you and providing you the technical assistance you need to move forward.

Thank you very much.

[The prepared statement of Ms. McCarthy follows:]

STATEMENT OF REGINA A. MCCARTHY
ASSISTANT ADMINISTRATOR
OFFICE OF AIR AND RADIATION
U.S. ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
U.S. SENATE
JULY 9, 2009

Chairman Carper, Ranking Member Vitter, and members of the Subcommittee, thank you for inviting me to testify today about EPA's efforts to mitigate the impacts of emissions from power plants. During my visits with many of you during my confirmation process to be the head of EPA's Office of Air and Radiation, I appreciated the opportunity to discuss with you our shared concerns over the public health and environmental effects of air pollutants from power plants. I agree with Senator Carper that emissions of SO_2, NO_x, mercury, and other pollutants from the generation of energy is a cause for great concern, and I am grateful for his leadership on this important issue over the years. I am glad that we have begun this dialogue and I look forward to continuing to work on this issue.

As I stated at my confirmation hearing in April, I take my responsibility to protect our health and our environment very seriously and I care deeply about these issues. I know everyone here is familiar with the range of serious health and environmental problems caused by SO_2, NO_x, and mercury. For over a generation we have been hoping and expecting that we could lower emissions from power plants enough to dramatically reduce the frequency of problems like premature deaths, childhood asthma, and acid rain. We have made great progress since 1970, but we have a great distance yet to go. In the

meantime, we have learned about the likelihood of increasing serious public health and environmental risks due to CO_2 and other greenhouse gases, and we must now make complex decisions about how to address that threat.

In 1980 U.S. power plants emitted 17.3 million tons of SO_2. In 1990, the year Congress passed the Clean Air Act Amendments that included the Acid Rain Program, power plants still emitted 15.7 million tons of SO_2 and 6.7 million tons of NO_x. By 2000 power plant emissions had dropped to 11.2 million tons of SO_2 and 5.1 million tons of NO_x. The Acid Rain Program was – and is - not just protecting our lakes and streams from acid rain, but also protecting millions of Americans and Canadians from the harmful effects of fine particles. In 2008, power plants emitted 7.6 million tons of SO_2 and 3 million tons of NO_x. While all coal-fired power plants in the U.S. now control particulate matter and about two-thirds of them use advanced pollution controls for SO_2 and/or NO_x, it is clear that more cost-effective emission reductions are both necessary and possible.

Data from the 2005 Clean Air Interstate Rule (CAIR) show that the power industry is capable of making significant reductions quickly. The data show that in just three years since the rule was finalized in 2005, the sources planning to comply with it reduced annual SO_2 emissions by 2.5 million tons and annual NO_x emissions by 500,000 tons, with many of these emission reductions taking place in the critical summertime ozone season. Rest assured that even though CAIR has now been remanded to EPA, we do not intend to backslide and lose the public health or environmental benefits we have worked so hard to get. Instead, we intend to use what we learned from the CAIR experience to move forward.

And so we find ourselves facing both the great responsibility and the great opportunity to reshape our approach to reducing air pollution from power plants. When I arrived at EPA last month, I was greeted with a briefing that outlined about a dozen pending or imminent rules and decisions affecting power plants. It is a little overwhelming to be sure, but taken together, these pieces will pave the way towards significant progress over the next few years. Our goal is to make these regulations and decisions work together in a coordinated way to reduce emissions from the entire industry. My purpose here today is to support your efforts to reduce emissions from power plants, to confirm that cost-effective reductions are necessary and possible, and to talk about what we are doing under existing law to achieve these common goals.

Before I arrived at EPA this spring, Administrator Lisa Jackson signed a proposal to regulate mercury and other toxic air emissions from cement kilns. While this rule does not affect power plants, I mention it today because I believe it sends the message that this Administration is serious about reducing air pollution. Since my nomination and confirmation, Administrator Jackson has made it clear that she wants us to move forward both smartly and aggressively. Smartly means we take care to make our regulations fit as best we can into the existing regulatory and economic landscape, that they make sense, that they offer what flexibility they can without sacrificing human health or environmental protection, and that they are cost-effective. Aggressively means we protect public health and the environment as much as we can and as soon as we can.

Recently, I took the first step in implementing this approach by issuing a notice of the Agency's intent to collect information about power plants The information collection would require power plants to provide EPA with data on their emissions of toxic air

pollutants, including mercury, acid gases, and dioxin. This data collection could be extensive, but it is necessary for us to set smart and aggressive Maximum Achievable Control Technology (MACT) standards for toxic air pollutants from power plants. As we receive the data, we plan to analyze it and propose MACT standards for power plants as quickly as our understanding of the issues allows.

As you know, the MACT program requires us to set our standards for existing sources at least as stringently as the top performing 12% of sources. Until we identify the top performing 12% of sources, we will not know what that level will be. I can tell you that there are some coal-fired power plant boilers that have already reduced their mercury emissions by 90% or more. The engineers at EPA tell me it is likely the data we collect will indicate the need for a MACT standard that reduces emissions of many air toxics by similar amounts. I have committed to them and to you that I will follow where the data lead on this and all issues. I can also tell you that the MACT program requires these controls to be installed on existing sources within three years after the rule is finalized, with the possibility of an extension of another year for specific sources under some limited circumstances.

EPA is also continuing to address the problem of interstate transport of SO_2 and NOx emissions and the resulting fine particle and ozone pollution across the eastern U.S. Working within the framework of the 2008 court decision that remanded CAIR, we are developing a new approach to reduce regional interstate transport of these long-distance pollutants while guaranteeing that each downwind non-attainment area is getting the reductions it is entitled to under the law. We have told the court that we thought it would take about two years to develop a final rule to replace CAIR. We are well underway with

the necessary emissions and air quality modeling, and both staff and managers have already held many meetings with various stakeholders, particularly the states, so that we can consider their perspectives early in our process. Although this transport rule may be finalized before the MACT standard, it will take into account any relevant emissions data from the Information Collection Request I mentioned earlier. In addition, it is likely that whatever controls end up being necessary to meet our MACT standard are also likely to substantially reduce emissions of SO_2 and particulate matter (PM).

There are other rules EPA is working on that affect power plants – rules that reduce regional haze, rules that help states achieve the National Ambient Air Quality Standards, and rules that reduce emissions from new or modified power plants. Each of these rules is an important component of our ability to clean up the air we breathe and improve the health of the world around us, and will complement the MACT and interstate transport rules.

For example, in January of this year EPA made findings of "failure to submit" for 38 states that had not submitted regional haze State Implementation Plans (SIPs). This started the "clock" for us to put a Federal Implementation Plan (FIP) in place by January of 2011. In addition, none of the regional haze SIPs we have received have been approved, in most cases because they rely on reductions from CAIR that may not be enforceable in the future. We are currently working to coordinate our modeling and decision-making on these haze SIP and FIP issues with the decisions we are making for the utility MACT and interstate transport rules.

We are also using our non-regulatory tools to help reduce emissions by reducing energy demand and supporting the transition to a clean energy future. EPA and the

Department of Energy are working together on Energy Star, which helps individuals, companies, cities, counties, states, and the federal government to reduce their energy use. Energy Star has helped revolutionize the market for cost-effective energy efficient products, and provides a wide range of tools and resources to help homeowners and businesses reduce their energy costs. For example, "Home Performance with Energy Star" has 27 sponsors who have completed over 50,000 retrofits to date that can serve as a model for reducing greenhouse gas emissions from the residential buildings sector. EPA also has programs that provide information to state and local governments about different ways to design successful energy efficiency and renewable energy programs.

The Administration is a strong supporter of energy efficiency across the board. EPA is working with federal agencies such as DOE and HUD that received American Recovery and Reinvestment Act (ARRA) funding for weatherization to install the best types of energy efficiency upgrades, as well as to address other environmental concerns that can come up during these renovations such as indoor air quality and lead contamination. We also continue to coordinate with other federal agencies that have responsibilities for power generation, such as DOE and FERC, to help make energy efficiency a top priority energy resource.

State and federal agencies are working to reduce demand for electricity in dozens of other complementary ways as well, such as supporting policies to realign utility business models so that investing in energy efficiency is no longer a disincentive, supporting demand-response programs and related pricing structures, weatherizing homes, supporting combined heat and power, and installing the beginnings of smart grid technologies. DOE is investing in clean energy technology development, and working

with cities and counties to experiment with innovative financing to help customers install them. All of these efforts and many more are helping us clean the air by making it possible to imagine a not-too-distant future where we can shift investments and subsidies away from the highest polluting plants that are the hardest to clean up and towards the clean state-of-the-art technologies we need for the future.

Let me share a quick example from my experience in Connecticut that illustrates the importance of including demand-side tools in our efforts to reduce air pollution from power plants. Connecticut is making an aggressive commitment to using energy efficiency as a priority energy resource by employing a full suite of strategies. These strategies include requiring that a growing percentage of energy demand be met through energy efficiency, identifying energy efficiency as the resource of first choice in energy planning, aggressive funding of state and utility run programs, and rewarding utilities for their achieved energy savings. Among other things, this focused effort on energy efficiency has allowed the state to target investment in Southwest Connecticut, a load pocket that includes part of New York City, which was under intense scrutiny to ensure adequate reliability.

The six New England states, the Independent Transmission System Operator (ISO), and industry stakeholders have worked together to develop something called a "Forward Capacity Market." Under this system, ISO New England can project the needs of the power industry three years in advance, and then hold an auction to purchase the resources – either demand- or supply-side resources - necessary to meet those needs. In the latest auction, in December of 2008, over 2,900 MW of demand-side resources "cleared;" that is 400 MW more than cleared in the first auction. Briefly put, this means it

is cheaper to save this electricity than to build new capacity to generate it, and that states and industry are continuing to improve their ability to draw on energy efficiency as a valuable resource. These demand-side resources are pollution-free megawatts that make it easier for our states to meet their clean air obligations and – most importantly – for our citizens to breathe clean air.

No discussion regarding the future of the power industry is complete without discussing greenhouse gas pollution control. As Administrator Jackson has repeatedly said, the best approach would be to address this through comprehensive energy legislation. Like many of you, I watched the debate in the House over the Waxman-Markey bill closely, and EPA staff provided timely modeling to assist the legislators there. In addition, we are laying the groundwork for new climate legislation and regulation through efforts such as the Mandatory Reporting Rule. There are of course still some unanswered questions about what exactly the final bill will require power plants to do, but I am confident of one thing: the new crop of power plants will look very different than they do now. I have no illusions that this transition will be easy, but I know it is necessary. I am confident that the laws we adopt and the regulations we implement will drive smart investments in pollution control and energy efficiency, as well as innovative generation technologies, that will pay back benefits for years to come.

As I consider how best to move forward to protect public health, meet our legal obligations, and support this transformation of the energy industry, I come back to the following basic principles. First, we must get emission reductions at the appropriate global, regional, and/or local scales as quickly as is practical. This means getting our new policies in place as quickly as we can while doing what we can to keep emissions from

rising in the meantime. These policies must cover all the pollutants we are responsible for: SO_2, NO_x, air toxics (e.g., mercury, acid gases, others), and greenhouse gases. Second, we must not pay any more than necessary to reach our environmental goals. This means looking for cost-effective ways to get reductions on the right geographic scales by using the right combination of emissions trading, performance standards and hybrid approaches as appropriate; providing industry the kind of information they can rely on to plan for the future so we can keep the lights on and make smart investments; and avoid unnecessarily high or volatile energy costs for consumers. Third, our policies must be clear, coordinated, and legally defensible. Finally, we must keep in mind that soon we will likely be living in a carbon controlled world that will require greenhouse gas emission reductions from power plants. As we plan for the future, it is both environmentally and economically irresponsible not to take this likelihood into account.

To sum up, we are working hard to coordinate our approach to regulating power plants both now and in the future. I am not saying we will solve all of our problems next year, or the year after, but I am saying we are committed to this effort just as you are. One of my top priorities at EPA is to work with you, with the power industry, with community groups and environmental groups, and with experts from government, business, and universities to find the right path forward. This path will let us meet our legal and moral obligations to protect human health and the environment and keep the lights on, all while laying a strong foundation for future changes and investments in the years to come.

In closing, I would like to thank Senator Carper and other members of the committee for your strong leadership on these issues over the years. I am confident we

can make great strides to meet our shared goals to protect public health and the environment from the effects of air pollution in the near future.

Thank you. I look forward to answering your questions.

Environment and Public Works Committee Hearing
July 9, 2009
Follow-Up Questions for Written Submission

Senator James M. Inhofe

1. In your testimony (last paragraph of page 4) you indicate that in response to the courts remand of CAIR the EPA is "developing a new approach to reduce regional interstate transport of these long-distance pollutants."

a. Can you tell us about the rule under development? Specifically,

i. Will it continue to be a market based approach?

ii. How will it integrate the use of existing Title IV acid rain program allowances?

iii. What the agency's timeline for formally proposing the rule?

ANSWER: EPA is continuing to evaluate options for a rule to replace the CAIR. We are carefully weighing a range of alternative proposals, including market based approaches. We aim to propose a rule in early 2010. This proposal will include one or more options; any proposed options will be consistent with the Court's July 11, 2008 decision. We aim to complete the rule in 2011.

2. Do you believe that the current Clean Air Act would allow for the most cost-effective trading program?

ANSWER: As EPA evaluates options for a rule to replace CAIR, we will be weighing a range of alternative proposals that we believe are within the authority of the Clean Air Act and the court's decision.

3. Do you believe that improvements in energy efficiency will help reduce air pollution, including emissions of GHGs? If so, should emission sources undergoing plant changes to improve efficiency have to undergo time-consuming and costly New Source Review?

ANSWER: Improved energy efficiency is expected to reduce global and regional air pollution, including GHG emissions. In most instances, energy efficiency improvements at a particular unit will also result in reduced emissions compared to that unit's emissions in recent years, assuming the same level of operation. Changes that reduce emissions from an emission source need not undergo New Source Review.

However, if output outpaces improvements in energy efficiency at a particular unit, emissions may increase compared to that unit's past emissions. In that case, those emissions increases may need to undergo New Source Review to address their impact on the environment.

4. Since the courts vacatur last year, has the EPA updated its modeling to determine which states should be included in a CAIR replacement rule? If so, could you tell us if the EPA modeling indicates any changes of the subset of states to be subject to the CAIR replacement rule?

ANSWER: EPA has not yet updated its modeling to determine which states will be included in the rule we will propose to replace the remanded CAIR rule.

As you know, the Clean Air Act section 110(a)(2)(D) requires states to assure that they do not contribute significantly to non-attainment problems in downwind states. EPA has issued two rules to help eastern states deal with interstate transport: the NO_x SIP Call in 1998, and the CAIR rule in 2005. In both cases EPA conducted modeling that demonstrated which states were contributing to non-attainment problems in downwind states. That modeling formed the basis of these rules.

We are now in the process of doing new modeling to understand which downwind fine particle and ozone non-attainment areas are affected by interstate transport from upwind states. Until that modeling and analysis is complete, and we consider the implications of the court decision for how we determine which states must control emissions under section 110(a)(2)(D), we will not know what states will be covered under the new interstate transport rule.

5. How much money has the EPA spent on CAIR?
a. Cost in developing rule?
b. Cost to defend the legality of the rule?
c. Estimated cost to develop a replacement rule?

EPA does not keep precise records of Full Time Equivalents (FTE) devoted to developing or defending rules or major decisions. However, in October 2008, EPA estimated in response to a request from Henry Waxman, at that time Chairman of the House Committee on Oversight and Government Reform, that to date approximately 80 FTE had been spent on the CAIR rule over the many years the rule was being developed and litigated, and approximately $35 million in contract funds had been expended.

EPA believes that lessons learned in the first CAIR rule can help make the process of developing the replacement rule more efficient. However, given that the number of modeling runs, the scope of the analysis, and other major decisions have not yet been made, and the analysis is not yet complete, we cannot estimate with any accuracy what it will cost to develop a replacement rule for CAIR.

Senator David Vitter

1. In your testimony (last paragraph of page 4) you indicate that in response to the courts remand of CAIR the EPA is "developing a new approach to reduce regional interstate transport of these long-distance pollutants."

a. Can you tell us a little about the rule under development? Specifically,
i. Will it continue to be a market based approach?
ii. How will it integrate the use of existing Title IV acid rain program allowances?
iii. What the agency's timeline for formally proposing the rule?

ANSWER: See response above to Senator Inhofe Question 1.

2. Since the courts vacatur last year, has the EPA updated its modeling to determine which states should be included in a CAIR replacement rule? If so, could you tell us if the EPA modeling indicates any changes of the subset of states to be subject to the CAIR replacement rule?

ANSWER: See response above to Senator Inhofe Question 4.

3. How much money has the EPA spent on CAIR?
a. Cost in developing rule?
b. Cost to defend the legality of the rule?
c. Estimated cost to develop a replacement rule?

ANSWER: See response above to Senator Inhofe Question 5

4. On January 21, 2009 President Obama issued an executive order calling for transparency and open government. In developing a replacement rule for CAIR, does your office (Air and Radiation) work directly with stakeholders in the emission markets outside of the formal notice and comment process? If so, how do you select these stakeholders and do you provide disclosure about these meeting to the rest of the emission market participants?

ANSWER: Yes, in light of the Court decision to remand CAIR to EPA and EPA's obligation to re-write the rule, the Office of Air and Radiation has been communicating frequently with stakeholders in the SO_2 and NO_x emissions markets and with the rest of the stakeholder community. We have met with a broad range of stakeholder groups so far; they are listed in Attachment 1.

These meetings with stakeholders were "listening sessions" that provided a broad cross-section of stakeholders the opportunity to provide EPA input at an early stage. Some meetings were at the stakeholders' request, while some were initiated by EPA in order to hear from a variety of groups. Meeting notes were compiled and are part of the new rule's docket. EPA remains open and willing to meet with any group who has input on the rule.

5. In your testimony on (3rd paragraph of page 2) you allude that the 2.5 million tons of emissions reduced between 2005 and 2008 were attributed to CAIR. However, isn't it a bit misleading to attribute all of these emission reductions to CAIR since the current recession that began in December 2007 surely reduced electrical demand and resulting S02 emissions?

ANSWER: While electricity demand has decreased somewhat recently, EPA has measured emissions and heat input in the CAIR region since CAIR was promulgated in 2005. Over the three year period I mentioned in my testimony, SO_2 emissions have decreased substantially (about 26%) while heat input has stayed about the same (decreased less than 1%). This indicates that, generally, utilization of the units covered by CAIR has been fairly constant.

Attachment 1

Clean Air Transport Rule Stakeholder List (July 14, 2009)

(1) March 16, 2009 – Lake Michigan Air Directors Consortium (LADCO)
- Michigan DEQ
- Ohio EPA
- Illinois EPA
- Indiana DEM
- Wisconsin DNR

(2) March 18, 2009 – Ozone Transport Commission (OTC)
- NACAA
- NESCAUM
- MARAMA
- Connecticut
- Delaware
- District of Columbia
- Maine
- Maryland
- Maryland
- New Hampshire
- New Jersey
- Pennsylvania
- Rhode Island
- Virginia

(3) March 31, 2009 – Non-Governmental Organizations (Enviros and Health Advocates)
- Clean Air Task Force
- Natural Resources Defense Council (NRDC)
- Sierra Club
- National Parks Conservation Association (NPCA)
- American Lung Association

(4) April 1, 2009 – Central States Air Resources Agency (CenSARA)
- Arkansas DEQ
- Iowa DNR
- Kansas DHE
- Kansas City
- Louisiana DEQ
- Minnesota Pollution Control Agency
- Missouri DNR
- City of St. Louis
- St. Louis County
- Nebraska DEQ
- Oklahoma DEQ

Texas TCEQ
City of Houston

(5) April 2, 2009 – National Association of Clean Air Agencies (NACAA)
Dayton (Ohio) Regional Air Pollution Control Agency
Houston Department of Health and Human Services
Iowa DNR
Knox County Tennessee Air Quality Management
Maryland DEQ
Michigan DEQ
New Jersey DEP
North Carolina DENR
New York State DEC
Oklahoma DEQ

(6) April 13, 2009 - Southeastern States Air Resource Managers (SESARM) and METRO 4
Alabama ADEM
Florida DEP
Georgia EPD
Kentucky
Louisville Air Pollution Control District
North Carolina DENR
Mississippi DEQ
South Carolina DHEC
Tennessee DEC
Knoxville County AQM
Nashville/Davidson County
Nashville Metro Public Health Department
Virginia DEQ

(7) April 14, 2009 - Council of Industrial Boiler Owners (CIBO) and Other Manufacturers
Fuel Tech
Toyota
Eastman Chemical
Alcoa
DuPont
American Chemistry Council
AF&PA
Bracewell & Giuliani for CIBO
Koch Public Sector
Inter-Power/AhlCon Partners
Purdue University
MWV & Alliance of Automobile Manufacturers
Alliance of Automobile Manufacturers
Babcock & Wilcox
Cogentrix Energy

Piney Creek Power Plant

(8) April 17, 2009 – Electric Power Sector (Edison Electric Institute and other electric power generation associations and companies)

EEI
American Electric Power
Calpine
Con Edison Company of NY
Constellation
Consumers Energy
Dominion
Entergy
Entergy (Baker Botts)
Exelon
FPL
Large Public Power Council (Van Ness Feldman)
Luminant
Midwest Generation (Latham & Watkins)
Minnesota Power
Mirant
Midwest Ozone Group (Jackson Kelly)
National Mining Association
National Mining Association (Troutman Sanders)
National Rural Electric Cooperative Association
NRG
PPL
PSEG
Reliant
Southern Company
Utility Air Regulatory Group (Hunton & Williams)
United Mine Workers of America

(9) April 28, 2009 – Texas Commission on Environmental Quality (TCEQ)

Senator CARPER. Thank you very much, Ms. McCarthy.

And now let me call on Mr. Stephenson. Welcome.

STATEMENT OF JOHN B. STEPHENSON, DIRECTOR, NATURAL RESOURCES AND ENVIRONMENT, U.S. GOVERNMENT ACCOUNTABILITY OFFICE

Mr. STEPHENSON. Thank you, Mr. Chairman, Senators Vitter, Voinovich, and Alexander.

I am pleased to be here today to discuss our preliminary findings on the effectiveness and cost of mercury control technologies as well as key issues EPA faces in developing a regulation for mercury emissions from coal-fired power plants.

Mercury, as you know, is a toxic element that poses human health risk, including neurological disorders in children that impair their cognitive abilities. Coal-fired power plants represent the largest unregulated industrial source of mercury emissions in the United States.

Nearly 10 years ago, EPA determined that it was appropriate and necessary to regulate mercury emissions from coal-fired power plants under section 112 of the Clean Air Act. Subsequently, as you have heard, in 2005 EPA chose to promulgate a cap-and-trade program, rather than establish a maximum achievable control or MACT standard to control mercury emissions. However, the cap-and-trade program was vacated by the D.C. Circuit Court of Appeals in February 2008 before EPA could implement it.

EPA must now develop a MACT standard to regulate mercury emissions from coal-fired plants which will require most existing boilers to reduce mercury emissions to at least the average level achieved by the best performing 12 percent of the boilers.

While developing MACT standards for hazardous air pollutants can take up to 3 years, EPA has until July 27 of this year to settle or respond to a lawsuit filed by several environmental groups that require EPA to promulgate final mercury emissions standards for coal-fired plants by a date no later than December 2010.

In 2005, we reported that mercury emissions reduction technology showed promise but that data on long-term performance in a production facility were limited. My testimony today is based on ongoing work for this subcommittee, so our findings are preliminary, but our analysis to date shows that the most promising technology, sorbent injection, has matured sufficiently for us to report that at least a 90 percent reduction in mercury emissions appears achievable and affordable at most power plants.

This assessment is based on the widespread success of sorbent injection systems at types of boiler configurations and use at more than three-fourths of the U.S. coal-fired boilers. Specifically, the substantial mercury reductions have been demonstrated at all 25 boilers at 14 plants currently using these systems to comply with State requirements, and at 50 DOE and industry full scale tests at operating power plants as well.

In addition, our preliminary analysis shows that the cost of sorbent control technology for mercury currently being used by power plants is far less than the cost of control technologies for other pollutants such as wet scrubbers for sulfur dioxide or selective catalytic reduction for nitrogen oxide.

The cost of mercury controls varied depending upon what other pollution control devices were installed at the plant but generally averaged about $3.6 million or 12/100ths of a cent per kilowatt hour. If fully passed on to customers, this represents a potential increase in the average residential customer's monthly bill of only 97 cents, but the actual increase will depend on market conditions and the regulatory framework.

For example, on rate-regulated company has reported that it will be requesting a consumer rate increase of only 6 cents to 10 cents per month to install mercury controls, costing about $4.5 million.

Moving forward, EPA faces key regulatory issues that will have implications on the effectiveness of the mercury emission standards: First, how it will calculate emissions reductions from the best performers on which the MACT standard will be based; second, whether it can or should establish varying standards for the three coal types, bituminous, sub-bituminous, and lignite; and third, how EPA's standard will take into account varying operating conditions.

In addition, EPA must decide on whether it will use an input standard, the mercury content of the coal being burned; an output standard, emissions from the stack; or some combination.

Finally, the vacating of the Clean Air Mercury Rule by courts has delayed the collection of data on mercury emissions and resolution of some technical issues with monitoring systems. We are pleased to note that just last week, EPA announced its intention to conduct an information collection request from power plants, which is the first step to establishing a utility MACT.

Whether power plans will install sorbent inspection systems for mercury alone or pursue multi-pollutant control strategies for sulfur dioxide and nitrogen oxide as well will likely be driven by the broader regulatory context in the legislation you have heard, in which they will operate in the future.

Mr. Chairman, that concludes the summary of my statement. Our final report on mercury control technology will be issued to you in October, and I will be happy to answer questions.

[The prepared statement of Mr. Stephenson follows:]

United States Government Accountability Office

GAO

Testimony

Before the Subcommittee on Clean Air and Nuclear Safety, Committee on Environment and Public Works, U.S. Senate

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CLEAN AIR ACT

Preliminary Observations on the Effectiveness and Costs of Mercury Control Technologies at Coal-Fired Power Plants

Statement of John B. Stephenson, Director
Natural Resources and Environment

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GAO-09-860T

July 9, 2009

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Highlights

Highlights of GAO-09-860T, testimony before the Subcommittee on Clean Air and Nuclear Safety, Committee on Environment and Public Works, U.S. Senate

CLEAN AIR ACT

Preliminary Observations on the Effectiveness and Costs of Mercury Control Technologies at Coal-Fired Power Plants

Why GAO Did This Study

The 491 U.S. coal-fired power plants are the largest unregulated industrial source of mercury emissions nationwide, annually emitting about 48 tons of mercury—a toxic element that poses health threats, including neurological disorders in children. In 2000, the Environmental Protection Agency (EPA) determined that mercury emissions from these sources should be regulated, but the agency has not set a maximum achievable control technology (MACT) standard, as the Clean Air Act requires. Some power plants, however, must reduce mercury emissions to comply with state laws or consent decrees.

After managing a long-term mercury control research and development program, the Department of Energy (DOE) reported in 2008 that systems that inject sorbents—powdery substances to which mercury binds—into the exhaust from boilers of coal-fired power plants were ready for commercial deployment. Tests of sorbent injection systems, the most mature mercury control technology, were conducted on a variety of coal types and boiler configurations—that is, on boilers using different air pollution control devices.

This testimony provides preliminary data from GAO's ongoing work on (1) reductions achieved by mercury control technologies and the extent of their use at coal-fired power plants, (2) the cost of mercury control technologies in use at these plants, and (3) key issues EPA faces in regulating mercury emissions from power plants. GAO obtained data from power plants operating sorbent injection systems.

View GAO-09-860T or key components.
For more information, contact John Stephenson at (202) 512-3841 or stephensonj@gao.gov.

What GAO Found

Commercial deployments and 50 DOE and industry tests of sorbent injection systems have achieved, on average, 90 percent reductions in mercury emissions. These systems are being used on 25 boilers at 14 coal-fired plants, enabling them to meet state or other mercury emission requirements—generally 80 to 90 percent reductions. The effectiveness of sorbent injection is largely affected by coal type and boiler configuration. Importantly, the substantial mercury reductions using these systems commercially and in tests were achieved with all three main types of coal and on boiler configurations that exist at nearly three-fourths of U.S. coal-fired power plants. While sorbent injection has been shown to be widely effective, DOE tests suggest that other strategies, such as blending coals or using other technologies, may be needed to achieve substantial reductions at some plants. Finally, sorbent injection has not been tested on a small number of boiler configurations, some of which achieve high mercury removal with other pollution control devices.

The cost of the mercury control technologies in use at power plants has varied, depending in large part on decisions regarding compliance with other pollution reduction requirements. The costs of purchasing and installing sorbent injection systems and monitoring equipment have averaged about $3.6 million for the 14 coal-fired boilers operating sorbent systems alone to meet state requirements. This cost is a fraction of the cost of other pollution control devices. When plants also installed a fabric filter device primarily to assist the sorbent injection system in mercury reduction, the average cost of $16 million is still relatively low compared with that of other air pollution control devices. Annual operating costs of sorbent injection systems, which often consist almost entirely of the cost of the sorbent itself, have been, on average, about $640,000. In addition, some plants have incurred other costs, primarily due to lost sales of a coal combustion byproduct—fly ash—that plants have sold for commercial use. The carbon in sorbents can render fly ash unusable for certain purposes. Advances in sorbent technologies that have reduced sorbent costs at some plants offer the potential to preserve the market value of fly ash.

EPA's decisions on key regulatory issues will have implications for the effectiveness of its mercury emissions standard. For example, the data EPA decides to use will impact (1) the emissions reductions it starts with in developing its regulation, (2) whether it will establish varying standards for the three main coal types, and (3) how the standard will take into account a full range of operating conditions at the plants. These issues can affect the stringency of the MACT standard EPA proposes. Data from EPA's 1999 power plant survey do not reflect commercial deployments or DOE tests of sorbent injection systems and could support a standard well below what has recently been broadly achieved. Moreover, the time frame for proposing the standard may be compressed because of a pending lawsuit. On July 2, 2009, EPA announced that it planned to conduct an information collection request to update existing emission data, among other things, from power plants.

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss our preliminary findings on the effectiveness and costs of mercury control technologies, as well as key issues the Environmental Protection Agency (EPA) faces in developing a regulation for mercury emissions from coal-fired power plants. Mercury is a toxic element that poses human health threats—including neurological disorders in children that impair their cognitive abilities. Coal-fired power plants, the nation's largest electricity producers, represent the largest unregulated industrial source of mercury emissions in the United States.[1]

EPA determined in 2000 that it was "appropriate and necessary" to regulate mercury emissions from coal-fired power plants under section 112 of the Clean Air Act. Subsequently, in 2005, EPA chose to promulgate a cap-and-trade program,[2] rather than establishing a maximum achievable control technology (MACT) standard to control mercury emissions—as required under section 112. However, the cap-and-trade program was vacated by the D.C. Circuit Court of Appeals in February 2008 before EPA could implement it. EPA must now develop a MACT standard to regulate mercury emissions from coal-fired power plants[3]—which will require most existing coal-fired boilers to reduce mercury emissions to at least the average level achieved by the best performing 12 percent of boilers.[4] While developing MACT standards for hazardous air pollutants can take up to 3 years, EPA may be required to promulgate these standards in a shorter period of time to fulfill a negotiated settlement with litigants or comply with a court decision. Specifically, EPA has until July 27, 2009, to settle or respond to a lawsuit filed by several environmental groups requesting an order requiring the EPA Administrator to

[1]EPA's 1999 data, the agency's most recent available data on mercury emissions, show that the 491 U.S. coal-fired power plants annually emit 48 tons of mercury into the air.

[2]EPA's cap-and-trade program, known as the Clean Air Mercury Rule, was established under Clean Air Act section 111 and was to establish a cap on mercury emissions of 38 tons for 2010 and a second phase cap of 15 tons for 2018.

[3]According to EPA, its MACT will also cover the other hazardous air pollutants listed in the Clean Air Act as well as emissions from oil-fired power plants.

[4]For categories with fewer than 30 sources, the MACT standard must be set, at least, at the average level achieved by the top five performing units.

promulgate final mercury emissions standards for coal-fired power plants by a date certain no later than December 2010.

The Department of Energy's (DOE) National Energy Technology Lab has worked with EPA and the Electric Power Research Institute (EPRI), among others, during the past 10 years on a comprehensive mercury control technology test program. Mercury is emitted in such low concentrations that its removal and measurement are particularly difficult, and it is emitted in several forms, some of which are harder to capture than others.[5] The DOE program has focused largely on testing sorbent injection systems on all coal types and at a variety of boiler configurations at operating power plants.[6] Testing at a variety of boiler configurations using different types of coal was important because the type of coal burned and the variety of air pollution control devices for other pollutants already installed at power plants can impact the effectiveness of sorbent injection systems. Further, some power plants achieve mercury reductions as a "co-benefit" of using controls designed to reduce other pollutants, such as sulfur dioxide, nitrogen oxides, and particulate matter.

According to a 2008 DOE report describing its mercury technology testing program, "DOE successfully brought mercury control technologies to the point of commercial-deployment readiness." Nonetheless, the report stated that while the results achieved during DOE's field tests met or exceeded program goals, the only way to truly know the effectiveness—and associated costs—of mercury control technologies is through their continuous operation in commercial applications at a variety of configurations. In recent years, at least 18 states have passed laws or regulations requiring mercury emission reductions at coal-fired power plants. The compliance time frames for the state requirements vary, and four states—Connecticut, Delaware, Massachusetts, and New Jersey—require reductions currently. In this context, you asked us to examine (1) what mercury reductions have been achieved by existing mercury control technologies and the extent to which they are being used at coal-fired power plants; (2) the costs

[5]Mercury can be emitted in particulate, oxidized, or elemental form.

[6]Sorbent injection systems inject sorbents—powdery substances, typically activated carbon, to which mercury binds—into the exhaust from boilers before it is emitted from the stack.

associated with mercury control technologies currently in use; and (3) key issues EPA faces in developing a new regulation for mercury emissions from coal-fired power plants.

We are currently responding to these objectives. To do this, we are identifying power plants with coal-fired boilers that are currently operating sorbent injection systems—the most mature, mercury-specific control technology—to reduce mercury emissions. Using a structured interview tool, we are obtaining data from plant managers and engineers on the effectiveness of sorbent injection systems at reducing mercury emissions and the costs of doing so. We are also obtaining information on the engineering challenges plant officials have encountered in installing and operating sorbent injection systems and actions taken to mitigate them.[7] In addition, we are examining DOE National Energy Technology Lab, EPRI, and academic reports on the effectiveness and costs of sorbent injection systems over time and reviewing literature from recent technical conferences that addressed strategies to overcome challenges that some plants have experienced with sorbent injection systems. We are also reviewing EPA's requirements for establishing MACT standards under the Clean Air Act and recent court cases with implications for how EPA establishes such standards. Finally, we have met with EPA officials in the Office of Air and Radiation regarding the agency's plans for regulating mercury at power plants. EPA officials in the Offices of Air and Radiation and Research and Development provided comments on the information provided in this testimony, and we have made technical clarification where appropriate.

Background

Mercury enters the environment in various ways, such as through volcanic activity, coal combustion, and chemical manufacturing. As a toxic element, mercury poses ecological threats when it enters water bodies, where small aquatic organisms convert it into its highly toxic form—methylmercury. This form of mercury may then migrate up the food

[7]To date, we have visited seven plants using sorbent injection systems, and we have interviewed plant managers at five other plants that are meeting state mercury emissions requirements with existing pollution control devices for other pollutants.

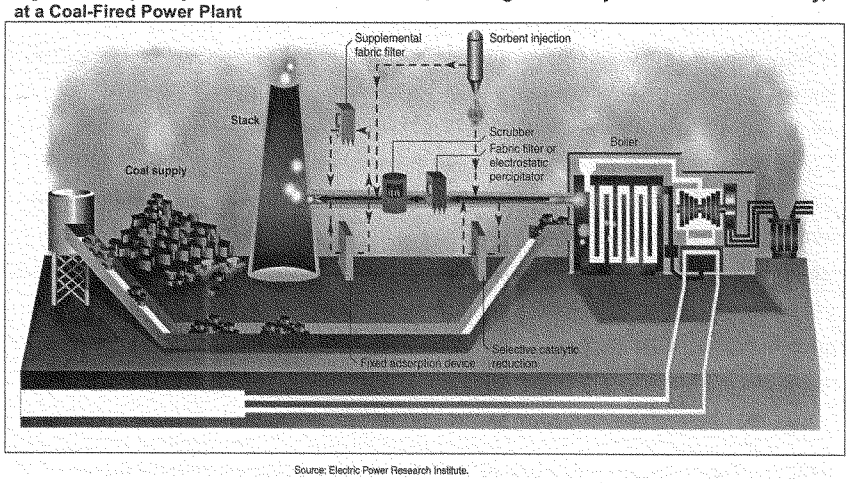
chain as predator species consume the smaller organisms. Fish contaminated with methylmercury may pose health threats to people who rely on fish as part of their diet. Mercury can harm fetuses and cause neurological disorders in children, resulting in, among other things, impaired cognitive abilities. The Food and Drug Administration and EPA recommend that expectant or nursing mothers and young children avoid eating swordfish, king mackerel, shark, and tilefish and limit consumption of other potentially contaminated fish. These agencies also recommend checking local advisories about recreationally caught freshwater and saltwater fish. In recent years, most states have issued advisories informing the public that concentrations of mercury have been found in local fish at levels of public health concern.

Coal-fired power plants burn at least one of three primary coal types—bituminous, subbituminous, and lignite—and some plants burn a blend of these coals. Of all coal burned by power plants in the United States in 2004, DOE estimates that about 46 percent was bituminous, 46 percent was subbituminous, and 8 percent was lignite. The amount of mercury in coal and the relative ease of its removal depend on a number of factors, including the geographic location where it was mined and the chemical variation within and among coal types. Coal combustion releases mercury in oxidized, elemental, or particulate-bound form. Oxidized mercury is more prevalent in the flue gas from bituminous coal combustion, and it is relatively easy to capture using some sulfur dioxide controls, such as wet scrubbers. Elemental mercury, more prevalent in the flue gas from combustion of lignite and subbituminous coal, is more difficult to capture with existing pollution controls. Particulate-bound mercury is relatively easy to capture in particulate matter control devices. In addition to mercury, coal combustion releases other harmful air pollutants, including sulfur dioxide and nitrogen oxides.[8] EPA has regulated these pollutants since 1995 and 1996, respectively, through its program intended to control acid rain. Figure 1 shows various pollution controls that may be used at coal-fired power plants: selective catalytic reduction to control nitrogen oxides, wet or

[8]Pollution controls that may be used at coal-fired power plants include selective catalytic reduction to control nitrogen oxides, wet or dry scrubbers to reduce sulfur dioxide, electrostatic precipitators and fabric filters to control particulate matter, and sorbent injection to reduce mercury emissions.

dry scrubbers to reduce sulfur dioxide, electrostatic precipitators and fabric filters to control particulate matter, and sorbent injection to reduce mercury emissions.

Figure 1: Sample Layout of Air Pollution Controls, Including Sorbent Injection to Control Mercury, at a Coal-Fired Power Plant



Source: Electric Power Research Institute.

From 2000 to 2009, DOE's National Energy Technology Lab conducted field tests at operating power plants with different boiler configurations to develop mercury-specific control technologies capable of achieving high mercury emission reductions at the diverse fleet of U.S. coal-fired power plants. As a result, DOE now has comprehensive information on the effectiveness of sorbent injection systems using all coal types at a wide variety of boiler configurations. Most of these tests were designed to achieve mercury reductions of 50 to 70 percent while decreasing mercury reduction costs—primarily the cost of the sorbent. Thus, the results from the DOE test program may understate the mercury reductions that can be achieved by sorbent injection systems to some extent. For example, while a number of short-term tests achieved mercury reductions in excess of 90 percent, the amount of sorbent injection that achieved the

reductions was often decreased during long-term tests to determine the minimum cost of achieving, on average, 70 percent mercury emission reductions.

Under its mercury testing program, DOE initially tested the effectiveness of untreated carbon sorbents. On the basis of these results, we reported in 2005 that sorbent injection systems showed promising results but that they were not effective when used at boilers burning lignite and subbituminous coals.[9] DOE went on to test the effectiveness of chemically treated sorbents—which can help convert the more difficult-to-capture mercury common in lignite and subbituminous coals to a more easily captured form—and achieved high mercury reduction across all coal types.[10] Finally, DOE continued to test sorbent injection systems and to assess solutions to impacts on plant devices, structures, or operations that may result from operating these systems—called "balance-of-plant impacts."[11] In 2008, DOE reported that the high performance observed during many of its field tests at a variety of configurations has given coal-fired power plant operators the confidence to begin deploying these technologies.

Bills have been introduced in the prior and current Congress addressing mercury emissions from power plants. The bills have proposed specific limits on mercury emissions, such as not less than 90 percent reductions, and some have specified time frames for EPA to promulgate a MACT regulation limiting mercury emissions from power plants. For example, a bill introduced in this Congress would require EPA to promulgate a MACT standard for mercury from coal-fired power plants within a year of the bill's enactment. In addition, some bills introduced the past few years—termed multipollutant bills—would have regulated sulfur dioxide, nitrogen oxides, and carbon

[9]GAO, *Clean Air Act: Emerging Mercury Control Technologies Have Shown Promising Results, but Data on Long-Term Performance Are Limited*, GAO-05-612 (Washington, D.C.: May 31, 2005).

[10]DOE injected sorbents that were treated with halogens such as chlorine or bromine, which help convert mercury from an elemental form into an oxidized form.

[11]Near the end of the research program, DOE continued field tests of advanced mercury control technologies but aimed to achieve 90 percent or greater mercury capture at low costs and to have them available for commercial demonstration by 2010. According to a DOE official, federal funding for DOE tests was eliminated before the final phase of tests was completed.

dioxide emissions, in addition to mercury, from coal-fired power plants. Most would have required a 90 percent reduction—or similarly stringent limit—of mercury emissions, with the compliance deadlines varying from 2011 to 2015. One such bill currently before Congress would prohibit existing coal-fired power plants from exceeding an emission limit of 0.6 pounds of mercury per trillion British thermal units (BTUs), a standard measure of the mercury content in coal—equivalent to approximately a 90 percent reduction—by January 2013.

Substantial Mercury Reductions Have Been Achieved Using Sorbent Injection Technology at 14 Plants and in Many DOE Tests, but Some Plants May Require Alternative Strategies to Achieve Comparable Results

The managers of 14 coal-fired power plants reported to us they currently operate sorbent injection systems on 25 boilers to meet the mercury emission reduction requirements of 4 states and several consent decrees and construction permits.[12] Preliminary data show that these boilers have achieved, on average, reductions in mercury emissions of about 90 percent.[13] Of note, all 25 boilers currently operating sorbent injection systems have met or surpassed their relevant regulatory mercury requirements, according to plant managers. For example:

- A 164 megawatt bituminous-fired boiler, built in the 1960s and operating a cold-side electrostatic precipitator and wet scrubber, exceeds its 90 percent reduction requirement—achieving more than 95 percent mercury emission reductions using chemically treated carbon sorbent.
- A 400 megawatt subbituminous-fired boiler, built in the 1960s and operating a cold-side electrostatic precipitator and a fabric filter, achieves a 99 percent

[12]To date, we have interviewed managers at plants with 24 of the 25 sorbent injection systems. We do not have mercury emissions reduction data for 5 of the 24 sorbent injection systems because the power company running these systems is not required to measure emissions under its regulatory framework.

[13]This number reflects 9 boilers that were required to achieve 90 percent mercury emission reduction—which seven surpassed—and 10 boilers that were required to achieve reductions between 80 percent and 89 percent. Plant officials did not provide data on mercury reductions achieved by sorbent injection systems for 5 boilers. Data for another boiler are pending.

mercury reduction using untreated carbon sorbent, exceeding its 90 percent reduction regulatory requirement.

- A recently constructed 600 megawatt subbituminous-fired boiler operating a fabric filter, dry scrubber, and selective catalytic reduction system achieves an 85 percent mercury emission reduction using chemically treated carbon sorbent, exceeding its 83 percent reduction regulatory requirement.

While mercury emissions reductions achieved with sorbent injection on a particular boiler configuration do not guarantee similar results at other boilers with the same configuration, the reductions achieved in deployments and tests provide important information for plant managers who must make decisions about pollution controls to reduce mercury emissions as more states' mercury regulations become effective and as EPA develops its national mercury regulation.[14] The sorbent injection systems currently used at power plants to reduce mercury emissions are operating on boiler configurations that are used at 57 percent of U.S. coal-fired power boilers.[15] Further, when the results of 50 tests of sorbent injection systems at power plants conducted primarily as part of DOE's or EPRI's mercury control research and development programs are factored in, mercury reductions of at least 90 percent have been achieved at boiler configurations used at nearly three-fourths of coal-fired power boilers nationally.[16] Some boiler configurations tested in the DOE program that are not yet included in commercial deployments follow:

[14]For example see EPRI's 2006 *Mercury Control Technology Selection Guide*, which summarized tests by DOE and other organizations to provide the coal-fired power industry with a process to select the most promising mercury control technologies. EPRI assessed the applicability of technologies to various coal types and power plant configurations and developed decision trees to facilitate decision making.

[15]We used EPA's 2006 National Electric Energy Data System database for calculating the percentage of coal-fired boilers with particular configuration types. We excluded coal-fired boilers under 25 megawatts from our analysis because the Clean Air Act does not apply to smaller units such as these.

[16]We identified 56 field tests conducted by DOE during its mercury control technology testing program. Of these tests, we examined mercury reduction data of 41 tests conducted at power plants. The majority of these tests were long-term tests (30 days or more). We did not include mercury reduction data associated with the other 15 tests in our analysis either because they reflected mercury reduction associated with mercury oxidation catalysts—an emerging mercury control technology—or because test result data were not reported. We also analyzed results of 9 tests conducted by industry, primarily by EPRI.

- A 360 megawatt subbituminous-fired boiler with a fabric filter and a dry scrubber using a chemically treated carbon sorbent achieved a 93 percent mercury reduction.
- A 220 megawatt boiler burning lignite, equipped with a cold-side electrostatic precipitator, increased mercury reduction from 58 percent to 90 percent by changing from a combination of untreated carbon sorbent and a boiler additive to a chemically treated carbon sorbent.
- A 565 megawatt subbituminous-fired boiler with a fabric filter achieved mercury reductions ranging from 95 percent to 98 percent by varying the amount of chemically treated carbon sorbent injected into the system.[17]

As these examples of deployed and tested injection systems show, plants are using chemically treated sorbents and sorbent enhancement additives, as well as untreated sorbents. The DOE program initially used untreated sorbents, but during the past 6 years, the focus shifted to chemically treated sorbents and enhancement additives that were being developed. These more recent tests showed that using chemically treated sorbents and enhancement additives could achieve substantial mercury reductions for coal types that had not achieved these results in earlier tests with untreated sorbents. For example, injecting untreated sorbent reduced mercury by an average of 55 percent during a 2003 DOE test at a subbituminous-fired boiler. Recent tests using chemically treated sorbents and enhancement additives, however, have resulted in average mercury reductions of 90 percent for boilers using subbituminous coals.[18] Similarly, recent tests on boilers using lignite reduced mercury emissions by roughly 80 percent, on average.

[17]The rate of sorbent injection varied between 1.0 lbs per million actual cubic feet and 3.0 lbs per million actual cubic feet.

[18]On subbituminous coal units, eight long-term tests were conducted using chemically treated sorbents. The average mercury emission reduction was 90 percent, with mercury reductions ranging from 81 percent to 93 percent.

The examples of substantial mercury reductions highlighted above also show that sorbent injection can be successful with both types of air pollution control devices that power plants use to reduce emissions of particulate matter. Specifically, regulated coal-fired power plants typically use either electrostatic precipitators or fabric filters for particulate matter control. The use of fabric filters—which are more effective at mercury emission reductions than electrostatic precipitators—at coal-fired power plants to reduce emissions of particulate matter and other pollutants is increasing, but currently less than 20 percent have them. Plant officials told us that they chose to install fabric filters along with 10 of the sorbent injection systems currently deployed to assist with mercury control—but that some of the fabric filters were installed primarily to comply with other air pollution control requirements. One plant manager, for example, told us that the fabric filter installed at the plant helps the sorbent injection system achieve higher levels of mercury emission reductions but that the driving force behind the fabric filter installation was to comply with particulate matter emission limits. Further, as another plant manager noted, fabric filters may provide additional benefits by limiting emissions of acid gases and trace metals, as well as by preserving fly ash—fine powder resulting from coal combustion—for sale for reuse.[19]

The successful deployments of sorbent injection technologies at power plants occurred around the time DOE concluded, on the basis of its tests, that these technologies were ready for commercial deployment. Funding for the DOE testing program has been eliminated.[20] Regarding deployments to meet state requirements that will become effective in the near future, the Institute of Clean Air Companies reported that power plants had 121 sorbent injection systems on order as of February 2009.[21]

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[19]Properties of fly ash vary significantly with coal composition and plant-operating conditions. Some power plants sell fly ash for use in Portland cement and to meet other construction needs.

[20]The DOE mercury testing program has not received new funding since fiscal year 2008.

[21]Illinois, Maryland, Minnesota, Montana, New Mexico, New York, and Wisconsin require compliance by the end of 2010. Arizona, Colorado, New Hampshire, Oregon and Utah require compliance in 2012 or beyond. Georgia and North Carolina require installation of other pollution control devices between 2008 and 2018 that capture sulfur dioxide, nitrogen oxides, and mercury as a side benefit. North Carolina requires the submission of specific mercury reduction plans for certain plants by 2013.

Importantly, mercury control technologies will not have to be installed on a number of coal-fired boilers to meet mercury emission reduction requirements because they already achieve high mercury reductions from their existing pollution control devices.[22] EPA data indicate that about one-fourth of the industry may be currently achieving mercury reductions of 90 percent or more as a co-benefit of other pollution control devices.[23] We found that of the 36 boilers currently subject to mercury regulation, 11 are relying on existing pollution controls to meet their mercury reduction requirements.[24] One plant manager told us their plant achieves 95 percent mercury reduction with a fabric filter for particulate matter control, a scrubber for sulfur dioxide control, and a selective catalytic reduction system for nitrogen oxides control. Other plants may also be able to achieve high mercury reduction with their existing pollution control devices. For example, according to EPA data, a bituminous-fired boiler with a fabric filter may reduce mercury emissions by more than 90 percent.

While sorbent injection technology has been shown to be effective with all coal types and on boiler configurations at more than three-fourths of U.S. coal-fired power plants, DOE tests show that some plants may not be able to achieve mercury reductions of 90 percent or more with sorbent injection systems alone. For example:

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[22]Nationwide, mercury reductions achieved as a co-benefit of other pollution control devices reduces mercury emissions from about 75 tons (inlet coal) to approximately 48 tons. Mercury reductions achieved as a co-benefit range from zero to nearly 100 percent, depending on control device configuration and coal type. For example, a boiler using bituminous coal and having a fabric filter can achieve mercury reductions in excess of 90 percent. In contrast, a boiler using subbituminous coal and having only a cold-side electrostatic precipitator might achieve little, if any, co-benefit mercury capture.

[23]This estimate is based on data from EPA's 1999 information collection request, which EPA air toxics program officials believe to be representative of the current coal-fired power industry.

[24]Two of these plants will face increasingly stringent limits in the next 3 to 4 years. One plant manager, facing a mercury reduction requirement that will increase from 80 percent to 90 percent, told us that the plant is currently installing a sorbent injection system in anticipation of the more stringent standard. The other plant manager, facing a mercury reduction requirement that will increase from 85 percent to 95 percent, told us that his plant will likely need to install a sorbent injection system in the future to supplement the co-benefit mercury capture the plant currently achieves with existing pollution controls.

- Sulfur trioxide—which can form under certain operating conditions or from using high sulfur bituminous coal—may limit mercury reductions because it prevents mercury from binding to carbon sorbents.
- Hot-side electrostatic precipitators reduce the effectiveness of sorbent injection systems. Installed on 6 percent of boilers nationwide, these particulate matter control devices operate at very high temperatures, which reduces the ability of mercury to bind to sorbents and be collected in the devices.
- Lignite, used by roughly 3 percent of boilers nationwide, has relatively high levels of elemental mercury—the most difficult form to capture. Lignite is found primarily in North Dakota and the Gulf Coast, the latter called Texas lignite. Mercury reduction using chemically treated sorbents and sorbent enhancement additives on North Dakota lignite has averaged about 75 percent—less than reductions using bituminous and subbituminous coals. Less is known about Texas lignite because few tests have been performed using it. However, a recent test at a plant burning Texas lignite achieved an 83 percent mercury reduction.

Boilers that may not be able to achieve 90 percent emissions reductions with sorbent injection alone, and some promising solutions to the challenges they pose, are discussed in appendix I. Further, EPRI is continuing research on mercury controls at power plants that should help to address these challenges.

In some cases, however, plants may need to pursue a strategy other than sorbent injection to achieve high mercury reductions. For example, officials at one plant decided to install a sulfur dioxide scrubber—designed to reduce both mercury and sulfur dioxide—after sorbent injection was found to be ineffective. This approach may become more typical as power plants comply with the Clean Air Interstate Rule and court-ordered revisions to it, which EPA is currently developing, and as some plants add air pollution control technologies required under consent decrees. EPA air strategies group officials told us that many power plants will be installing devices—fabric filters, scrubbers, and selective catalytic reduction systems—that are typically associated with

high levels of mercury reduction, which will likely reduce the number of plants requiring alternative strategies for mercury control. Finally, mercury controls have been tested on about 90 percent of the boiler configurations at coal-fired power plants. The remaining 10 percent include several with devices, such as selective catalytic reduction devices for nitrogen oxides control and wet scrubbers for sulfur dioxide control, which are often associated with high levels of mercury emission reductions.

Mercury Control Technologies Are Often Relatively Inexpensive, but Costs Depend Largely on How Plants Comply with Requirements for Reducing Other Pollutants

The cost to meet current regulatory requirements for mercury reductions has varied depending in large part on decisions regarding compliance with other pollution reduction requirements. For example, while sorbent injection systems alone have been installed on most boilers that must meet mercury reduction requirements—at a fraction of the cost of other pollution control devices—fabric filters have also been installed on some boilers to assist in mercury capture or to comply with particulate matter requirements, according to plant officials we interviewed.

The costs of purchasing and installing sorbent injection systems and monitoring equipment have averaged about $3.6 million for the 14 coal-fired boilers that use sorbent injection systems alone to reduce mercury emissions (see table 1).[25] For these boilers, the cost ranged from $1.2 to $6.2 million.[26] By comparison, on the basis of EPA estimates, the average cost to purchase and install a wet scrubber for sulfur dioxide control, absent monitoring system costs, is $86.4 million per boiler—the estimates range from $32.6 to $137.1 million.[27] EPA's estimate of the average cost to purchase and install a selective

[25]All reported cost data have been adjusted for inflation and are reported in 2008 dollars.

[26]The total cost to purchase and install a sorbent injection system reflects the costs of (1) sorbent injection equipment, (2) an associated mercury emissions monitoring system, and (3) associated engineering and consulting services.

[27]EPA cost estimates reported in 2006 have been adjusted for inflation and are reported in 2008 dollars.

catalytic reduction device to control nitrogen oxides is $66.1 million, ranging from $12.7 to $127.1 million.

Capital costs can increase significantly if fabric filters are also purchased to assist in mercury emission reductions or as part of broader emission reduction requirements. For example, plants installed fabric filters at another 10 boilers for these purposes. On the five boilers where plant officials reported also installing a fabric filter specifically designed to assist the sorbent injection system in mercury emission reductions, the average reported capital cost for both the sorbent injection system and fabric filter was $15.8 million per boiler—the costs ranged from $12.7 million to $24.5 million. Importantly, these boilers have uncommon configurations—ones that, as discussed earlier, DOE tests showed would need additional control devices to achieve high mercury reductions.[28] Table 1 shows the per-boiler capital costs of sorbent injections systems depending on whether fabric filters are also installed primarily to reduce mercury emissions.

[28]Three of the five boilers with fabric filters designed specifically to assist in mercury reduction, for instance, have hot-side electrostatic precipitators—a relatively rare particulate matter control device that inhibits high mercury removal when sorbent injection systems are used without fabric filters.

Table 1: Average Cost to Purchase and Install Mercury Control Technologies and Monitoring Equipment, per Boiler

2008 dollars

Mercury control technology	Number of boilers[a]	Sorbent injection system	Mercury emissions monitoring system	Consulting and engineering	Fabric filter	Total
Sorbent injection system	14	$2,723,277	$559,592	$381,535	[b]	**$3,594,023**[c]
Sorbent injection system and fabric filter to assist in mercury removal	5	$1,334,971	$119,544	$1,444,179	$19,009,986	**$15,785,997**[d]

Source: GAO analysis of data from power plants operating sorbent injections systems.

[a] We identified 25 boilers with sorbent injection systems to reduce mercury emissions, for which power companies provided cost data on 24. Cost data for 19 of the 24 are provided in the table. Costs for the remaining 5 are discussed further below because much of the cost incurred for fabric filters in these cases is not related to mercury removal.

[b] Not applicable.

[c] Numbers do not add to total. Total capital costs data were provided for 14 boilers in this category, and these totals were used to provide the average total capital cost. However, the average cost for the individual cost categories include data on only 12 of the 14 boilers in this category for which we were provided data.

[d] Numbers do not add to total. Total capital cost data were provided for five boilers with fabric filters, and these totals were used to provide the average total capital cost. However, the average cost for the individual cost categories only include data on two of the five boilers for which we were provided data.

For the five boilers where plant officials reported installing fabric filters along with sorbent injection systems largely to comply with requirements to control other forms of air pollution, the average reported capital cost for both the sorbent injection system and fabric filter was $105.9 million per boiler, ranging from $38.2 million to $156.2 million per boiler.[29] We did not determine what portion of these costs would appropriately be allocated to the cost of reducing mercury emissions. Decisions to purchase such fabric filters will likely be driven by the broader regulatory landscape affecting plants in the near future, such as requirements for particulate matter, sulfur dioxide, and nitrogen oxide reductions, as well as EPA's upcoming MACT regulation for coal-fired power

[29] The average cost of the sorbent injection system for these boilers was $2.9 million and for the monitoring systems, $500,000. The average cost for the fabric filters was $84 million and for the engineering studies, $11 million.

plants that, according to EPA officials, will regulate mercury as well as other air toxics emitted from these plants.

Regarding operating costs, plant managers said that annual operating costs associated with sorbent injection systems consist almost entirely of the cost of the sorbent itself. In operating sorbent injection systems, sorbent is injected continuously into the boiler exhaust gas to bind to mercury passing through the gas. The rate of injection is related to, among other things, the level of mercury emission reduction required to meet regulatory requirements and to the amount of mercury in the coal used. For the 18 boilers with sorbent injection systems for which power plants provided sorbent cost data, the average annualized cost of sorbent was $674,000.[30]

Plant engineers often adjust the injection rate of the sorbent to capture more or less mercury—the more sorbent in the exhaust gas, for example, the higher the likelihood that more mercury will bind to it. Some plant managers told us that they have recently been able to decrease their sorbent injection rates, thereby reducing costs, while still complying with relevant requirements. Specifically, a recently constructed plant burning subbituminous coal successfully used sorbent enhancement additives to considerably reduce its rate of sorbent injection—resulting in significant savings in operating costs when compared with its original expectations. Plant managers at other plants reported that they have injected sorbent at relatively higher rates because of regulatory requirements that mandate a specific injection rate. One state's consent decree, for example, requires plants to operate their sorbent injection systems at an injection rate of 5 pounds per million actual cubic feet.[31] Among the 19 boilers for which plant managers provided operating data, the average injection rate was 4 pounds per million actual cubic feet; rates ranged from 0.5 to 11.0 pounds per million actual cubic feet.

[30]Sorbent costs ranged from $76,500 to $2.4 million.

[31]Pounds per million actual cubic feet is the standard metric for measuring the rate at which sorbent is injected into a boiler's exhaust gas.

For those plants that installed a sorbent injection system alone—at an average cost of $3.6 million—to meet mercury emissions requirements, the cost to purchase, install, and operate sorbent injection and monitoring systems represents 0.12 cents per kilowatt hour, or a potential 97 cent increase in the average residential consumer's monthly electricity bill. How, when, and to what extent consumers' electric bills will reflect the capital and operating costs power companies incur for mercury controls depends in large measure on market conditions and the regulatory framework in which the plants operate. Power companies in the United States are generally divided into two broad categories: (1) those that operate in traditionally regulated jurisdictions where cost-based rate setting still applies (rate-regulated) and (2) those that operate in jurisdictions where companies compete to sell electricity at prices that are largely determined by supply and demand (deregulated). Rate-regulated power companies are generally allowed by regulators to set rates that will recover allowable costs, including a return on invested capital.[32] Minnesota, for example, passed a law in 2006 allowing power companies to seek regulatory approval for recovering the cost of anticipated state-required reductions in mercury emissions in advance of the regulatory schedule for rate increase requests. One utility in the state submitted a plan for the installation of sorbent injection systems to reduce mercury emissions at two of its plants at a cost of $4.4 and $4.5, respectively, estimating a rate increase of 6 to 10 cents per month for customers of both plants.[33]

For power companies operating in competitive markets where wholesale electricity prices are not regulated, prices are largely determined by supply and demand.[34] Generally

[32]Under traditional cost-based rate regulations, utility companies submit to regulators the costs they seek to cover through the rates they charge their customers. Regulators examine the utility's request and decide what costs are allowable under the relevant rules.

[33]The rate increase request will be submitted in conjunction with requests for rate increases for the utility's other plants.

[34]If demand for electricity is elastic (that is, consumers have some flexibility in adjusting the quantities that they purchase in response to price changes), suppliers may not be able to raise prices in order to fully recover the incremental cost of mercury emissions control. For instance, if pollution controls add 5 percent to the cost of generating electricity, the generating company may be able to raise its prices by only 3 percent.

speaking, market pricing does not guarantee full cost recovery to suppliers, especially in the short run. Of the 25 boilers using sorbent injection systems to comply with a requirement to control mercury emissions, 21 are in jurisdictions where full cost recovery is not guaranteed through regulated rates.

In addition to the costs discussed above, some plant managers told us they have incurred costs associated with balance-of-plant impacts. The issue of particular concern relates to fly ash—fine particulate ash resulting from coal combustion that some power plants sell for commercial uses, including concrete production, or donate for beneficial purposes, such as backfill. According to DOE, about 30 percent of the fly ash generated by coal-fired power plants was sold in 2005; 216 plants sold some portion of their fly ash. Most sorbents increase the carbon content of fly ash, which may render it unsuitable for some commercial uses. Specifically, some plant managers told us that they have incurred additional costs because of lost fly ash sales and additional costs to store fly ash that was previously either sold or donated for beneficial re-use. For the eight boilers with installed sorbent injection systems to meet mercury emissions requirements for which plants reported actual or estimated fly-ash related costs, the average net cost reported by plants was $1.1 million per year.[35]

Advances in sorbent technologies that have reduced costs at some plants also offer the potential to preserve the market value of fly ash. For example, at least one manufacturer offers a concrete-friendly sorbent to help preserve fly ash sales—thus reducing potential fly ash storage and disposal costs. Additionally, a recently constructed plant burning subbituminous coal reported that it had successfully used sorbent enhancement additives to reduce its rate of sorbent injection from 2 pounds to less than one-half pound per million actual cubic feet—resulting in significant savings in operating costs and enabling it to preserve the quality of its fly ash for reuse. Other potential advances

[35]Technologies to mitigate balance-of-plant costs associated with fly ash are available. For example, one plant installed a polishing fabric filter using TOXECON™ system, which preserves the plant's ability to sell its fly ash. Another plant had previously installed as ash reduction device that removes excess carbon in fly ash and enables the plant to sell the vast majority of its fly ash when operating its sorbent injection system.

include refining sorbents through milling and changing the sorbent injection sites. Specifically, in testing, milling of sorbents has, for some configurations, improved their efficiency in reducing mercury emissions—that is, reduced the amount of sorbent needed—and also helped minimize negative impact on fly ash re-use. Also, in testing, some vendors have found that injecting sorbents on the hot side of air preheaters[36] can decrease the amount of sorbent needed to achieve desired levels of mercury control.

Some plant managers reported other balance-of-plant impacts associated with sorbent injection systems, such as ductwork corrosion and small fires in the particulate matter control devices. Plant engineers told us these issues were generally minor and have been resolved. For example, two plants experienced corrosion in the ductwork following the installation of their sorbent injection systems. One plant manager resolved the problem by purchasing replacement parts at a cost of $4,500. The other plant manager told us the corrosion problem remains unresolved but that it is primarily a minor engineering challenge not impacting plant operations. Four plant managers reported fires in the particulate matter control devices; plant engineers have generally solved this problem by emptying the ash from the collection devices more frequently. Overall, despite minor balance-of-plant impacts, most plant managers said that the sorbent injection systems at their plants are more effective than they originally expected.

Decisions EPA Faces on Key Regulatory Issues Will Have Implications for the Effectiveness of its Mercury Emission Standard for Coal-Fired Power Plants and the Availability of Monitoring Data

EPA's decisions on key regulatory issues will impact the overall stringency of its mercury emissions limit. Specifically, the data EPA decides to use will affect (1) the mercury emission reductions calculated for "best performers," from which a proposed emission limit is derived, (2) whether EPA will establish varying standards for the three coal types, and (3) how EPA's standard will take into account varying operating conditions. Each of

[36]An air preheater is a device designed to preheat the combustion air used in a fuel-burning furnace for the purpose of increasing the thermal efficiency of the furnace.

these issues could affect the stringency of the MACT standard the agency proposes. In addition, the format of the standard—whether it limits the mercury content of coal being burned (an input standard) or of emissions from the stack (an output standard)—may affect the stringency of the MACT standard the agency proposes. Finally, the vacatur of the Clean Air Mercury Rule has delayed for a number of years the continuous emissions monitoring that would have started in 2009 at most coal-fired power plants. Consequently, data on mercury emissions from coal-fired power plants and the resolution of some technical issues with monitoring systems have both been delayed.

Current Data from Commercial Deployments and DOE Tests Could Be Used to Support a More Stringent Standard for Mercury Emissions from Power Plants than Was Last Proposed by EPA

Obtaining data on mercury emissions and identifying the "best performers"—defined as the 12 percent of coal-fired power plant boilers with the lowest mercury emissions[37]—is a critical initial step in the development of a MACT standard for mercury. EPA may set one standard for all power plants, or it may establish subcategories to distinguish among classes, types, and sizes of plants. For example, in its 2004 proposed mercury MACT,[38] EPA established subcategories for the types of coal most commonly used by power plants.[39] Once the average mercury emissions of the best performers are established for power plants—or for subcategories of power plants—EPA accounts for variability in the emissions of the best performers in its MACT standard(s). EPA's method for accounting for variability has generally resulted in MACT standards that are less stringent than the average emission reductions achieved by the best performers.

[37]This is how section 112 of the Clean Air Act, as amended, defines best performers for the largest categories of sources when establishing MACT standards.

[38]Prior to finalizing the Clean Air Mercury Rule, EPA also proposed a MACT standard for mercury emissions from coal-fired power plants. EPA chose not to finalize the MACT rule.

[39]Under the Clean Air Act Amendments of 1990, EPA had 10 years from the enactment of the amendments, or two years from the listing of electric steam generating units as sources of hazardous air pollutants subject to regulation, whichever was later, to promulgate a MACT standard. Because EPA did not list electric steam generating units until 2000, it originally had two years, or until 2002, to promulgate a MACT standard.

To identify the best performers, EPA typically collects emissions data from a sample of plants representative of the U.S. coal-fired power industry through a process known as an information collection request. Information collection requests are required when an agency collects data from 10 or more nongovernmental parties. According to EPA officials, this data collection process, which requires Office of Management and Budget (OMB) review and approval, typically takes from 8 months to 1 year. EPA's schedule for issuing a proposed rule and a final rule has not yet been established as the agency is currently in negotiations with litigants about these time frames. In developing the rule, EPA told us it could decide to use data from its 1999 information collection request, data from commercial deployments and DOE tests to augment its 1999 data, or implement a new information collection request for mercury emissions. On July 2, 2009, EPA published a draft information collection request in the Federal Register, providing a 60-day public comment period on the draft questionnaire to industry prior to submitting this information collection request to OMB for review and approval.

Our analysis of EPA's 1999 data, as well as more current data from deployments and DOE tests, shows that newer data may have several implications for the stringency of the standard. First, the average emissions of the best performers, from which the standard is derived, may be higher. Our analysis of EPA's 1999 data shows an average mercury emission reduction of nearly 91 percent for the best performers.[40] In contrast, using more current commercial deployment and DOE test data, as well as data on co-benefit mercury reductions collected in 1999, an average mercury emission reduction of nearly 96 percent for best performers is demonstrated. The 1999 data do not reflect the significant and widespread mercury reductions achieved by sorbent injection systems. Further, EPA's 2004 proposed MACT standards for mercury were substantially lower than the 1999 average emission reduction of the best performers because of variability in mercury emissions among the top performers, as discussed in more detail below.

[40]Our analysis of EPA's data includes the three primary coal ranks: bituminous, subbituminous, and lignite.

Second, more current information that reflects mercury control deployments and DOE tests may make the rationale EPA used to create MACT standards for different subcategories less compelling to the agency now. In its 2004 proposed MACT, using 1999 data, EPA proposed separate standards for three subcategories of coal used at power plants, largely because the co-benefit capture of mercury from subbituminous- and lignite-fired boilers was substantially less than from bituminous-fired boilers and resulted in higher average mercury emissions for best performers using these coal types. Specifically, the 1999 data EPA used for its 2004 MACT proposal showed that best performers achieved average emission reductions of 97 percent for bituminous, 71 percent for subbituminous, and 45 percent for lignite. In contrast, more current data show that using sorbent injection systems with all coal types has achieved at least 90 percent mercury emission reductions in most cases.

Finally, using more current emissions data in setting the mercury standard, may mean that accounting for variability in emissions will not have as significant an effect as it did in the 2004 proposed MACT—thereby lowering the MACT standard—because the current data already reflect variability. In its 2004 proposed MACT, EPA explained that its 1999 data, obtained from the average of short-term tests (three samples taken over a 1- to 2-day period), did not necessarily reveal the range of emissions that would be found over extended periods of time or under a full range of operating conditions they could reasonably anticipate. EPA thus extrapolated longer-term variability data from the short-term data, and on the basis of these calculations, proposed MACT standards equivalent to a 76 percent reduction in mercury emissions for bituminous coal, a 25 percent reduction for lignite, and a 5 percent reduction for subbituminous coal—20 to 66 percentage points lower than the average of what the best performers achieved for each coal type.

However, current data may eliminate the need for such extrapolation. Data from commercial applications of sorbent injection systems, DOE field tests, and co-benefit mercury reductions show that mercury reductions well in excess of 90 percent have been

achieved over periods ranging from more than 30 days in field tests to more than a year in commercial applications. Mercury emissions measured over these periods may more accurately reflect the variability in mercury emissions that plants would encounter over the range of operating conditions. Along these lines, at least 15 states with mercury emission limits require long-term averaging—ranging from 1 month to 1 year—to account for variability. According to the manager of a power plant operating a sorbent injection system, long-term averaging of mercury emissions takes into account the "dramatic swings" in mercury emissions from coal that may occur. He told us that while mercury emissions can vary on a day-to-day basis, this plant has achieved 94 percent mercury reduction, on average, over the last year.[41] Similarly, another manager of a power plant operating a sorbent injection system told us the amount of mercury in the coal they use "varies widely, even from the same mine." Nonetheless, the plant manager reported that this plant achieves its required 85 percent mercury reduction because the state allows averaging mercury emissions on a monthly basis to take into account the natural variability of mercury in the coal.

The Type of Standard EPA Chooses May Also Affect the Stringency of the Regulation

In 2004, EPA's proposed mercury MACT included two types of standards to limit mercury emissions: (1) an output-based standard for new coal-fired power plants and (2) a choice between an input- or output-based standard for existing plants. Input-based standards establish emission limits on the basis of pounds of mercury per trillion British thermal units (BTUs) of heat input; output-based standards, on the other hand, establish emission limits on the basis of pounds of mercury per megawatt hour of electricity produced. These standards are referred to as absolute limits. For the purposes of setting a standard, absolute emissions limits can be correlated to percent reductions. For example, EPA's 2004 proposed standards for bituminous, lignite, and subbituminous coal (2, 9.2, and 5.8 pounds per trillion BTUs, respectively) are equivalent with mercury emissions reductions of 76, 25, and 5 percent, respectively, based on nationwide

[41]The requirement for this plant, which the plant manager reported it has met, is for a 90 percent reduction averaged over a 3-month period.

averages of the mercury content in coal. During EPA's 2004 MACT development process, state and local agency stakeholders, as well as environmental stakeholders, generally supported output-based emission limits; industry stakeholders generally supported having a choice between an emission limit and a percent reduction. EPA must now decide in what format it will set its mercury MACT standard(s).

Input-based limits can have some advantages for coal-fired power plants. For example, input-based limits can provide more flexibility to older, less efficient plants because they allow boilers to burn as much coal as needed to produce a given amount of electricity, as long as the amount of mercury per trillion BTUs does not exceed the level specified by the standard.[42] However, input-based limits may allow some power plants to emit more mercury per megawatt hour than output-based limits. Under an output-based standard, mercury emissions cannot exceed a specific level per megawatt-hour of electricity produced—efficient boilers, which use less coal, will be able to produce more electricity than inefficient boilers under an output-based standard. Moreover, under an output-based limit, less efficient boilers may have to, for example, increase boiler efficiency or switch to a lower mercury coal. Thus, output-based limits provide a regulatory incentive to enhance both operating efficiency and mercury emission reductions.

We found that at least 16 states have established a format for regulating mercury emissions from coal-fired power plants. Eight states allow plants to meet either an emission limit or a percent reduction, three require an emission limit, four require percent reductions, and one state requires plants to achieve whatever mercury emissions reductions—percent reduction or emission limit—are greater.[43] On the basis of our

[42]The main types of coal burned, in decreasing order of rank, are bituminous, subbituminous, and lignite. Rank is the coal classification system based on factors such as the heating value of the coal. High-rank coal generally has relatively high heating values (i.e., heat per unit of mass when burned) compared with low rank coal, which has relatively low heating values.

[43]Colorado, Connecticut, Delaware, Illinois, Massachusetts, New Jersey, Oregon, and Utah allow either an emission limit or a percent reduction; Montana, New Mexico, and New York require an emission limit; Maryland, Minnesota, New Hampshire, and Wisconsin require percent reductions; and Arizona requires the more stringent option.

review of these varying regulatory formats, we conclude that to be meaningful, a standard specifying a percent reduction should be correlated to an absolute limit. When used alone, percent reduction standards can limit mercury emissions reductions. For example, in one state, mercury reductions are measured against "historical" coal-mercury content data, rather than current coal-mercury content data. If plants are required to reduce mercury by, for example, 90 percent compared to historical coal data, but coal used in the past had higher levels of mercury than the plants have been using more recently, then actual mercury emission reductions would be less than 90 percent. In addition, percent reduction requirements do not provide an incentive for plants burning high mercury coal to switch coals or pursue more effective mercury control strategies because it is easier to achieve a percent reduction requirement with high mercury coal than with lower mercury coals.

Similarly, a combination standard that gives regulated entities the option to choose either a specified emission limit or a percent reduction might limit actual mercury emission reductions. For example, a plant burning coal with a mercury content of 15 pounds per trillion BTUs that may choose between meeting an absolute limit of 0.7 pounds of mercury per trillion BTUs or a 90 percent reduction could achieve the percent reduction while emitting twice the mercury that would be allowed under the specified absolute limit. As discussed above, for the purposes of setting a standard, a required absolute limit, which provides a consistent benchmark for plants to meet, can be correlated to a percent reduction. For example, according to EPA's Utility Air Toxic MACT working group, a 90 percent mercury reduction based on national averages of mercury in coal equates to an emission limit of approximately 0.7 pounds per trillion BTUs.[44] For bituminous coal, a 90 percent reduction equates to a limit of 0.8 pounds per trillion BTUs; for subbituminous coal, a 90 percent reduction equates to a limit of 0.6

[44]Presentation on "Recommendations on the Utility Air Toxics MACT, Final Working Group Report, October 2002." The Working Group on the Utility MACT was formed under the Clean Air Act Advisory Committee, Subcommittee for Permits/New Source Reviews/Toxics.

pounds per trillion BTUs; and for lignite, a 90 percent reduction equates to a limit of 1.2 pounds per trillion BTUs.

Continuous Monitoring of Mercury Emissions at Most Power Plants Has Been Delayed, as Has Resolution of Emissions Monitoring Challenges

EPA's now-vacated Clean Air Mercury Rule required most coal-fired power plants to conduct continuous emissions monitoring for mercury—and a small percentage of plants with low mercury emissions to conduct periodic testing—beginning in 2009. State and federal government and nongovernmental organization stakeholders told us they support reinstating the monitoring requirements of the Clean Air Mercury Rule. In fact, in a June 2, 2008, letter to EPA, the National Association of Clean Air Agencies requested that EPA reinstate the mercury monitoring provisions that were vacated in February 2008 because, among other things, the monitoring requirements are important to state agencies with mercury reduction requirements. This association for state clean air agencies also said the need for federal continuous emissions monitoring requirements is especially important in states that cannot adopt air quality regulations more stringent than those of the federal government. However, EPA officials told us the agency has not determined how to reinstate continuous emissions monitoring requirements for mercury at coal-fired power plants outside of the MACT rulemaking process. As a result, continuous monitoring of mercury emissions from coal-fired power plants may continue to be delayed for years.

Under the Clean Air Mercury Rule, the selected monitoring methodology for each power plant was to be approved by EPA through a certification process. For its part, EPA was to develop a continuous emissions monitoring systems (CEMS) certification process and approve protocols for quality control and assurance. However, when the Clean Air Mercury Rule was vacated, EPA put its CEMS certification process on hold.

Effective emissions monitoring assists facilities and regulators in ensuring compliance with regulations and can also help facilities identify ways to better understand the efficiency of their processes and the efficiency of their operations. Monitoring mercury emissions is more complex than monitoring other pollutants, such as nitrogen oxides and sulfur dioxide, which are measured in parts per million. Mercury, for example, is emitted at lower levels of concentration than other pollutants and is measured in parts per billion—it is like "trying to find a needle in a haystack," according to one plant engineer. Consequently, mercury CEMS require more time to install and setup than CEMS for other pollutants, and, according to plant engineers using them, they involve a steeper learning curve in getting these relatively complex monitoring systems up and running properly.

EPA plans to release interim quality control protocols for mercury CEMS in July 2009. In our work, we found that these systems are installed on 16 boilers at power plants for monitoring operations or for compliance reporting.[45] Our preliminary data shows that for regulated coal-fired boilers, plant managers reported that their mercury CEMS were online from 62 percent to 99 percent of the time. When these systems were offline, it was mainly because of failed system integrity checks or routine parts failure. Some plant engineers told us that CEMS are accurate at measuring mercury, but others said that these systems are "several years away" from commercial readiness. However, according to an EPA Clean Air Markets Division official, while some technical monitoring issues remain, mercury CEMS are sufficiently reliable to determine whether plants are complying with their relevant state mercury emissions regulations.

[45]At least 14 states have enacted mercury emission standards that include a mercury monitoring requirement. Six states require monitoring to be conducted in accordance with the monitoring provisions of the Clean Air Mercury Rule. Four states require sole use of CEMS. Three states allow periodic stack tests—a method not approved under the Clean Air Mercury Rule—until CEMS can be used at a later date. One state requires use of CEMS or other method approved by the state environmental protection agency.

Concluding Observations

Data from commercially deployed sorbent injection systems show that substantial mercury reductions have been achieved at a relatively low cost. Importantly, these results, along with test results from DOE's comprehensive research and development program, suggest that substantial mercury emission reductions can likely be achieved at most coal-fired power plants in the United States. Other strategies, including blending coal and using other technologies, exist for the small number of plants with configuration types that were not able to achieve significant mercury emissions reductions with sorbent injection alone.

Whether power plants will install sorbent injection systems or pursue multipollutant control strategies will likely be driven by the broader regulatory context in which they operate, such as requirements for sulfur dioxide and nitrogen oxides reductions in addition to mercury, and the associated costs to comply with all pollution reduction requirements. Nonetheless, for many plants, sorbent injection systems appear to be a cost-effective technology for reducing mercury emissions. For other plants, sorbent injection may represent a relatively inexpensive bridging technology—that is, one that is available for immediate use to reduce only mercury emissions but that may be phased out—over time—with the addition of multipollutant controls, which are more costly. Moreover, some plants emit small amounts of mercury without mercury-specific controls because their existing controls for other air pollutants also effectively reduce mercury emissions. In fact, while many power companies currently subject to mercury regulation have installed sorbent injection systems to achieve required reductions, about one-third of them are relying on existing pollution control devices to meet the requirements.

As EPA proceeds with its rulemaking process to regulate hazardous air pollutants from coal-fired power plants, including mercury, it will likely find that current data from commercially deployed sorbent injection systems and plants with high native mercury capture justify a more stringent mercury emission standard than was last proposed in

2004. More significant mercury emission reductions are actually being achieved by the current best performers than was the case in 1999 when such information was last collected—and similar results can likely be achieved by most plants across the country at relatively low cost.

Mr. Chairman, this concludes my prepared statement. We expect to complete our ongoing work by October 2009. I would be happy to respond to any questions that you or other Members of the Subcommittee may have at this time.

GAO Contact and Staff Acknowledgments

Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. For further information about this testimony, please contact me at (202) 512-3841 or stephensonj@gao.gov. Key contributors to this statement were Christine Fishkin (Assistant Director), Nathan Anderson, Mark Braza, Antoinette Capaccio, Nancy Crothers, Philip Farah, Mick Ray, and Katy Trenholme.

Appendix I: Potential Solutions to Challenges Associated with Achieving Mercury Emissions Reductions of 90 Percent or More Using Sorbent Injection Systems

DOE tests show that some plants may not be able to achieve mercury reductions of 90 percent or more with sorbent injections alone. Specifically, the tests identified three factors that can impact the effectiveness of sorbent injection systems: sulfur trioxide interference, using hot-side precipitators, and using lignite. These factors are discussed below, along with some promising solutions to the challenges they pose.

Sulfur trioxide interference. High levels of sulfur trioxide gas may limit mercury emission reductions by preventing some mercury from binding to carbon sorbents. Using an alkali injection system in conjunction with sorbent injection can effectively lessen sulfur trioxide interference. Depending on the cause of the sulfur trioxide interference—which can stem from using a flue gas conditioning system, a selective catalytic reduction system, or high sulfur bituminous coal—additional strategies may be available to ensure high mercury reductions:

- Flue gas conditioning systems, used on 13 percent of boilers nationwide, improve the performance of electrostatic precipitators by injecting a conditioning agent, typically sulfur trioxide, into the flue gas to make the gas more conducive to capture in electrostatic precipitators. Mercury control vendors are working to develop alternative conditioning agents that could be used instead of sulfur trioxide in the conditioning system to improve the performance of electrostatic precipitators without jeopardizing mercury emission reductions using sorbent injection.
- Selective catalytic reduction systems, a common control device for nitrogen oxides, are used by about 20 percent of boilers nationwide. Although selective catalytic reduction systems often improve mercury capture, in some instances these devices may lead to sulfur trioxide interference when sulfur in the coal is converted to sulfur trioxide gas. Newer selective catalytic reduction systems often have improved catalytic controls, which can minimize the conversion of sulfur to sulfur trioxide gas.

- High sulfur bituminous coal—defined as having a sulfur content of at least 1.7 percent sulfur by weight—may also lead to sulfur trioxide interference in some cases. As many as 20 percent of boilers nationwide may use high sulfur coal, according to 2005 DOE data; however, the number of coal boilers using high sulfur bituminous coal is likely to decline in the future as more stringent sulfur dioxide regulations take effect. Plants can consider using alkali-based sorbents, such as Trona, which adsorb sulfur trioxide gas before it can interfere with the performance of sorbent injection systems. Plants that burn high sulfur coal can also consider blending their fuel to include some portion of low sulfur coal. In addition, according to EPA, power companies are likely to have or to install scrubbers for controlling sulfur dioxide at plants burning high sulfur coal and are more likely to use the scrubbers, rather than sorbent injection systems, to also reduce mercury emissions.

Hot-side electrostatic precipitators. Installed on 6 percent of boilers nationwide, these particulate matter control devices operate at very high temperatures, which reduce the incidence of mercury binding to sorbents for collection in particulate matter control devices. However, at least two promising techniques have been identified in tests and commercial deployments at configuration types with hot-side electrostatic precipitators. First, 70 percent mercury emission reductions were achieved with specialized heat-resistant sorbents during DOE testing. Moreover, one of the 25 boilers currently using a sorbent injection system has a hot-side electrostatic precipitator and uses a heat-resistant sorbent. Although plant officials are not currently measuring mercury emissions for this boiler, the plant will soon be required to achieve mercury emission reductions equivalent to 90 percent.[46] Second, in another DOE test, three 90 megawatt boilers—each with a hot-side electrostatic precipitator—achieved more than 90 percent mercury emission reductions by installing a shared fabric filter in addition to a sorbent injection system, a system called TOXECON.™ According to plant officials, these three units currently use this system to comply with a consent decree and achieved 94 percent

[46]Plant officials did not provide us with mercury emission reduction data for this boiler.

mercury emission reductions during the third quarter of 2008, the most recent compliance reporting period when the boiler was operating under normal conditions.

Lignite. North Dakota and Texas lignite, the fuel source for roughly 3 percent of boilers nationwide, have relatively high levels of elemental mercury—the most difficult form to capture. Four long-term DOE tests were conducted at coal units burning North Dakota lignite using chemically-treated sorbents. Mercury emission reductions averaged 75 percent across the tests. The best result was achieved at a 450 megawatt boiler burning North Dakota lignite and having a fabric filter and a dry scrubber—mercury reductions of 92 percent were achieved when chemically-treated sorbents were used. In addition, two long-term tests were conducted at plants burning Texas lignite with a 30 percent blend of subbituminous coal. With coal blending, these boilers achieved average mercury emission reductions of 82 percent. Specifically, one boiler, with an electrostatic precipitator and a wet scrubber, achieved mercury reductions in excess of 90 percent when burning the blended fuel. The second boiler achieved 74 percent reduction in long-term testing. However, 90 percent was achieved in short term tests using a higher sorbent injection rate. Although DOE conducted no tests on plants burning purely Texas lignite, one power company is currently conducting sorbent injection tests at a plant burning 100 percent Texas lignite and is achieving promising results. In the most recent round of testing, this boiler achieved mercury removal of 83 percent using untreated carbon and a boiler additive in conjunction with the existing electrostatic precipitator and wet scrubber.

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Senator CARPER. Well, thank you for that preview, and actually for a very encouraging preview. We appreciate the work that GAO does on a lot of fronts, and we are especially grateful for your help in this particular instance.

Ms. McCarthy, if I remember correctly, the Clean Air Interstate Rule was implemented to help States with I think the 1997 particulate matter and ozone standards. Is my memory correct?

Ms. MCCARTHY. Yes, it is, Senator.

Senator CARPER. So we are about 12 years into this without regulations that are fully established. Is that correct?

Ms. MCCARTHY. That is correct.

Senator CARPER. All right.

When do you think that you or EPA will promulgate a replacement for the Clean Air Interstate Rule?

Ms. MCCARTHY. When the CAIR rule was remanded back to EPA, the indication from EPA was that we would do our best within 2 years to have a replacement rule. We are already engaged in that discussion with outside communities and we are heavily involved in the technical work that needs to be done to re-shape a CAIR rule so that it will pass the test of time.

Our indication now is that we are looking for a rule to come out in early 2010 as a proposal, with a final in early 2011. That is an expedited schedule for us, but we are fully intending to meet that schedule.

Senator CARPER. All right. So roughly 2 years into this Administration.

Ms. MCCARTHY. That is correct.

Senator CARPER. OK. And I think I know the answer to this question, but could this rule be litigated and create some further delays?

Ms. MCCARTHY. It could be litigated, but the work that we are undergoing now is with the intent that we let science and the law drive this decision and that we craft a rule that is informed by the court actions that have been taken, and that is going to be able to withstand legal challenge.

Senator CARPER. All right.

Could you talk with us a bit further about the maximum achievable control technology process for those that may not be as familiar here?

Ms. MCCARTHY. Yes, I can. The maximum achievable control technology process is a process where we will take a rule like CAMR that has been found to not be acceptable to the courts and legal, and we will expand that for the utilities to look at all of the hazardous air pollutants.

What that means is we first go out with an information request that looks at gathering the emissions data from across the country in terms of what utilities are generating in terms of hazardous air pollutants. And then we will set specific standards for meeting those emission requirements on the basis of some of the top performing utilities.

So it is a standard where you must achieve good individual controls at your facilities based on what we believe to be some of the best technologies that are available. And as I think the GAO report is indicating, there is quite an opportunity here to achieve signifi-

cant reductions, not just in mercury hazardous air pollutants, but also in additional air pollutants that will drive specific reductions at individual plants.

Senator CARPER. The process you just outlined for us, it sounds like it could take a while, even without lawsuits. Is that a fair statement?

Ms. MCCARTHY. It is a fair statement that it is now in litigation, and we are working with the litigants concerning what type of time line we can actually commit to at EPA in terms of the development of that final rule.

Senator CARPER. Has the maximum achievable control technology process ever been litigated when regulating other source categories?

Ms. MCCARTHY. Yes.

Senator CARPER. OK. Could you just briefly explain for us banked allowances? Just take a minute on that. Just talk to us about banked allowances please.

Ms. MCCARTHY. Senator, if I may, I assume that your discussion is talking specifically about how it relates to this challenge with the utilities. And what I will say is that there is an opportunity as part of a trading scheme to bank allowances. And as we all know, trading allows reductions in NO_x and SO_2 in ways that drive investments so that we are getting the lowest possible, least possible cost associated with those reductions.

As part of that trading process, there is an ability to bank allowances. In the Acid Rain Program, there are now significant allowances that have been banked. And now that we are beginning the NO_x process that we began on January 1 of this year under the first phase of the CAIR rule, there have also been reductions in SO_2 allowances in anticipation of CAIR happening.

So those allowances can actually be used instead of individual reductions in the trading scheme. And the challenge that we face right now with this particular issue relative to CAIR, is that there have been significant—the good news is there have been significant reductions in terms of pollution, in terms of SO_2 emissions. But as a result of that, there are a number of banked allowances that are sitting there that could be used instead of individual emission reductions, which is the goal that we are all looking to achieve.

Senator CARPER. All right. Thanks.

I have a question, and I will yield to Senator Vitter.

If the D.C. Court's decision keeps EPA from extending the Acid Rain Program, could all the banked allowances from the Acid Rain Program be worth relatively little, giving little incentive for utilities to hold on to them? And would this create, really could lead to an increase, rather than a decrease in air pollution?

Ms. MCCARTHY. Mr. Chairman, I think you are recognizing an issue that is of concern to both you and to EPA. We have been monitoring the markets and looking at what is happening among the utilities. And what we are seeing is that emissions are continuing to go down, but that is also a reflection of the economy. So you raise a concern to both of us.

Senator CARPER. All right. Thank you.

We have been joined by Senator Alexander.

Senator Alexander, when we come to you on the questioning, I am going to offer you the opportunity to make an opening statement as well, if you would like.

Senator Vitter.

Senator VITTER. Thanks, Mr. Chairman.

And thanks to our witnesses for all your work.

Ms. McCarthy, you talked about the agency's time line for formally proposing the rule. I appreciate that. Will it continue to be a market-based approach? And how will it integrate the use of existing title IV Acid Rain Program allowances?

Ms. MCCARTHY. Senator, what I will tell you is that in looking at doing the work we need to do before the proposed rule is released, we are looking closely at what the court actually said. And we do believe there remain opportunities for trading within CAIR and the CAIR replacement rule.

The challenge for us will be that we need to address the central issue that was raised by the courts, which is we need to understand the significant contributions that are being made by upwind States to downwind States, and we need to make sure that any proposal that we put on the table addresses that fundamental issue.

So we still believe that there are opportunities for trading. We are also looking at hybrid approaches, which look at the establishment of individual performance standards at facilities with a trading regime. So we understand the benefits of trading in this and we are looking to design a hybrid proposal, or look at trading in a way that will pass muster based on the court's decision.

Relative to the SO_2 banked allowances, we have to continue to monitor that. The court made it clear to us that we can't control the acid rain SO_2 allowances through a replacement of CAIR.

Senator VITTER. OK. Since the court's vacating the rule last year, has the EPA updated its modeling to determine which States should be included in a replacement rule? And if so, could you tell us if the EPA modeling indicates any changes to the subset of States that you expect to be subject to a replacement rule?

Ms. MCCARTHY. As far as I know, Senator, we are continuing that investigation, and as soon as I can answer your question more specifically, I am happy to.

Senator VITTER. OK. Compared to the rule time line, do you have any general notion of when we would at least know that sort of basic fact in terms of if the subset of States is going to be changed or affected?

Ms. MCCARTHY. I guess the answer is I don't know the answer to your question, Senator, but I can take a look at it and see if we can get you that information in advance.

Senator VITTER. OK. Thank you.

Is the agency working directly with stakeholders in the emission markets outside of the formal comment and notice process?

Ms. MCCARTHY. We have been doing significant outreach to the States, as well as to the power plant industry and others, looking at what we need to do for a CAIR replacement rule that once again provides stability and surety in terms of how investments will be made. We will continue to do that through the course of our tech-

nical investigations and through the course of the development of this rulemaking procedure.

Senator VITTER. OK. How do you all choose the stakeholders to include in discussions? And how do you sort of publicize that in the spirit of the President's executive order calling for complete transparency?

Ms. MCCARTHY. So far, we have had open discussions at various forums. We are happy to go and attend meetings. We will be using the formal rulemaking process and comments from everybody will be considered. But at this point, we are attending meetings. We are talking about it openly. We are looking for opportunities and advice. But we will be entering into the formal rulemaking procedure, and when we do that we will go through the comment process.

Senator VITTER. Have you also proactively invited stakeholders in to discussions you have hosted?

Ms. MCCARTHY. I am sorry. We have set up working meetings. I do not believe that those, the attendance at those meetings have been handcrafted or hand-picked. We have offered to have workshops. We have publicly spoken about those and invited attendees, and they have been pretty well attended.

Senator VITTER. OK. And how is that publicized? And how is the list of attendees publicized? Is that on your Web site anywhere?

Ms. MCCARTHY. My understanding is that it has been on the Web site. But Senator, I am happy to provide you information in terms of what workshops we have already done and how we have advertised that. And if you have suggestions for how we could do greater outreach, I am certainly open to those.

Senator VITTER. Great.

And quickly for Mr. Stephenson, I think in your GAO study you discuss sorbent injections and some other technologies used to decrease mercury emissions. Are some of these successful at removing more than mercury, including SO_x and NO_x? And so can they lead to reductions in those other categories from the same platform?

Mr. STEPHENSON. Sorbent injection is primarily aimed at mercury. However, you can get co-benefits from emission reduction technologies from sulfur dioxide and nitrogen oxide. The reverse is true. Some of the plants, some of the boilers we looked at were achieving 90 percent mercury reduction with no additional emission technology.

Senator VITTER. OK.

Thank you, Mr. Chairman.

Senator CARPER. Just a point of clarification in response to your answer to Senator Vitter's last question. He was asking when we deploy the mercury emission control, do we get a co-benefit in reduction in SO_x and NO_x? My interpretation of what you said is, no, we don't. But if we are putting in place technologies to reduce SO_x and NO_x, there is a co-benefit with mercury. Is that what you are saying?

Mr. STEPHENSON. Yes.

Senator CARPER. OK. Thanks.

OK. Senator Voinovich.

Senator VOINOVICH. Yes. Again, thank you for being here.

Ms. McCarthy, in a recently proposed rule pertaining to maximum achievable control technology standards for hospital, medical

and infectious waste incinerators, EPA came up with a new method for setting MACT standards. We understand that this was determined without consideration of cost or feasibility, and that the EPA concedes that the new standards are so stringent that no facility will be able to comply.

Is it your view that the proposed revised standards are consistent with the legal requirement that are based on what is actually achieved in practice? Two, do you think Congress intended in enacting the Clean Air Act to have EPA set technology-based standards without regard to costs or feasibility? And three, will you commit to undertaking a common sense review of this regulation with a view of improving air quality in a manner that is consistent with past precedent for setting such standards?

I posed this question to you in writing during your confirmation. You promised to get back to me. To date, we have received no response. I note the EPA is under a court order, a deadline of September 15 to finalize the rule. The industry has told me that implementation of the proposed rule would result in the closure of many existing facilities, including those in my State of Ohio.

I therefore ask that you move this issue to the top of your agenda and with a response to my specific question as soon as possible. I know that the industry has requested a meeting with you so they could talk to you about this, and I would very much appreciate if you would give them that meeting.

Ms. MCCARTHY. Senator, thank you for raising this issue. I apologize if I did not provide you a timely and complete response, and I will certainly do that. I am happy to meet with industry on this issue and to take a closer look at it.

Now, as it relates to the issues before us, you know, clearly on the utility MACT standard, we know that we need to move forward aggressively on that standard, but we also know we need to look at the emissions that are currently being generated to understand what is achievable, and to move forward as quickly as possible, but with an understanding of what can be achieved and what is doable. And I will bring that same level of judgment in discussion when I have that meeting with the industry representatives on the other MACT standard, and we can talk it through.

Senator VOINOVICH. Well, I am real concerned about it because they feel that they are going to have to close some of the facilities based on the proposed rule that you are talking about. So I would like to have you spend some time with them and appreciate the fact that you will meet with them.

The other thing is the whole idea behind cap-and-trade is that they send a price signal to encourage emission reductions. And ever since the court's unexpected decision in the CAIR case, SO_2 allowance prices have been very low. In fact, you talked about them. They are putting them on a shelf.

So most power plants from an economic perspective would be better off buying allowances and now even operating their scrubbers. And you know, the issue I have is why can't we fix this problem right now by codifying the Clean Air Interstate Rule? And by the way, if we did do that, codify it, that would not prevent Senator Carper and others from increasing the percentage of reduction

that, you know, that they would like to see, assuming Congress wants to do it.

Ms. McCARTHY. Senator, this committee and Congress has every right to move forward to resolve this situation as you see fit. I guess my challenge is that in my world, which is the world of regulation, we also need to move forward. And we need to see how we align these decisions and how we provide that level of certainty that you are looking for as quickly as possible.

Now, I do believe that we have a lot of opportunity to move forward, by moving forward on the utility MACT standard which will provide some certainty in terms of what we are looking for for reductions of hazardous air pollutants, and then looking at moving forward with CAIR as well.

Now, the timing on this is as aggressive as we can get in terms of a replacement rule for CAIR. We are hoping to have a final rule in place by early 2011. But those are the tools that I have to work with, and we will certainly work together and hopefully in concert with one another to identify the best path forward.

Senator VOINOVICH. Well, I will be interested in hearing from some of the other witnesses about where does that put them right now in terms of what their SIP plans are and what they are telling people. Because right now, it is just kind of, they are in limbo.

And I have to tell you that when we put that in effect and they thought it was going to stick, they really moved. They did a terrific job. There is a great deal that was accomplished during that period of time, and then whoops, the court made their decision and then everything kind of just stopped.

And so the earlier we can get on this, I think the better it is for everyone, including reducing the emissions.

Ms. McCARTHY. And I think you will hear from some of my State colleagues that they are interested in resolving these issues as well, and I think as we all are.

Senator VOINOVICH. Thank you.

Senator CARPER. All right. Thanks, Senator Voinovich.

Senator Alexander, if you would like to make an opening statement, you are welcome to do so before your questions.

OPENING STATEMENT OF HON. LAMAR ALEXANDER, U.S. SENATOR FROM THE STATE OF TENNESSEE

Senator ALEXANDER. Thanks.

Senator CARPER. I am delighted you are here. Thank you for your great interest and leadership.

Senator ALEXANDER. Thank you, Tom.

I first want to congratulate Senator Carper for his consistent leadership on the issues of how we properly regulate sulfur, nitrogen and mercury. He and I have worked together ever since I have been a Senator on 3P legislation. I will only speak for myself in what I have to say, but I think we see eye to eye on much of this. And I am glad that he is calling attention to this.

Here is my statement. I hope, and I would echo what Senator Voinovich said, and I will ask a couple of questions. But I would hope, Ms. McCarthy, that we can move as rapidly as we can to reinstate the CAIR rule. I gather you do, too. And it is very important for all of the reasons that are suggested.

I have also introduced legislation on limiting carbon for dealing with global warming, but we really don't know what to do with carbon yet. We do know what to do with sulfur, nitrogen and mercury. And we know that for the foreseeable future, we are going to have to burn coal.

And my general view of it is that we ought to regulate sulfur, nitrogen and mercury and get on with it as rapidly as we can, and chalk it up as a cost of doing business for burning coal, and know that it is going to be a part of our energy life for the next 10 or 20 years or so until we find some other alternative way of powering a country that produces 25 percent of the gross domestic product in the world and uses 25 percent of the electricity.

So I think you have strong bipartisan support and interest from the Congress in a reasonable, effective CAIR rule. And I will be asking you in a minute if there is anything else that you think we can do that will make it easier for you to achieve that goal.

One reason I have worked with Senator Carper on these three pollutants is because I don't want sulfur, nitrogen and mercury to get lost in all of the talk about carbon. I mean, all of them are important, but Tennessee is 10th highest among States for sulfur emissions; 12th for nitrogen. We have 800,000 people with chronic lung disease, according to the American Lung Association.

The Great Smoky Mountains National Park, which is 2 miles from my house, is the most polluted and most visited national park in America. The conservative Republicans who live around there are for clean air because they breathe the air, and they know tourists come there to see the Smokys, not to see smog. So we are all in favor of good, strong national standards for sulfur, nitrogen and mercury in our part of the world.

And in fact, we know that we can't continue to recruit auto suppliers and auto plants to Tennessee unless there are strong national air pollution standards because by ourselves we can't clean up the air enough because so much of it blows in from other parts of the country.

So I am one Senator who believes that we obviously have scrubbers and SCRs and a way to deal with mercury at a 90 percent level, and we should just get on with it. And I am sure there are reasonable questions that can be debated back and forth, but that is my general view. And I hope that you will make that a top priority.

And I guess my main view is, while we are figuring out what to do with carbon and how to do it, I see no need whatsoever to delay for a minute what we already know how to do about sulfur, nitrogen and mercury. That is my view.

Now, may I switch to questions, Mr. Chairman?

Is there anything that we here can do to make it easier for you to enact a CAIR rule more quickly?

Ms. McCARTHY. Senator, first let me thank you for your leadership on this issue as well. I know we have spoken about this individually, and I share your concern that we move as quickly as possible. This is a less complicated issue than many we deal with, and as you heard from Mr. Stephenson, the technology is there for many of these issues. And we know we need to move this forward.

And so you have my pledge that this is a priority, not just for EPA and the Administrator, but for me personally.

Senator ALEXANDER. But is there anything we can do to make it more rapid than early 2011?

Ms. MCCARTHY. That is a good question. In terms of a regulatory process, we think we are moving as expeditiously as we can through the regulatory process, and as open as we can in terms of our outreach on this issue so that when we actually move toward regulation that it will stand the test of time. That is going to be our challenge.

I would just encourage you to continue the dialog. I encourage, through Senator Carper, EPA will be there to provide you technical support in modeling resources so that you can take a look at this issue and continue to engage all of us in focusing our attention on this.

Senator ALEXANDER. If we move ahead, Senator Carper has talked about moving ahead with legislation on three pollutants, and I am very much inclined to join him in that, as I have before. Will that make it harder or easier for you to do a rule? Or does it matter?

Ms. MCCARTHY. To me, Senator, it doesn't matter as long as we understand that our resources will be going to both efforts, and as long as you understand that my charge from the Administrator is to move as far and as fast as we can to get the reductions that we need for public health and the environment.

Senator ALEXANDER. So you believe that you have sufficient authority now to reinstate a regional CAIR rule by early 2011. Is that correct?

Ms. MCCARTHY. I believe that we do. And it is not just the CAIR rule, Senator, it is also the utility MACT standard because I think that what you and I are both trying to do is to set a pathway forward that utilities can understand and begin to target their investments wisely.

Senator ALEXANDER. Right.

Ms. MCCARTHY. While we are not seeing utilities not running their scrubbers and taking their SO_2 allowances and using those instead, it could happen. You know, we are doing everything we can to move forward quickly and to work with States where they do have some authority to mitigate that and to prevent that from happening. But we need to run far and we need to run fast together.

Senator ALEXANDER. I suspect it would be helpful to utility executives to know that you are not the only one interested in reinstating the CAIR rule as they are sitting in their board rooms making their decisions about whether to invest in an expensive scrubber or equipment for mercury, that there is substantial support in Congress to do that even if you can't.

Ms. MCCARTHY. And my sense is that the utilities will be participating in your process to look at legislation, and I have already met with a number of the major utilities to talk to them about our efforts to coordinate our regulatory process, how quickly we want to get that done and our interest in providing them that path to certainty that they are looking for.

Senator ALEXANDER. Would you be kind enough to supply me with some estimate of what percent of the coal plants in the country have scrubbers; what percent have SCRs?

Ms. MCCARTHY. I would be happy to provide you that information.

Senator ALEXANDER. And then I have one other question, something you said attracted my interest. I don't want to get off on climate change very much. But you said that the best way to deal with climate change is comprehensive energy legislation. When dealing with fuel, do you think that cap-and-trade is more effective at reducing carbon than a low carbon fuel standard?

Ms. MCCARTHY. Oh, I am sorry. Someone was saying something.

Senator, we can take a look at that. I know that there were changes in the Waxman-Markey bill and that there will be other conversations here on the Senate side.

Senator ALEXANDER. No, but my question is, there are two different ways to deal with fuel, which is 30 percent of carbon: cap-and-trade or a low carbon fuel standard. Which one do you think is more effective?

Ms. MCCARTHY. I think both of them have opportunities for effectiveness. I will tell you that when I was in Connecticut, we joined with other New England States in looking at the development of a low carbon fuel standard. There is tremendous opportunity.

Senator ALEXANDER. Yes, but, well do you really think a cap-and-trade is an effective way to deal with fuel?

Ms. MCCARTHY. I believe that you could do it both ways.

Senator ALEXANDER. Well, I would like to urge you to examine that, because we have had testimony before this committee that cap-and-trade—by Oak Ridge scientists—that cap-and-trade was a very inefficient way to deal with fuel because it raises the price, that is for sure, but it doesn't reduce the carbon because it only raises the price by 10 or 20 cents, and that is not enough to change behavior. That is 10 or 20 cents that adds to the cost of people driving. It is 10 or 20 cents that might be going into the Highway Trust Fund.

And why would we impose a complex cap-and-trade system on fuel, which is 30 percent of carbon, when we could use a low carbon fuel standard, is my point. And then, of course, if I had more time, I would go over into the smokestacks part and say instead of a big complex cap-and-trade, why don't we just build nuclear power plants, and as we open them, close some of the dirtiest coal plants.

I think we have gotten into the situation of taking a good idea, renewable energy, and expanding it until it doesn't work. I didn't mean to get off very much on climate change today, but I would like you to ask you to look at the effectiveness of a low carbon fuel standard opposed to cap-and-trade for dealing with carbon from fuel.

Ms. MCCARTHY. Senator, I know this is a discussion that we will be having and I will make sure that I am educated by testimony that has been given to you in the past, and we will have a good discussion as a bill is moved through the Senate.

Senator ALEXANDER. Thank you for your time.

And Senator Carper, thank you for inviting me to join you today.

Senator CARPER. Delighted you are here. Delighted to work with you on these issues.

Let me go back to something I think you said to one of my colleagues earlier. And I think you were talking about the authority to allow for trading under a revised CAIR rule. And I think you said that EPA had the authority to do that. Were you talking about interstate trading or intrastate trading?

Ms. MCCARTHY. Senator, I was trying to make the distinction that in the court case, what the court said was that EPA hadn't effectively identified and dealt with the significant contributions from one State that would contribute significantly to non-attainment or the maintenance of attainment in another State. It didn't specifically say that you could not do trading.

And so we are looking at that court decision specifically because we believe that our task now is to do what the court told us to do, to understand better the relationship between one State and another in terms of interstate transport. And we believe that we can look at trading regimes that are either intrastate, that are closer, more regional, that are maybe tighter that can meet the standards, the test that the court has given us, or that are combined with performance standards.

So we don't believe that trading is off the table by any means. We are trying to meet the challenge that the court provided us without giving up the flexibility and the cost-effectiveness that trading can provide for NO_x and SO_2.

Senator CARPER. All right. Fair enough. Thank you.

Let me talk to you just a little bit more about the Acid Rain Program if we could. Do you believe that the Acid Rain Program was a success? And if so, what do you think are a couple of major reasons why it was successful?

Ms. MCCARTHY. Unequivocally, yes, I do believe it was a tremendous success. I think part of its success obviously is in the reductions it has achieved, and the fact that it has achieved those reductions in a cost-effective way, at a cost that was substantially lower than industry predicted. And I think that it was the basis for us to look at the development of a CAIR rule in the past Administration, and it is an opportunity for us to understand the value that trading brings to the table now, and to try to keep those advantages, while we recognize that trading is not necessarily appropriate for other pollutants like toxic air pollutants.

Senator CARPER. All right. I want to ask another question. I think I know the answer to this question. We sort of talked at it or around it already. But I would just like to ask for the record, and that is do you believe that legislation with targets and timetables for mercury, for nitrogen oxide, for sulfur dioxide, could give certainty for environmental reductions and business decisions?

Ms. MCCARTHY. I think that legislation certainly can provide certainty, but I also would indicate to you that I think regulations done well and done in a coordinated way can work as well.

Senator CARPER. Good. Thanks.

And for Mr. Stephenson, with what GAO has found so far, if EPA used mercury technology currently deployed today, what kind of percentages would they likely set for a mercury-only MACT?

Mr. STEPHENSON. What our finding is so far is that the actual demonstrations on operating plants and the DOE test combined represent over 75 percent of the power plant configurations and technologies that are out there now. We are saying that at least 90 percent is probably achievable.

Senator CARPER. All right. Thank you.

Could you clarify how many States already have fossil fuel plant mercury emission mandates? And do most States take an at-the-stack approach?

Mr. STEPHENSON. I am not sure about the latter part. There is about 20 or so States that have mercury-specific legislation ongoing. There are four States, including yours, that they are actually implemented so far. I am not sure how many use a stack approach versus a——

Senator CARPER. In the States, do you have any idea what the average reduction requirements are?

Mr. STEPHENSON. Excuse me?

Senator CARPER. In the States that have them, do you have any idea what the average reduction requirements are?

Mr. STEPHENSON. I have a table in front of me. The top percentage is a 90 percent reduction. Some call for 80 percent reductions. Some call for 40 percent of the largest four utilities. There is a variation across the board.

Senator CARPER. All right. Thank you.

How much is GAO finding mercury technology costs when compared to other clean air technologies such as scrubbers? I think you spoke to this earlier, but I want you to go back to it.

Mr. STEPHENSON. Yes, it is very inexpensive. The average cost of the plants that are actually using sorbent injection now is only $3.4 million. That sounds like a lot, but converted to kilowatts per hour, it is less than 12/100ths of 1 cent. And likely the increase in a resident's monthly bill would be certainly less than $1 and probably 10 cents a month.

Senator CARPER. Per month?

Mr. STEPHENSON. Yes.

Senator CARPER. All right.

And finally, have you found facilities that could get much greater mercury reductions but are not doing so because they are not mandated by either the Federal or the State government to do that?

Mr. STEPHENSON. Absolutely. I mean, that is the reason for a need for a MACT standard. There are many who are not. The ones that are in compliance now and already demonstrating this capability are because there is a State law. A Federal law that would affect all 491 plants would achieve the same kind of results, in our opinion, that those States have achieved.

Senator CARPER. So let me see if I understand this. We have each year, Ms. McCarthy I am told, 600,000 babies born whose moms have high levels of mercury. We know that we can reduce emissions by roughly 90 percent at these coal-fired power plants, at a cost of maybe not much more than $1 a year for consumers. I have no idea what the cost-benefit analysis of that would be, but it has got to be off the charts. What do you think?

Ms. MCCARTHY. I will tell you, Senator, just to confirm your suspicions, almost half of the mercury emissions in the U.S. are from

these power plants. So it is a significant public health, as well as an environmental issue.

Senator CARPER. Senator Vitter.

Senator VITTER. No.

Senator CARPER. OK.

Our thanks to both of you. Some of my colleagues who could not be here will want to submit some questions for the record. We appreciate your presence today. We appreciate your preparation for today's hearing, and for your responses today. And we would appreciate your prompt responses to any other questions that we submit to you. You are both doing great work. You make a good team, and we appreciate that teamwork and your presence today. Thanks so much.

As our second panel approaches the witness table, I am just going to go ahead and begin their introductions, if I could.

On this panel, first we have Steve Corneli. Mr. Corneli is NRG Energy's Senior Vice President of Market and Climate Policy. We are delighted that you are here. Welcome. Nice to see you again.

Next we have Mr. Randall R. LaBauve. I understand you are the Vice President, Environmental Services, for the Florida Power and Light Company. Mr. LaBauve.

Our third witness, and I am just going to stick with the order in which our witnesses are sitting before us, Mr. Hart, Mr. Gary Hart. You look different than your pictures.

[Laughter.]

Senator CARPER. But you still look good, and we are happy you could be with us today. Mr. Hart is the Market Analyst for ICAP Energy. Is it ICAP? Is it OK to call it ICAP? Prior to ICAP Energy, he spent 28 years with Southern Company as their Manager of Emissions Trading.

Next, Mr. Chris—is it Korleski? Oh, I am sorry. You fellows are sitting in different order than my notes have been prepared, but that is OK. I will get it right.

Next, Doug Scott. Mr. Scott is Director of Illinois Environmental Protection Agency. In addition to being its Director, he served 2 years as Chair of the Air Committee for Environmental Council of the States. Great to see you.

Now, Chris Korleski. And Mr. Korleski is Director of Ohio Environmental Protection Agency. And he was before our subcommittee I think around this time last year discussing this same issue. Very nice to see you again. Thank you for joining us today.

And finally, Conrad Schneider. Mr. Schneider is the Advocacy Director for the Clean Air Task Force, and has been, again, before our committee in the past discussing clean air issues. And we are delighted that you have been willing to come back. Sometimes people refuse to come back a second time, but you are nice to do that.

I am going to ask you to hold your statements to about 5 minutes, and if go much over that, I will have to rein you in, but hopefully I won't have to do that. But we are delighted that you are here. We look forward to a very good discussion. Thank you.

Mr. Corneli.

STATEMENT OF STEVE CORNELI, SENIOR VICE PRESIDENT, MARKET AND CLIMATE POLICY, NRG ENERGY, INC.

Mr. CORNELI. Thank you, Chairman Carper and members of the subcommittee. I am happy to testify today on behalf of NRG Energy about ways to reduce the emissions of sulfur dioxide, nitrogen oxides, and mercury.

NRG owns about 23,000 megawatts of power plants, including fossil, wind and nuclear resources, and we are actively developing new nuclear, new wind, and new solar resources as we speak.

We are also a member of the United States Climate Action Partnership. We are strong supporters of cap-and-trade legislation for climate change. And we look forward to working with all of you in addressing that issue in the weeks and months to come.

We also take other missions very seriously, and we spent over $400 million in the last 5 years reducing our emissions of SO_2, NO_x and mercury. We have a total of about $1.3 billion of planned spending on those emissions in the next 5 years or so.

At the start, I would like to say that we really liked CAIR. And we are supporters of that approach. But given the court's remand to CAIR, while we hope the rulemaking process can proceed, we really think an economically responsible and an environmentally effective rule would be advantaged by legislation that would give specific authorities to the EPA.

I would like to talk today about four principles that, in our view, could guide such legislation. First, we think, as you pointed out, Senator Carper, cap-and-trade and the Acid Rain Program have been an unqualified success, a stunning success, and the Nation owes it to its citizens, its businesses, and its economy to build on that success in addressing these other emissions, with the exception of mercury.

According to EPA, as you noted, the emission reductions have been over 40 percent at well less than half of the projected cost, and we should build on that. So to do that, we think Congress should clearly authorize EPA to use cap-and-trade to address regional and national emissions transport problems under section 110(A)(2)(d) of the Clean Air Act; should expressly authorize EPA to create a regional NO_x program similar to that established under CAIR; and should modify title IV to authorize the use of acid rain program allowances to reduce the transport of SO_2 emissions that contribute to fine particle non-attainment problems and help keep people from seeing the Smoky Mountains when they visit Senator Alexander's beautiful State.

This will help provide the legal continuity that the business community needs to actually invest the billions of dollars that we plan on spending to address these emissions. But we also need to assure the economic continuity of the program.

So our second principle is to make sure we do that by reducing the emission caps in a timely manner, consistent with the expected deployments of technology, to keep the prices at a stable level and avoid precipitous price crashes and volatility that otherwise can, as you pointed out, make these investments essentially worthless.

A third principle, in our view the cap-and-trade program should continue to use the reasonable free allocation of allowances, at least in a partial way, to avoid punitive burdens on companies and

on their customers that must invest these billions of dollars to achieve the needed reductions.

Our analysis suggests that a full auction of SO_2 and NO_x allowances could easily cost large fossil fuel companies $100 million or so per year. In our view, there is absolutely no reason for such punitive cost burdens when reasonable allocations such as under the current approaches will lead to the same environmental results, while keeping the cost of compliance much lower for the affected companies and many of their customers.

In addition, we think banked SO_2 allowances should be useful for compliance, with a discount, as in the CAIR program.

Finally, we think the implementation of SO_2 and NO_x cap-and-trade systems should anticipate and coordinate with the emerging climate change bill, and especially the technology deployment and emission reductions that we think are likely to result from the automotive sector, the transport sector, and the power sector as those sectors adopt low carbon technologies.

Post-combustion, carbon capture and sequestration, more nuclear, electric cars, higher efficiencies, all of those will tend to reduce the 3Ps from other sources, as well as from the power sector. We have to invest billions on that stuff, too, so we think an approach that facilitates and encourages the private investment and does so in a coordinated way is what you should all shoot for, and we look forward to working with you on that.

And I would be happy to answer any questions you have.

[The prepared statement of Mr. Corneli follows:]

Testimony of Steven Corneli

before the

Clean Air and Nuclear Safety Subcommittee

Environment and Public Works Committee

July 9, 2009

Good morning, Chairman Carper, Ranking Member Voinovich, and Senators. I want to thank you for inviting me to testify here today on behalf of NRG Energy. NRG owns some 23,000 megawatts of power plants in the US, making us the second largest all merchant power company in the country. We have power plants in the Northeast, including New York, Delaware and Maryland, in Louisiana, Texas and California. Our fleet includes coal, natural gas, and nuclear plants and we are actively developing new wind, nuclear and solar thermal, with solar projects announced in both New Mexico and California. We are active members of USCAP and are strong supporters of cap and trade legislation for climate change. We take other air emissions seriously, as well, and have spent over $1.3 billion in the last 5 years on reducing our emissions of sulfur dioxide (SO2), nitrous oxides (NOx), and mercury. I am happy to share our views today regarding additional legislation for further reducing those emissions.

At the start, let me say we supported the Clean Air Interstate Rule. But as we have read the various court orders affecting CAIR, we are concerned that EPA may not be able to craft a rule that would be both environmentally effective and economically reasonable without new legislative authority.

Legislation can help EPA to achieve these goals by providing both specific authority and a framework for rule development. Such legislation should clearly authorize EPA to address regional and national emission transport problems under Section 110(a)(2)(D) of the Clean Air Act through market-based systems.

Additionally, Congress needs to impose on coal-fired electric generating units an obligation to control mercury emissions within a reasonable time frame and remove fossil-fuel fired electric generating plants from Section 112 of the Clean Air Act. Mercury poses a clear environmental and health hazard that must be addressed. However, it is important that power plants be removed from Section 112 to avoid undermining the flexibility created by the cap & trade program designed to address SO2 and NOx emissions.

Such legislation would minimize the cost of achieving additional emission reductions to the nation and to the regulated entities, while providing the stable regulatory framework businesses need to make the significant investments associated with reducing emissions.

Today, I want to cover four basic principles that, in our view, should guide the development of such legislation:

- First, cap and trade has been a real success in reducing sulfur dioxide and acid rain. Congress should modify Title IV to authorize EPA to utilize the allowances created under the Acid Rain Program to reduce the transport of SO_2 emissions that contribute to fine particle nonattainment problems. Congress also should expressly authorize EPA to create a regional NOx emission transport program that requires reductions in NOx emissions from power plants to address both fine particle and ozone problems, similar to that established under the CAIR.

- Second, we need to do this in a way that builds on the successes of the acid rain program, and improves on it where experience shows improvements are warranted. For example, a key lesson learned, in our view, is that caps need to become tighter as emissions fall in order to spur continued investment in emission reductions.

- Third, the cap and trade programs should continue to allocate allowances to affected sources. Reasonable allocations provide a positive incentive to businesses, while minimizing their costs of compliance, and have the added benefit of increasing support and reducing opposition to legislation which, as noted above, we believe is needed.

- Finally, implementation of the SO2 and NOx cap and trade systems, as well as the mercury control requirements, should align in time with the major investment decisions that will be made under the emerging climate change program. This coordination is critical to allow companies to make long-term capital plans for controlling or retiring power plants, building new capacity and investing in conservation to ensure a reliable, affordable electricity supply.

Use cap and trade to minimize economic cost and maximize net benefits. The success of the acid rain cap and trade program is well known. The EPA reports that emissions of sulfur dioxide from covered sources were reduced by over 40%, from 15.7 million tons in 1990 to 7.6 million tons in 2008. And, while the EPA originally predicted that SO2 allowance prices would be in the $500 to $1000 range, innovation and competition among different ways to reduce sulfur emission actually produced prices in the $100 to $200 range.[1] As the nation seeks to achieve additional reductions in sulfur and nitrous oxide emissions, it owes it to its citizens, businesses, and economy as a whole to continue to use this tried and true approach to reducing emissions at the lowest cost.

Build on the lessons learned from the Acid Rain Program and other emission markets. One of the key lessons learned from the acid rain program and CAIR to date is that investments in reducing pollution depend on commercial and legal continuity of the

[1] *Acid Rain Program 2005 Progress Report,* EPA-430-R-06-015

regulatory program. Commercial continuity can be harmed when reductions lead to emissions falling below the cap, leading to a relative surplus of emission allowances and excessively low prices. Legal continuity can be harmed when litigation results in uncertainty about the future validity of the program. Both types of events create risk that the billions of dollars spend on reducing emissions will not be recovered, and both need to be guarded against. To do so, legislation should provide:

- Regularly scheduled reductions in the cap itself, designed to achieve the total targeted reductions over a realistic time frame, considering the availability and likely cost of various means to effectively reduce emissions

- The continued ability to use banked allowances, earned through previous emission reductions, for compliance purposes. It may be desirable to balance the supply of these allowances with demand by adjusting the quantity of allowances that can be used to cover a ton of emissions in the new regime (e.g., through CAIR's 2:1 and 2.85:1 multiples.)

- Robust and clear provisions to deal with the critical issues raised in the CAIR remand and other potential litigation drivers.

Use moderate allocations to buffer impact and improve incentives. Allocations, if designed properly, help keep the cost of compliance low, while avoiding windfalls and creating strong positive incentives for investment in clean energy production. Historically, the Acid Rain Program's full allocation made sense in the context of a regulated utility sector. The EU ETS, however, demonstrated that full allocation can lead to windfalls in a merchant or competitive power market, if the free allowances exceed a covered entity's net compliance costs – that is, the portion of compliance cost that it cannot pass through in higher power prices.

As a general principle, NRG supports this net compliance cost approach to allocations, with the potential for additional allocations to be passed through to consumers by regulated electric distribution companies (whether stand-alone or as part of a vertically integrated utility) if necessary to buffer significant retail cost increases.[2] With respect to NOx, legislation should enable the CAIR allocation approach to continue essentially as is, though with appropriate reductions consistent with a cap that gets tighter over time. With regard to SO2 allocations, our recommendation is to continue the CAIR provisions through 2015. After that, ongoing allocations should be consistent with the net compliance cost principle, and in addition, previously banked acid rain program allowances should be valid for compliance use, with a multiple as provided for in CAIR.

Integrate and coordinate with climate change legislation. NRG is committed to the passage of environmentally effective, economically sustainable climate change legislation that includes cap and trade, complementary measures to support the rapid deployment of low and no carbon technology, and fair allocations to buffer the cost

[2] This is the approach used in HR 2454 for greenhouse gas emission allowances.

impact on both consumers and businesses, while avoiding windfalls. In our view, such a policy is among the highest national priorities for the environment, energy security, and investment and innovation.

There is good reason to believe that such a policy will lead to rapid reductions of air pollution due to reduced emissions from power plants, other large stationary sources of greenhouse gases, and automobiles. In the power sector, in particular, we anticipate that post combustion carbon capture and sequestration (CCS) will coincidentally lead to dramatic reductions in the emissions of sulfur dioxide, nitrous oxides, particulates and mercury from the more efficient existing fleet of coal plants. CCS for new coal plants will have a similar effect, while an increasing price on carbon will render less efficient existing coal plants uneconomic, leading to earlier retirement than without a cap and trade regime. At the same time, increased efficiency and increased electrification of automobiles should dramatically reduce the emission of ozone precursors from mobile sources. Legislation addressing other emissions should be crafted in a manner that anticipates and helps support the massive investment in low and no carbon technologies that regulated entities will be called upon to make, and the likely reductions in non-GHG emissions that will accompany these investments.

I look forward to any questions you may have.

Senator CARPER. You bet. We look forward to working with you as well.

Mr. LaBauve. Welcome. Please proceed.

STATEMENT OF RANDALL R. LaBAUVE, VICE PRESIDENT, ENVIRONMENTAL SERVICES, FLORIDA POWER AND LIGHT COMPANY

Mr. LABAUVE. Mr. Chairman, Members of the Subcommittee, thank you for the opportunity to testify today. My name is Randall LaBauve, and I am Vice President, Environmental Services for Florida Power and Light Company.

Senator CARPER. Sir, is your microphone on? Just double check.

Mr. LABAUVE. Now it is.

Senator CARPER. Good. What was your name? No, go ahead.

[Laughter.]

Mr. LABAUVE. FPL Group is a leading clean energy company with approximately 39,000 megawatts of generating capacity and more than 15,000 employees in 27 States and Canada. FPL Group's principal subsidiaries are NextEra Energy Resources, the largest generator of renewable energy from wind and sun in North America, and Florida Power and Light Company, which serves 4.5 million customer accounts in Florida and is one of the largest regulated electric utilities in the country.

Today, the electric energy sector is at an environmental crossroads. While some companies like FPL Group have transitioned to the no and low emissions generation technologies of the future, other companies are stalled in an untenable past. As such, the environmental decisions that the Congress and the agencies make will dictate billions of dollars' worth of future decisions. But perhaps more importantly, these decisions also stand to reward and/or punish companies for the actions they may or may not have taken.

When CAIR was promulgated, its legality was challenged by numerous companies, including FPL Group, in various States. The D.C. Circuit Court decided in July, 2008 that CAIR was fundamentally flawed, and EPA was directed to rewrite the rule. The court found many flaws in the rule including three which we believe are significant to future EPA regulations.

First, the court found that the proposed emissions trading program would not necessarily bring all areas into attainment as required by section 110 of the Clean Air Act. Second, the court ruled that EPA had no authority to terminate or limit sulfur dioxide emission allowances under title IV of the Clean Air Act. Finally, upholding FPL Group's challenge, the court ruled that EPA had unlawfully acted beyond the bounds of its statutory authority by utilizing fuel adjustment factors to reallocate NO_x allowances from cleaner generation to those utilizing coal-fired generation.

Unfortunately, the issues the court identified will not be easily remedied by EPA. Without significant revisions to the Clean Air Act, the EPA likely cannot rewrite CAIR to include the currently proposed program measures. This may leave EPA little choice but to develop a draconian command and control rule that would be extremely costly and would certainly lead to further litigation.

Therefore, it is now incumbent on the Congress to act and to provide EPA clear legislative direction to develop effective and equitable rules. Since the court's ruling, there have been several calls for a quick fix to codify the existing CAIR proposal. However, such an overly simplistic rushed effort to avoid the court's decision simply isn't practicable.

Codifying CAIR will not address the growing complexity of rules that are staged to affect electric generating facilities, and will not provide a comprehensive solution to all the confusing and overlapping regulations that will result in additional litigation, create economic uncertainty, and affect future electric generating reliability. In other words, inaction isn't a choice.

But instead of a rushed and incomplete half measure, Congress should take on the task and enact a comprehensive national policy that addresses the various emission reduction programs currently being developed by EPA. We need Congress to develop a comprehensive 3P bill that provides protective and reasonably attainable reductions of SO_2 and NO_x emissions, incorporates the regulation of mercury and other hazardous air pollutants; and corrects the flaws in CAIR.

Without legislation, EPA's current patchwork of Clean Air Act and court decision-driven rule development will continue to be a stifling burden to reducing emissions and achieving industry compliance.

The legislation should establish an efficiency-based cap-and-trade program to distribute emission allowances without inequitable fuel adjustment factors, initially utilizing free allocations of a percentage of the allowances, and then transitioning to a 100 percent auction of allowances.

The legislation should also include direction and authority for EPA to utilize a market-based trading program that will reduce the downwind impact of emissions to non-attainment areas and include assurances that attainment standards will be met.

FPL Group believes that only Congress can effectively address the confusing and incomplete patchwork of onerous air emission regulations that are stifling the decision processes for upgrading, maintaining, repowering, and building new power plants.

As such, we commend the Chairman for taking on this issue and stand ready to work with this subcommittee to pass a comprehensive three-pollutant bill that will provide the necessary certainty to reduce pollution and advance our Nation's energy policy.

Thank you.

[The prepared statement of Mr. LaBauve follows:]

Testimony of Randall R. LaBauve
Vice President Environmental Services, Florida Power & Light Company

Before the
Subcommittee on Clean Air and Nuclear Safety
U.S. Senate

Hearing On
"Oversight: Environmental Protection Agency's Clean Air Regulations—One Year after the CAIR and CAMR Federal Court Decisions"
July 09, 2009

Mr. Chairman, Members of the Subcommittee, thank you for the opportunity to testify today. My name is Randy LaBauve, and I am the Vice President of Environmental Services for Florida Power & Light Company, testifying on behalf of FPL Group.

FPL Group is a leading clean energy company with approximately 39,000 megawatts of generating capacity and more than 15,000 employees in 27 states and Canada. FPL Group's principal subsidiaries are NextEra Energy Resources, the largest generator of renewable energy from the wind and sun in North America, and Florida Power & Light Company, which serves 4.5 million customer accounts in Florida and is one of the largest regulated electric utilities in the country.

Today, the electric energy sector is at an environmental crossroads. While some companies, like FPL Group, have transitioned to the no- and low-emissions generations technologies of the future, other companies are stalled in an untenable past. As such, the environmental decisions that the Congress and the agencies make will dictate billions of dollars worth of future decisions, and perhaps more importantly, these decisions also stand to reward and/or punish companies for the actions that they may or may not have taken.

When CAIR was promulgated, its legality was challenged by numerous companies, including FPL Group, and various states. The DC Circuit Court decided in July 2008 that CAIR was "fundamentally flawed" and EPA was directed to rewrite the rule.

The Court found many flaws in the rule, including three which we believe are significant to future EPA regulations. First, the Court found that the proposed emissions trading program would not necessarily bring all areas

into attainment as required by Section 110 of the Clean Air Act. Secondly, the Court ruled that EPA had no authority to terminate or limit sulfur dioxide emissions allowances under Title IV of the Clean Air Act. Finally, upholding FPL Group's challenge, the Court ruled that EPA had unlawfully acted "beyond the bounds of its statutory authority" by utilizing fuel adjustment factors to reallocate NOx allowances from cleaner generation to those utilizing coal-fired generation.

Unfortunately, the issues the Court identified will not be easily remedied by EPA. Without significant revisions to the Clean Air Act, the EPA likely cannot rewrite CAIR to include the currently proposed program measures. This may leave EPA little choice, but to develop a draconian command and control rule that would be extremely costly, and would certainly lead to further litigation. Therefore, it is now incumbent on the Congress to act and provide EPA clear legislative direction to develop effective and equitable rules.

Since the Court's ruling, there have been several calls for a quick fix to codify the existing CAIR proposal. However, such an overly simplistic, rushed effort to avoid the Court's decision simply isn't practicable. Codifying CAIR will not address the growing complexity of rules that are staged to affect electric generating facilities and will not provide a comprehensive solution to all the confusing and overlapping regulations that will result in additional litigation, create economic uncertainty and affect future electric generating reliability. In other words, inaction isn't a choice.

But, instead of a rushed and incomplete half measure, Congress should take on the task and enact a comprehensive national policy that addresses the various emissions reduction programs currently being developed by EPA. We *need* Congress to develop a comprehensive three-pollutant bill that provides protective and reasonably attainable reductions of SO2 and NOx emissions, incorporates the regulation of mercury and other hazardous air pollutants and corrects the flaws in CAIR. Without legislation, EPA's current patchwork of Clean Air Act and court decision driven rule development will continue to be a stifling burden to reducing emissions and achieving industry compliance.

The legislation should establish an efficiency-based cap and trade program to distribute emissions allowances, without inequitable fuel adjustment factors, initially utilizing free allocations of a percentage of the allowances; and then transitioning to a 100% auction of allowances. The legislation

should also include direction and authority for EPA to utilize a market-based trading program that will reduce the downwind impacts of emissions to non-attainment areas and include assurances that attainment standards will be met.

FPL Group believes that only Congress can effectively address the confusing and incomplete patchwork of onerous air emissions regulations that are stifling the decision processes for upgrading, maintaining, repowering and building new power plants. As such, we commend the Chairman for taking on this issue and stand ready to work with this Subcommittee to pass a comprehensive three-pollutant bill that will provide the certainty necessary to reduce pollution and advance our nation's energy policy.

Thank you.

Follow-up Questions from Senator David Vitter to Randall R. LaBauve in Response to July 9, 2009 Testimony before the Senate EPW
Submitted August 20, 2009

1. You testify that "CAIR's" legality was challenged by numerous companies."

Question a. Isn't it in fact true that CAIR was originally challenged by only 11 companies?

FPL Group Response: CAIR was challenged by 12 company related petitioners. At least three of the company-related petitions included associations with several member companies or electric generating municipalities (See the list of petitioners below). As such, there were at least 36 electric generating companies or electric generating municipalities participating in the rule challenge not counting states and the environmental consortium. FPL Group believes this number represents a "numerous" number of companies. More specifically, with respect to Florida the membership of the Florida Association of Electric Utilities (FAEU) alone includes nine electric generating companies or municipalities and represents 75% of the state of Florida's electric generation.

FPL Group believes that more important than any specific number of companies that challenged the rule is the fact that the DC Circuit Court found in their initial decision that the CAIR Rule was so profoundly flawed that it should be vacated. We believe that any individual, company, municipality or state that shows that they are harmed by the unlawful application of EPA's authority should receive equal consideration regardless of how many individuals they represent in any given group. For example, in the case of CAIR, the DC Circuit Court agreed that EPA's application of fuel adjustment factors was outside the boundary of EPA's authority. The net result is that states with mainly oil- and gas-fired electric generating units subsidize reductions in states with mainly coal-fired electric generating units. Due to the fuel adjustment factors, valuable NOx allowances were taken from oil and gas fired generators and given to coal-fired generators, thereby financially hurting the customers of oil- and gas-fired generators. In Florida, a total of 16,599, annual allowances were redistributed to states with coal heavy generation. In Louisiana, 14,520, annual allowances were redistributed to coal heavy states such as Ohio, Kentucky and Illinois. FPL Group and Entergy Corporation challenged the application of fuel adjustment factors because these factors represent an actual and significant financial harm to our customers. The Court agreed with our position.

CAIR petitioners:

- **Florida Association of Electric Utilities**
  - Florida Power & Light Co.
  - Progress Energy
  - Gulf Power Co.
  - Lakeland Utilities
  - Lake Worth Utilities
  - City of Vero Beach
  - Florida Municipal Power Association
  - Seminole Electric Co.
  - Orlando Utilities Commission
- **FPL Group**
- **Entergy Corporation**
- **Xcel Energy**
- **Texas Commission on Environmental Quality (SB 2481)**
- **Minnesota Power**
- **State of North Carolina**
- **Duke Energy**
- **ARRIPA—Waste Coal Plants**
  - ARIPPA is a not-for-profit trade association comprising fourteen independent power producers in Pennsylvania that generate approximately 1400 megawatts of electricity by using environmentally-friendly Circulating Fluidized Bed (CFB) boiler technology to burn coal mining refuse.
- **South Carolina E&G**
- **South Carolina Public Service and Jacksonville Electric Authority**
- **AES Corporation**
- **N. Indiana Public Svc.**
- **Integrated Waste Services Association**
  - Covanta Energy Corporation
  - Wheelabrator Technologies Inc.
  - Veolia ES Waste-to-Energy, Inc.
  - Energy Answers Corporation
  - 24 municipalities employing WTE
  - Businesses engaged in support of WTE
- **Commonwealth of Massachusetts**
- **Environmental Consortium**

Question b. Further, isn't it true that after the rule was vacated 3 of the 11 "company" petitioners argued to have the vacatur stayed because they never sought to have the entire CAIR rule vacated but instead only sought to have the court strike down very specific portions?

FPL Group Response: We are unaware of any petitioners that challenged CAIR anticipating or seeking a complete vacatur. While some companies did not want CAIR vacated after the July 11, 2008 court decision, it is our understanding that this was not necessary because these companies supported the flaws in CAIR, but because the vacatur of CAIR by the court put some companies at risk for financial recovery of costs associated with the early implementation of CAIR related compliance projects. Several companies initiated the installation of pollution control equipment to meet the compliance requirements of CAIR. In fact some companies speculatively traded CAIR allowances.

FPL Group did not seek vacatur of CAIR initially. However, following the Court's July 11, 2008 decision calling for vacatur, FPL Group came to support the complete vacatur of CAIR for several reasons. First, we felt the court had upheld our position on CAIR's flaws and the vacatur would force EPA to expeditiously develop a new rule correcting the flaws. Secondly, allowing EPA to move forward and implement the fundamentally flawed rule, as labeled by the Court, would continue to perpetuate the unfounded use of the fuel adjustment factors that unfairly penalized cleaner oil and gas fired companies such as FPL Group. This concern has been realized as EPA has indeed failed to remove the fuel adjustment factors as directed by the Court. This substantiates FPL Group's position that vacatur was necessary to effectuate the ruling on fuel adjustment factors. Lastly, FPL Group was concerned that allowing CAIR to remain in-place with the fuel adjustment factors intact would set precedent that may be carried into other future rulemaking, such as rules regulating greenhouse gas reductions.

FPL Group did not challenge the reduction targets or the timing of CAIR implementation. We agree that reasonable emissions reductions are needed to protect human health and the environment. However, we have not supported nor do we support future regulatory development that is unfair to our customers and unlawfully transfers allowances to coal-fired electric generation. Further, since the initial development of CAIR, it has become evident that the reduction requirements in CAIR did not go far enough for NOx and SO2 in order to be sufficiently protective of human health and the environment. For this reason, FPL Group believes that EPA should expeditiously rewrite CAIR to correct the flaws identified by the court, and to tighten the limits on NOx and SO2 emissions. To this end, as stated in my testimony before the subcommittee, the Senate should act to develop a comprehensive 3-pollutant bill that clarifies EPA's authority and not only equitably regulates SO2 and NOx, but also incorporates the regulation of mercury and hazardous air pollutants emissions in the wake of the Court's vacatur of the Clean Air Mercury Rule.

Senator CARPER. Mr. LaBauve, thank you very much for that statement and for being here today.

Mr. Hart. Gary R. Hart. Welcome.

STATEMENT OF GARY R. HART, MARKET ANALYST, ICAP ENERGY

Mr. HART. Good morning, Chairman Carper and to the distinguished members of the committee.

I appreciate the opportunity to appear before you and discuss the implications and impacts of the recent court decision on the emissions trading markets.

My name is Gary R. Hart. I represent ICAP Brokerage as a Market Analyst. Prior to my affiliation with ICAP, I spent 28 years with the Southern Company and retired as their Manager of Emissions Trading in late 2006. In that capacity, I managed a system-wide bank of emission allowance holdings valued at over $4 billion.

I helped found the trade association known as the Environmental Markets Association and was part of a delegation to Beijing to instruct the Chinese government and academia on how to implement a cap-and-trade program. I speak frequently on this, and have been quoted in things such as Wall Street Journal and Fortune and was recently quoted in the Washington Post on the Waxman-Markey bill.

I have been really fortunate to watch cap-and-trade grow from a theory or concept included in the 1990 amendments to the Clean Air Act, into a fully functioning policy tool providing real environmental benefits to our citizens. Even groups such as the Environmental Defense Fund published a pamphlet in September 2000 entitled, From Obstacle to Opportunity—How Acid Rain Emissions Trading Is Delivering Cleaner Air.

In my opinion, as compared to command and control, market-based solutions such as cap-and-trade offers the following positive advantages. It allows for compliance options or flexibility. It creates incentives to over-comply and sell those excess allowances back into the market. It establishes market prices to include in the unit dispatch equation, thus forcing cleaner units to run first and at greater capacity factors. And it really forces the economic allocation of capital dollars.

In March, 2005, EPA promulgated the CAIR and CAMR rules and from the regulated entity perspective, thousands of man hours were expended in developing long-term compliance strategies. Complex computer models were used to balance the cost of installing technology against the cost of relying upon the allowance markets to reach a least cost compliance strategy.

In many cases, it was determined that the needed technologies could not be installed in time, and hence decisions were made to purchase emission allowances for future compliance purposes. With the court ruling vacating the CAIR rule, we now find ourselves in a market where there is massive uncertainty as to the future viability of SO_2 and NO_x markets, and this is coupled with massive holdings of emission allowances that were purchased in anticipation of a two for one surrender beginning in 2010 for SO_2 compliance.

In theory, SO_2 and NO_x allowance market equilibrium prices should represent the next incremental cost to install control equipment, i.e. scrubbers or SCRs, on a unit and are expressed typically in dollar per ton removal costs. Currently, this 20-year levelized cost for an SO_2 scrubber is estimated to be between $750 to $900 per ton, yet due to these other factors, again the SO_2 market is now trading well below $100. The same equilibrium cost for annual NO_x has been estimated to be in excess of $2,000 per ton to put on an SCR, and yet right now NO_x allowances are trading at approximately $1,100.

Wait and see seems to be the prevailing attitude in these markets. This is further reinforced by an article in the April 1 issue of Air Daily where Sam Napolitano, the Director of the Clean Air Markets Division at EPA, was quoted as follows: "While no inferences should be made from last week's letter, I am urging buyer beware. Probably the trading allowances in the next 2 years is on good ground, but after that, it's not so good."

The results of the annual 2009 EPA auction pointed to a real lack of confidence in these markets, again due to the court decisions. The 2009 vintage SO_2 allowances sold at an average price of only $69.74, which was like the second all time low price, and future 7-year vintage allowances sold for only $6.65.

I refer to July 11, 2008, in my presentations as really "Black Friday" in the emissions market. Again, SO_2 prices fell from $314 on the morning of July 11 to close at $115, and annual NO_x prices fell from $4,800 down to $1,100 by the close of the day.

Cap-and-trade programs established by Congress and the EPA to deal with SO_2 and NO_x emissions have truly been an environmental success story, as you can see from my attached chart. Unfortunately, it appears the EPA has been painted into a corner and can only respond to the court with some type of command and control regime. There was a great deal of effort put forth in late 2008 to attempt to give the CAIR rule legislative authority. I would encourage the members of the committee to again consider such a focused technical legal fix to CAIR to restore much-needed confidence in these markets.

I wish to thank the distinguished members of the committee for holding this hearing and allowing me to share my views on this most important matter with you.

Thank you.

[The prepared statement of Mr. Hart follows:]

Written Testimony of
Gary R. Hart
Market Analyst for
ICAP United and ICAP Energy

Before

The United States Senate Sub Committee on Clean Air and Nuclear Safety

Oversight: Environmental Protection Agency's Clean Air Regulations – One Year after the CAIR and CAMR Federal Court Decisions

July 9th, 2009

Good morning Chairman Carper, Ranking Member Vitter and good morning to the distinguished members of this committee. I appreciate the opportunity to appear before you and discuss the implications and impacts of the recent court decisions upon the emission trading markets. My name is Gary R Hart and I represent ICAP brokerage as a market analyst. Prior to my affiliation with ICAP, I spent 28 years with Southern Company and retired as their Manager of Emissions Trading in late 2006. In that capacity I managed a system wide bank of emission allowance holdings valued at over $4 billion.

I helped found the trade association known as the Environmental Markets Association and I was also part of a US EPA delegation to Beijing in late 1999 to instruct the Chinese academia and government on how to implement a cap and trade program. I speak frequently on the use of market based programs to many diverse groups and have been quoted in publications such as the Wall Street Journal, Fortune and most recently in the Washington Post on May 26 regarding the Waxman-Markey bill.

Emissions trading, a unique success story

I have been very fortunate to watch cap and trade grow from a theory or concept included in the 1990 Amendments to the Clean Air Act into a fully functioning policy tool providing real environmental benefits to our citizens. Even groups such as the Environmental Defense Fund, published a pamphlet in September of 2000 titled "From Obstacle to Opportunity - How Acid Rain Emissions Trading is Delivering Cleaner Air." In my opinion, as compared to command and control, market based solutions such as cap and trade offer the following positive advantages:

- It allows compliance options or flexibility
- It creates incentives to over-comply and to sell excess allowances back into the market.
- It establishes a market price to include in the unit dispatch equation thus forcing cleaner units to run first and at greater capacity factors.

- "Forces" the economic allocation of capital dollars to the units with the lowest $/ton removal costs

2008 Federal Court Decisions and the Emission Markets

In March of 2005, the EPA promulgated the CAIR and CAMR rules. From the regulated entity perspective, thousands of man-hours were expended in developing long-term compliance strategies. Complex computer models were used to balance the cost of installing technology against the cost of relying upon the allowance markets to reach a least cost compliance strategy.

In many cases, it was determined that the needed technologies could not be installed in time, and hence decisions were made to purchase emission allowances for future compliance purposes. With the court vacating the CAIR rule, we now find ourselves in a market where there is massive uncertainty as to the future viability of the SO2 and NOx markets and this is coupled with massive holdings of emission allowances that were purchased in anticipation of a two for one surrender ratio beginning in 2010 for SO2 compliance.

In theory, the SO2 and NOx allowance market equilibrium prices should represent the next incremental cost to install control equipment (scrubbers or scr's) on a unit and are expressed in dollar per ton removal costs. Currently, this 20 year "levelized" cost for an SO2 scrubber is estimated to be in the $750 to $ 900 per ton range yet due to these "other factors" the SO2 market is trading at below $100 per ton. This same equilibrium cost for annual NOx has been estimated to be in excess of $2,000 per ton for NOx removal yet current annual NOx allowances are trading at approximately $1,100.

Uncertainty in the Marketplace

"Wait and see" seems to be the prevailing attitude in these markets. This is further reinforced by an article in the April 1st issue of Air Daily where Sam Napolitano, the director of the Clean Air Markets Division at EPA was quoted as follows:
"While no inferences should be made from last week's letter, I am urging "buyer beware". Probably the trading of allowances in the next two years is on good ground, but after that the ground is not so good to be standing on". The results of the annual 2009 EPA SO2 allowance auction also points to a real lack of confidence in these markets due primarily to the court decisions. 2009 vintage SO2 allowances sold at an average price of only $69.74 and future vintage allowance sold for only $6.65 (an all time low price). In many of my presentations, I refer to July 11, 2008 as "Black Friday" for the emissions markets. SO2 prices fell from $314 dollars on the morning of July 11th to close at $115 and Annual NOx prices fell from $4,850 per ton that morning to $1,150 per our records at ICAP.

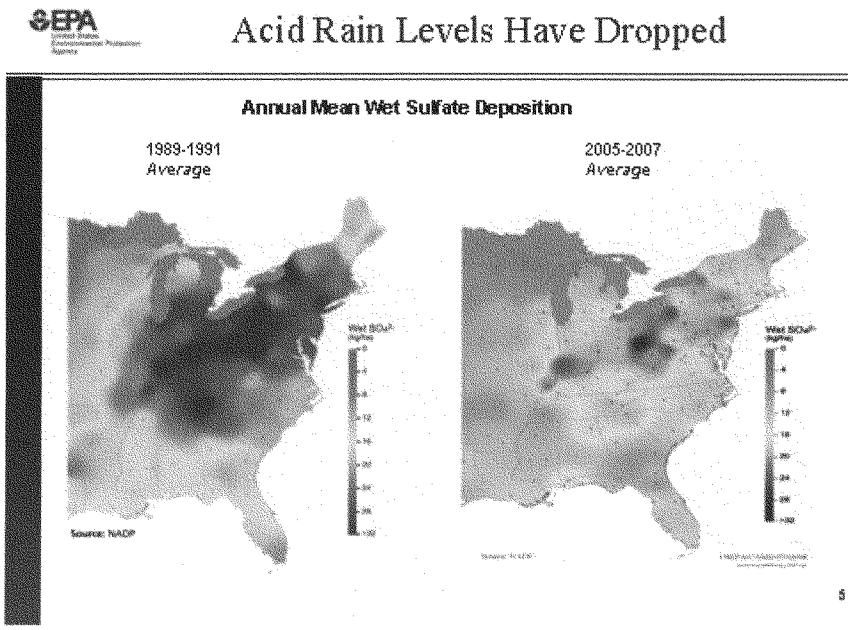
Conclusions

Cap and trade programs establish by Congress and by the EPA to deal with SO2 and NOx emissions have truly been an environmental success story (see attachment 1). Unfortunately, it appears that the EPA has been "painted into a corner" and can only respond to the Court with some type of command and control regime. There was a great deal of effort put forth in late 2008, to attempt to give the CAIR rule legislative authority. I would encourage members of the committee to again consider such a focused technical legal fix to the CAIR rule to restore much needed confidence in these markets.

I wish to thank the distinguished members of this committee for holding this hearing and allowing me to share my views on this most important matter with you.

Testimony of Gary R. Hart
July 9th, 2009
Attachment Number 1

EPA presentation to the Environmental Markets Association April 23, 2009



Senator CARPER. Thank you, Mr. Hart. Thank you very, very much.

Mr. Scott, please proceed. Welcome.

STATEMENT OF DOUGLAS P. SCOTT, DIRECTOR, ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

Mr. SCOTT. Thank you very much, Chairman Carper, Senator Voinovich, Senator Alexander. I appreciate the opportunity to be here with you today.

I have been the Director of the Illinois EPA for 4 years, and during that time period we have entered into extensive regulatory negotiations and rulemaking on just the subject we are talking about today, at the State level to address sulfur dioxide, nitrogen oxides and mercury, specifically addressing those emissions from coal-fired power plants in our State.

We get about 40 percent of our electricity from coal-fired power plants, and they represent the largest source of man-made emissions of mercury and sulfur dioxide, and one of the largest sources of nitrogen oxide in our State. We are home to 21 large coal-fired power plants that operate electric generating units.

We have made exceptional progress in the last few years in reducing the emissions that contribute to ozone and particulate matter air pollution as well as the toxic mercury emissions that deposit into and contaminate Illinois' waters and fish.

In particular, we reached landmark multi-pollutant standard agreements with the three largest coal-fired power plants in our system. They represent about 88 percent of the 17,000 megawatts of coal-fired electric generating capacity and account for hundreds of thousands of tons of air emissions each year.

We have what we call multi-pollutant and combined pollutant standards, MPS and CPS, that we entered into agreements with these companies, and they will improve Illinois and regional air quality dramatically by reducing the three pollutants we have been talking about today.

The agreed-to standards represent the largest reductions in air emissions ever agreed to by individual companies in Illinois under any context, whether through an enforcement action or through regulation. The combination of the Illinois mercury rule, CAIR, and the MPS and CPS will have enormous positive impacts on reducing mercury, SO_x and NO_x emissions far beyond the levels that were required under the Federal CAMR and CAIR alone, and I have additional details of those figures in my written testimony.

Whereas the Federal CAMR focuses solely on mercury emissions and CAIR concentrates on SO_2 and NO_x, Illinois has taken a combined approach that exceeds the goals in the context of a single regulatory framework accommodating engineering and construction issues and outage schedules, which are very, very important, as well as financing issues which have become even more important recently.

When the United States District Court of Appeals vacated CAMR, our Illinois mercury rule was already in effect, and therefore the vacator had minimal impact on our Illinois rule, as you heard from the gentleman in the previous panel. It did cause us to do some revisions to our particular rule with respect to moni-

toring provisions we had relied on CAMR for, but otherwise our rule is intact.

We were relying on CAIR phase one as part of our 8-hour ozone and annual $PM_{2.5}$ attainment plans in annual fine particulate matter non-attainment areas. We have improved to a very significant degree even without these expected reductions. As a result, all but one monitor is in attainment for these standards, which we are very glad of.

Despite the improvement in air quality, we would have much more significant problems in demonstrating attainment in our State implementation plan, as was discussed earlier, if CAIR phase one or something that looks very much like it, were not reinstated.

As was suggested during the first panel, there is concern that power plants may delay or cancel some controls that were being installed to comply with CAIR phase one due to the loss of value in the SO_2 and NO_x allowances. And as you have heard, the market value of these allowances is very uncertain.

We think that the vacator of CAMR and CAIR emphasizes the high risk associated with moving forward without legislation and moving forward only with Federal regulations subject to widespread opposition and controversy. Regulations will almost certainly be challenged in courts, potentially resulting in further delay of a vital strategy for the States to achieve attainment of Federal air quality standards.

Section 126 petitions will surely also be filed by States who believe their neighbors in upwind States could do more to address non-attainment, even if the complaining States' air quality issues are largely as a result of emissions from its own sources. And Mr. Korleski and I have been working with our colleagues in other Midwestern and in the Northeastern States on an approach, but it is a very difficult one to try to work on together.

As a result of our knowledge and experience gained through our efforts in Illinois, we support a comprehensive national strategy for reducing emissions of multiple pollutants from electric generating units. A comprehensive integrated approach benefits both regulators and the regulated community, in our opinion.

Multi-pollutant approaches should, where practicable, address all significant emissions from electric generating units and supplement, not replace, the existing Clean Air Act programs such as New Source Review and MACT standards and Regional Haze. And we agree with you, Senator Carper, that trading makes a lot of sense with respect to nitrogen oxide and sulfur dioxide, but not with the neurotoxin mercury. We agree with that approach very much.

We look forward to working with you, and again commend you and the other Senators who have—I have testified in front of you before and I really appreciate the continued interest that you have and the sentiment that you raised, Senator Alexander, that this not get lost in the other very, very important legislation that is coming through the Senate right now.

Thank you for having me here today.

[The prepared statement of Mr. Scott follows:]

TESTIMONY OF DOUGLAS P. SCOTT

DIRECTOR, ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE:

U.S. SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

SUBCOMMITEE ON CLEAN AIR AND NUCLEAR SAFETY

ON THE SUBJECT OF:

"OVERSIGHT: ENVIRONMENTAL PROTECTION AGENCY'S CLEAN AIR REGULATIONS – ONE YEAR AFTER THE CAIR AND CAMR FEDERAL COURT DECISIONS"

JULY 9, 2009

Written Testimony of Douglas P. Scott
Director, Illinois Environmental Protection Agency
Before the:
U.S. Senate Committee on Environment and Public Works/
Subcommittee on Clean Air and Nuclear Safety
On the Issue of:
"Oversight: Environmental Protection Agency's Clean Air Regulations – One Year after the CAIR and CAMR Federal Court Decisions"
July 9, 2009

Mr. Chairman and Members of the Committee: My name is Doug Scott and I am the Director of the Illinois Environmental Protection Agency. I want to thank Senator Carper and the other members of the Senate Subcommittee on Clean Air and Nuclear Safety for this opportunity to testify on Illinois' regulations to control sulfur dioxide, nitrogen oxides and mercury emissions from the State's coal-fired power plants.

I received a Bachelor's Degree with honors from the University of Tulsa in 1982, and received a graduate Juris Doctor law degree with honors from Marquette University in 1985. I served as Assistant City Attorney and City Attorney for the City of Rockford, Illinois from 1985 to 1995. I also represented the City on a number of environmental issues. From1995-2001 I served as an Illinois State Representative for the 67th District and served on the House Energy and Environment Committee, and was a member of the committee that rewrote the States' electric utility laws. I was elected to the Office of the Mayor of Rockford in April 2001 and served a four-year term and served as President of the Illinois Chapter of the National Brownfields Association. I was appointed as the Director of the Illinois EPA by Governor Rod Blagojevich in July 2005, and have served as Chair of the Air Committee of the Environmental Council of the States (ECOS), the national organization of state environmental agency leaders.

I am pleased to be here to provide testimony on the "three pollutant" approach and Illinois' experience in reaching agreements with our state's three largest coal-fired power plant system owners. My testimony will provide background information and a broad overview of the

development of Illinois' multi-pollutant reduction agreements. I will address some of the measures the Illinois EPA took during rule development to ensure that we relied on accurate and current information as we crafted the rule.

Illinois Multi-Pollutant Regulatory Approaches

Illinois is a large industrial state with a population of about 13 million people and a gross state product of $522 billion. Each of these are approximately four percent of the U. S. total and ranks Illinois as fifth among the nation in these categories. Illinois obtains more than 40 percent of its electricity from coal-fired power plants and sits on top of 38 billion tons of coal, giving it the third largest coal reserves in the nation. Coal-fired power plants in Illinois constitute the largest source of man-made emissions of mercury (Hg) and sulfur dioxide (SO_2), and one of the largest sources of nitrogen oxides (NO_x). Illinois is home to 21 large coal-fired plants that operate electric generating units.

Over the last several years in Illinois, exceptional progress has been made in reducing the emissions that contribute to ozone and particulate matter (PM) air pollution, as well as reducing toxic Hg emissions that deposit into and contaminate Illinois' waters and fish. In particular, the Illinois Environmental Protection Agency (Illinois EPA) reached landmark multi-pollutant standard agreements with the three largest coal-fired power plant systems operating in Illinois: Midwest Generation, Ameren and Dynegy. These three companies represent 88% of Illinois' 17,007 megawatts of coal-fired electric generating capacity and account for hundreds of thousands of tons of air emissions each year.

These multi-pollutant standards (MPS) are expected to result in measurable air quality improvements in Illinois and also in regional air quality by dramatically reducing Hg, SO_2, and NO_x emissions from Illinois' coal-fired power plants. The agreed-to multi-pollutant standards are one of the most important environmental and public health advances in Illinois in recent decades. They represent the largest reductions in air emissions ever agreed to by individual companies in Illinois under any context, whether through an enforcement action or regulation.

As a result of the knowledge and experience gained through Illinois' efforts, the Illinois EPA supports a comprehensive national strategy for reducing emissions of multiple pollutants from electric generating units. A comprehensive, integrated approach benefits both regulators and the regulated community. Multi-pollutant approaches should supplement, not replace, the existing Clean Air Act programs such as New Source Review (NSR), Maximum Achievable Control Technology (MACT) standards and regional haze, as well as other important statutory requirements for achieving and sustaining clean air.

In meeting emission goals, the regulated community should be afforded flexibility, where appropriate, which may include an emissions trading mechanism for NOx, and SO_2, but not pollutants where local impacts are of great concern or where concentrated emissions at a local scale may occur – as in the case of Hg. Any multi-pollutant strategy must also ensure that regions, states and localities retain their authority to adopt and implement measures which are more stringent than those of the federal government.

A 3-pollutant approach for controlling the emissions of Hg, SO_2, and NO_x from coal-fired power plants can have numerous advantages over the traditional, single pollutant schemes. For example, a well crafted multi-pollutant standard can increase the protection of public health and the environment, reduce pollution more cost-effectively, and offer greater certainty to both industry and regulators. Since Hg emission reductions can be obtained as a "co-benefit" from the control devices used to reduce SO_2 and NO_x, it makes sense to allow companies the option to synchronize the control of these pollutants, provided that public health and the environment are likewise positively impacted. Whereas the federal Clean Air Mercury Rule (CAMR) single-mindedly tackled mercury emissions, and the federal Clean Air Interstate Rule (CAIR) addressed SO_2 and NOx, Illinois was able to use a multi-pollutant strategy that accomplishes the aforementioned benefits in a unified regulatory framework accounting for planning, engineering, availability of financing and other issues that accompany a multi-pollutant control strategy.

Illinois believes the most feasible method of obtaining reliable emission reductions in a cost-effective manner is through a combination of emission rate based limits along with emissions trading. Although sources under the MPS are not allowed to utilize allowances to meet the

numeric emissions standards, sources are free to sell or trade allowances that are generated as a result of emissions being below the allowable emission rates. This provides an incentive for companies to go beyond the reductions required under the MPS in order to recover some of the costs associated with the control measures taken. Moreover, emissions' trading is recognized to provide market incentives for sources to control emissions as far and as fast as reasonably possible. Of note is that emissions trading under a cap and trade program has historically resulted in the highest emitting plants making the deepest reductions in emissions – a key finding that strongly supports the inclusion of emissions trading into any control strategy.

Illinois Multi-Pollutant Agreements

The catalyst for Illinois' agreements was the position taken in early 2006 that Illinois would propose an aggressive mercury regulation focused on cutting mercury emissions by 90% from coal-burning power plants by mid-2009. After the Illinois EPA presented its findings in support of the mercury rule during two weeks of well-attended and hotly contested public hearings, the Agency was approached by Ameren who expressed a desire to work with the Agency toward common goals. Subsequent to long hours of negotiation, an alternative standard was proposed that involved allowing some flexibility in complying with the mercury standards in exchange for commitments to also significantly reduce SO_2 and NOx emissions from Ameren's coal-fired power plants. This initial agreement led to similar discussions and agreements with Illinois' other two large coal burning systems, Dynegy and Midwest Generation.

The agreements reached and memorialized in the Multi-Pollutant Standard (MPS) and Combined Pollutant Standard (CPS) are significant not only for the magnitude of emissions reductions that occur, but also for the rule support that accompanied the agreements. The Illinois mercury rule was vehemently opposed by a unified coal-fired power industry. The initial agreement established that mutual goals were achievable, set the guiding principles, and opened the door for other companies to follow –which they did. Ultimately, the mercury rule was unanimously approved in 2006 by both the Illinois Pollution Control Board and the Joint Committee on Administrative Rules, the two governing oversight bodies for regulations in Illinois.

Both the MPS and CPS provisions provide some flexibility on the timing of mercury reductions in exchange for commitments to make significant reductions in both SO_2 and NOx. All of the provisions include some level of trading restrictions on SO_2 and NOx allowances provided under CAIR. Ameren, Dynegy and Midwest Generation will install a multitude of pollution control equipment on their boilers costing several billion dollars, including wet and dry scrubbers, selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR) devices, and fabric filters. Recent discussions with representatives of Illinois' coal-fired power plants indicate that they are all preparing to meet the requirements of the MPS and CPS, which initiate in 2010. In doing so, a wide array of emissions control equipment costing billions of dollars will come on-line in Illinois over the next several years. Illinois coal-fired power plants have already installed and begun operating numerous halogenated activated carbon injection (ACI) systems for mercury control. The first of many new scrubbers for SO_2 control will begin operation shortly. Fabric filter controls will accompany the installation of many of the scrubbers and result in the co-benefit of particulate matter reductions. Selective catalytic reduction devices and other new NOx controls are being scheduled for installation across Illinois. The shutdown of a few of the older, most polluting electric generating units began in December 2007 with two more units scheduled for shutdown by December 2010.

Illinois Mercury Rule

The Illinois mercury rule is designed to achieve a high level of mercury control, based on Illinois EPA's finding that there exists mercury control technology that is both technically feasible and economically reasonable. Mercury emissions may be reduced through the application of control technology specifically designed to control mercury (e.g., activated carbon injection), or through co-benefit from other control technologies designed to control SO_2, NOx, and PM. Depending on several variables, including coal and boiler type, there are a number of control technologies that will achieve 90+% removal of mercury. Mercury emissions control technology is a rapidly advancing field, with halogenated sorbents being an affordable and effective option for most applications. Although there may be some challenges to achieving 90% removal of mercury for

all applications, in almost every case each of these challenges can be overcome or addressed through technology that is economically reasonable and available today.

The Illinois mercury rule provides substantial flexibility in order to reduce the costs of compliance and risk of noncompliance for power plants. This flexibility includes the ability to meet either a 90% reduction or an output based standard of 0.0080 pounds mercury/GWh, phasing in standards over a period of 3 ½ years with a less restrictive standard in phase one, compliance by averaging of emissions, and the avoidance of installing controls on units that will be shutdown in the near future provided companies make an enforceable commitment to shutdown those units by a date certain.

Additional flexibility is provided via a "Temporary Technology Based Standard" (TTBS) that provides relief for units that install appropriate mercury controls but do not achieve full compliance. Eligible units only need to operate the mercury controls in an optimal manner to comply. This provision is available through June 2015 and can be used by up to 25% of a company's generating capacity.

Companies may choose to voluntarily comply with the MPS or CPS as an alternative to the otherwise applicable requirements of the mercury rule. These provisions provide additional flexibility in regards to mercury control in return for companies achieving significant reductions in the emissions of SO_2 and NOx.

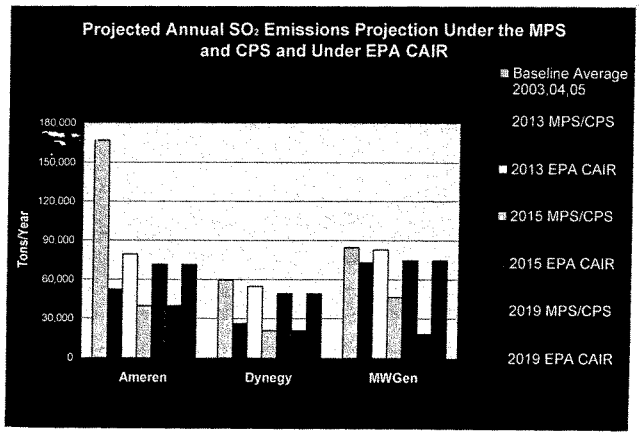
Under the MPS and CPS, companies can commit to voluntarily meet numerical emission standards for both NOx and SO_2 and in return are provided additional flexibility in complying with the mercury emission standards. The MPS and CPS provisions also contain restrictions on the trading of NOx and SO_2 allowances provided under CAIR. By regulating the emissions of NOx and SO_2 and restricting the trading of allowances, the MPS and CPS have obvious implications for the proposed CAIR NOx and SO_2 cap and trade program. As modeling has demonstrated, the benefits of these reductions will mostly impact Illinois and a few of the closest neighboring states (i.e., Indiana, Wisconsin and Missouri) with lesser benefits further downwind. While the positive impacts of the reductions are most significant within Illinois and its closest

neighbors, Illinois does support emissions trading as the most cost effective controls will be installed and the timing of controls is likely to occur more quickly than under a command and control option.

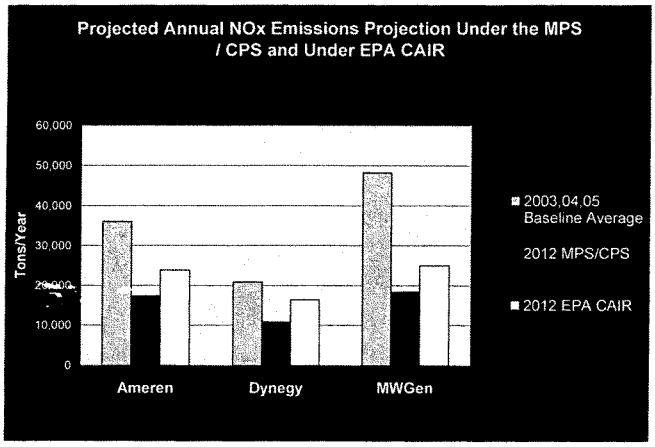
Emission Reductions

The combination of the Illinois mercury rule, CAIR, and the MPS and CPS will have enormous positive impacts, reducing mercury, SO_2 and NOx emissions far beyond the levels required under the federal CAMR and CAIR alone.

Under CAIR, U.S. EPA estimates that coal-fired power producers in Illinois would only have been required to reduce their SO_2 emissions by 34%, not the estimated 76% for Ameren, 65% for Dynegy, and 80% for Midwest Generation required under the MPS and CPS. The emissions of NOx are likewise expected to be reduced beyond the levels obtained by the model CAIR. In addition, both the MPS and CPS contain trading restrictions designed to ensure that the SO_2 and NOx reductions occur in Illinois.



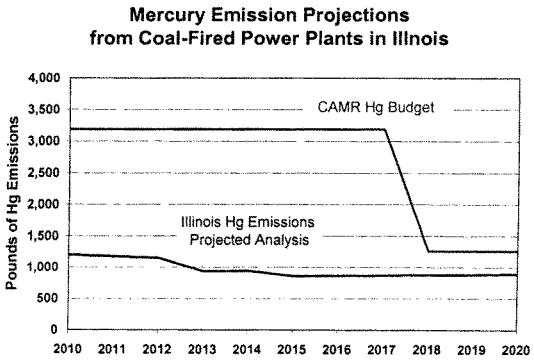
The reductions agreed to under the MPS and CPS for SO_2 and NOx are expected to go a long way toward helping Illinois achieve attainment of the ozone and PM standards. The modeling demonstrates that the emission reductions are very substantial.



The Illinois EPA estimates the total emission reductions from all three power companies at:

- SO_2 = 233,600 tons per year eliminated
- NOx = 61,434 tons per year eliminated
- Mercury = 7,040 pounds per year eliminated

Under CAMR, coal-fired power producers in Illinois would have only been required to reduce their mercury emissions by 47% in 2010 and 78% by 2018, not the 90% reduction by 2009 specified in the Illinois rule. The timing of mercury reductions for



those sources that opt-in to the MPS or CPS is essentially the same, and the amount of reduction is expected to be close to 90%, although the companies will not be required to comply with the 90% reduction requirement on a 12 month rolling basis until 2015. Sources under the MPS and CPS are expected to have mercury emission reductions that exceed the required 90% after 2015 due to the co-benefit reductions achieved from the installation of controls needed to comply with the corresponding SO_2 and NOx standards.

Impacts of Emissions Reductions

Under the agreements between the Illinois EPA and Midwest Generation, Ameren and Dynegy, the decreases in Hg, SO_2, and NOx emissions are estimated to far exceed the reductions required under the federal CAMR and CAIR.

In regards to mercury, over time Illinois expects to see reductions in deposition of Hg to Illinois' lakes and streams and corresponding mercury decreases in Illinois' fish, making those fish caught in Illinois waters safer to eat. There will be several recognized benefits to the State from tighter mercury controls beyond the expected public health benefits that come with a reduction in deposition to Illinois' waters and fish. Such benefits include support for existing jobs and the potential for additional jobs resulting from the installation and operation of additional pollution control devices.

The benefits of removing SO_2 and NO_x are well established and most notably will result in reductions in both particulate matter and ozone. SO_2 is a precursor to particulate matter and NO_x is a precursor to both particulate matter and ozone. Particulate matter related annual benefits include fewer premature fatalities, fewer cases of chronic bronchitis, fewer non-fatal heart attacks, fewer hospitalization admissions (for respiratory and cardiovascular disease combined) and should result in fewer days of restricted activity due to respiratory illness and fewer work loss days. Moreover, there should be health improvements for children from reduced upper and lower respiratory illness, acute bronchitis, and asthma attacks.

Ozone health-related benefits are expected to occur during the summer ozone season and include fewer hospital admissions for respiratory illnesses, fewer emergency room admissions for asthma, fewer days with restricted activity levels, and fewer days where children are absent from school due to illnesses. In addition, there should be ecological and welfare benefits. Such benefits include visibility improvements; reductions in acidification in lakes, streams, and forests; reduced nutrient replenishing in water bodies; and benefits from reduced ozone levels for forests and agricultural production.

CAMR and CAIR Vacatur Impact on Illinois Regulations:

On February 8, 2008, the United States Court of Appeals for the District of Columbia Circuit vacated the federal CAMR. The Illinois mercury rule is separate from the federal CAMR and therefore the vacatur of CAMR had minimal impact on the Illinois rule. However, this court action raised concerns regarding the status of certain federal provisions dealing with the monitoring of mercury emissions. Given the uncertainty surrounding federal mercury monitoring provisions, the Illinois EPA determined that a revision to the Illinois mercury rule was appropriate. The revisions focused on the methods used to measure or monitor mercury emissions, and did not include any revisions to the control standards themselves. The rule was amended to allow a source to demonstrate compliance for a three year period using stack testing. The Illinois mercury rule remains in full effect and all Illinois companies began complying with the rule on July 1st of this year.

In July of 2008, the U.S. Court of Appeals for the District of Columbia Circuit (DC Court of Appeals) vacated the CAIR rule in its entirety. After entertaining motions for reconsideration from the parties, on December 23, 2008, the same court issued an opinion stating that the federal CAIR was remanded to U.S. EPA without vacatur. U.S. EPA subsequently confirmed that it has begun implementation of CAIR starting January 1, 2009. Illinois CAIR is in full effect. For a number of reasons, the vacatur and reinstatement of Phase I of CAIR have had minimal impact on Illinois sources and the MPS and CPS remain in effect. However, for the reasons discussed below, Illinois strongly favors federal multi-pollutant legislation to "remedy" the flaws in CAMR and CAIR.

The decision of the DC Court of Appeals vacating CAIR in part, i.e., vacating Phase II of CAIR but reinstating Phase I of CAIR, has thus far had minimal impact on Illinois. CAIR Phase I required reductions up until the beginning of CAIR Phase II in January 1, 2015. Although Illinois relied upon CAIR Phase I as part of our 8-hour ozone (85 ppb) and annual PM2.5 attainment plans, air quality in Illinois' two 8-hour ozone (85 ppb) and annual fine particulate matter nonattainment areas has improved to a very significant degree without these expected reductions. As a result, all but one monitor is in attainment for these standards, and it is expected to be in attainment in 2012. Because the MPS and CPS result in significant reductions before 2015, Illinois is not dependent on CAIR Phase II reductions for the newest 8-hour standard (75 ppb) or the newest daily fine particulate matter standards, and for which attainment plans are not yet due. Despite the improvement in air quality, Illinois would have much more significant problems in demonstrating attainment in it state implementation plan if CAIR Phase I was not reinstated.

There is some concern that Illinois coal-fired power plants may delay or cancel some controls that were being installed to comply with CAIR Phase I due to the loss of value in SO_2 and NOx allowances. The market value of these allowances is uncertain, because there is controversy over whether the DC Court of Appeal's opinion has disallowed an emissions trading program. As a result, companies have no incentive to go beyond the reductions required by CAIR Phase I because the incentive to install controls early due to the cost recovery benefit of the allowances obtained is removed. Also, many companies have a significant number of banked allowances available for their use or for sale, and these banked allowances will be depleted rather than companies meeting the "emissions cap" through installation and operation of pollution control equipment, perhaps even to the extent of not operating existing or recently installed controls. However, we believe the MPS and CPS should keep Illinois sources on track for installation and operation of the planned control devices and reductions.

After the vacatur of CAIR, the Northeast and Midwest states began a process, called the "State Collaborative Process", the stated intent of which was to develop a multi-pollutant strategy to achieve levels of NOx and SO_2 reductions from the electric utility sector in the 28-state CAIR

region as expeditiously as possible that would remedy CAIR's flaws in accordance with the Court's July 11, 2008 opinion and satisfy the requirements of the Clean Air Act to attain the 1997 national ambient air quality standards (NAAQS) for ozone and PM. While significant progress was made in developing a framework for a CAIR replacement rule, no final recommendation to USEPA has yet been developed. The participating states disagree over the level of reductions that should be required, whether best available controls should be required on every power plant or just the larger/largest units, the timing of controls, whether emissions trading (or even intra-state emissions averaging) is allowable under the Court's decision, and whether a replacement rule can forestall Section 126 petitions under the Clean Air Act.

It is Illinois' experience that emissions trading will result in the greatest amount of reductions at the lowest cost. More importantly, emission trading will encourage companies to install controls earlier, and go beyond required reduction levels, as compared to a command and control strategy. Under a command and control strategy, the regulatory compliance deadline must be set such that there is 100% assurance that every affected source will be able to comply in consideration of the time necessary for planning, engineering and construction deadlines. In other words, there must be sufficient availability of engineering firms, control equipment and construction companies to plan, engineer, build and install all of the pollution control equipment required for compliance. Such a regulatory compliance date would certainly be difficult to establish and likely result in far fewer reductions in the near term when compared to an approach that includes emissions trading. Also, the construction season in many of the affected CAIR states is limited to a 7 to 8 month window, when electric demand is at its highest, further complicating this approach.

In addition to regulatory compliance deadlines, sources (and the states) must be concerned with power outages. In Illinois' opinion and experience in negotiating the MPS and CPS, within the CAIR region, it is not practical (and may not be possible) to retrofit all coal-fired power plants of any significant size (e.g., 25 MWe or more) in the same 3-year window (or even 5-year window). A command and control strategy necessarily sets a date certain for compliance for each affected and similarly situated source. Emissions trading will allow those time frames to be compressed, as source by source compliance is not required.

As Illinois discovered during its MPS and CPS negotiations, there are very significant costs associated with installing pollution controls of the magnitude negotiated under Illinois' rules – estimated in excess of 3 billon dollars. While this cost may be seem small on a kilowatt hour basis, these companies must obtain a rate increase if they are in a regulated state or financing if they are in a deregulated state like Illinois. The ability to obtain a rate increase or financing for these projects is uncertain and takes time, which must be accounted for in a compliance date for any command and control strategy. Emissions trading will allow those time frames to be compressed as well, as source by source compliance is not required.

The vacatur of both CAMR and CAIR emphasizes the high risk associated with moving forward with federal regulations subject to widespread opposition and controversy. Federal regulations will almost certainly be challenged, potentially resulting in further delay of a vital strategy for the states to achieve attainment of the federal air quality standards. Section 126 petitions will surely also be filed by any state that believes its neighbor and upwind states could do more to address nonattainment, even if the complaining state's air quality issues are largely a result of emissions from its own sources (area, mobile and point) and even if the targeted other state(s) has done more to address emissions from its coal-fired power plants than the complaining state. Section 126 petitions will use precious resources that are needed to address the newest recent daily PM2.5 standard, the revised 8-hour standard (75 ppb), the newest lead standard, and the recently-announced, revised NO2 standard. Federal multi-pollutant legislation represents the best option for addressing the points of disagreement among the states, without being bound by interpretations of the scope and flexibility provided under the 1990 Clean Air Act amendments, and in a way that best serves the goal of obtaining the greatest reductions in SO_2, NOx and Hg, in the shortest possible time frame, while taking into account electric costs and reliability.

In conclusion, the multi-pollutant approach taken in Illinois for controlling the emissions of Hg, SO_2, and NO_x from coal-fired power plants has numerous advantages. Whereas the federal CAMR focuses solely on mercury emissions, and CAIR concentrates on SO_2 and NO_x, Illinois' has taken a combined approach that exceeds the goals in the context of a single regulatory framework, accommodating engineering and construction issues and outage schedules, as well as

financing issues. The result has been a tremendous win-win-win for the environment, public health and the regulated community.

Multi-Pollutant Standard & Combined Pollutant Standard – Required Emissions Rates and % Reductions

	CAIR in IL[1]	CAIR in IL[1]	Midwest Generation		Ameren		Dynegy	
	Emission Rate (lbs/mmbtu)	% Reduction	Emission Rate (lbs/mmbtu)	% Reduction	Emission Rate (lbs/mmbtu)	% Reduction	Emission Rate (lbs/mmbtu)	% Reduction
2010					0.50	52%		
2013	0.50	31%	0.44	13.7%			0.24	56%
2014			0.41	19.6%	0.43	56%		
2015	0.45	34%	0.28	45.1%	0.25	76%	0.19	65%
2016			0.195	61.8%				
2017			0.15	70.6%	0.23	78%		
2018			0.13	74.5%				
2019	0.45	34%	0.11	78.4%[2]	0.23	78%	0.19	65%
NO_x								
Annual – 2012	0.15	44%	0.11	62%[3]	0.11	52%	0.10	48%
Annual - 2015	0.12	55%	0.11	62%[3]	0.11	52%	0.10	48%
Seasonal - 2012	-	-	0.11	51%	0.11	22%	0.10	25%

[1]CAIR emission rate numbers from page 5 of the June 28, 2005 USEPA presentation to LADCO (http://www.ladco.org/reports/rpo/Regional%20Air%20Quality/June28_2005/June-Workshop/CAIR%20LADCO%20.pdf). Percent reductions from the USEPA website that provides CAIR reductions expected in Illinois (http://www.epa.gov/cair/il.html). Emissions used for calculations are from Clean Air Markets Divisions of USEPA.

[2]80% including planned shutdowns.

[3]68% including planned shutdowns.

Note: Ameren SO2 rates reflect changes to allowable rates as contained in proposed revision to Illinois mercury rule.

Percent Mercury Reductions from CAMR, Illinois Combined Pollutant Standard (CPS) and Multi-Pollutant Standard (MPS)

Beginning Period	CAMR	[redacted] - CPS	Dynegy - MPS	Ameren - MPS
Mid 2008		21%		
Mid 2009		84% (ACI installed on most units)	(ACI installed on most units)	(ACI installed on most units)
2010	47%		86%	86%
2011		90% (ACI on all units)		
2013[1]		90%	90%	90%
2015[2]		>90%	94.4%	93.5%
2018	78%	95%		

[1]All units have controls installed that are designed to achieve 90% reduction in mercury emissions.

[2]Several units at plant have combination of Scrubber, Baghouse, SCR and/or ACI and many units will achieve greater than 90% reduction in mercury emissions.

All numbers are Illinois EPA estimates.

Oral Testimony

Illinois EPA Director Doug Scott

U.S. Senate Committee on Environment and Public Works/

Subcommittee on Clean Air and Nuclear Safety

Hearing on "Oversight: Environmental Protection Agency's Clean Air Regulations-One Year after the CAIR and CAMR Federal Court Decisions

406 Dirksen Senate Office Building

10 a.m., Thursday, July 9, 2009

(Five-minute time limit)

Mr. Chairman and Members of the Committee: My name is Doug Scott and I have been the Director of the Illinois Environmental Protection Agency since July 1, 2005, a period which covered intensive regulatory negotiations and rulemaking on the state level to address three pollutants - sulfur dioxide, nitrogen oxides, and mercury – specifically addressing those emissions from coal-fired power plants in our state.

Illinois obtains more than 40 percent of its electricity from coal-fired power plants and sits on top of 38 billion tons of coal, giving it the third largest coal reserves in the nation. Coal-fired power plants in Illinois constitute the largest source of man-made emissions of mercury (Hg) and sulfur dioxide (SO_2), and one of the largest sources of nitrogen oxides (NO_x). Illinois is home to 21 large coal-fired plants that operate electric generating units.

Over the last several years in Illinois, exceptional progress has been made in reducing the emissions that contribute to ozone and particulate matter (PM) air pollution, as well as reducing toxic Hg emissions that deposit into and contaminate Illinois' waters and fish.

In particular, Illinois EPA reached landmark multi-pollutant standard agreements with the three largest coal-fired power plant systems operating in Illinois: Midwest Generation, Ameren and Dynegy. These three companies represent 88% of Illinois' 17,007 megawatts of coal-fired electric generating capacity and account for hundreds of thousands of tons of air emissions each year.

These multi-pollutant standards (MPS) and Combined Pollutant Standards (CPS) will improve Illinois and regional air quality by dramatically reducing Hg, SO_2, and NO_x emissions from Illinois' coal-fired power plants.

The agreed-to multi-pollutant standards are one of the most important environmental and public health advances in Illinois in recent decades. They represent the largest reductions in air emissions ever agreed to by individual companies in Illinois under any context, whether through an enforcement action or regulation. The combination of the Illinois mercury rule, CAIR, and the MPS and CPS will have enormous positive impacts on reducing mercury, SO_2 and NOx emissions far beyond the levels required under the federal CAMR and CAIR alone. Additional details are contained in my written testimony.

Whereas the federal CAMR focuses solely on mercury emissions, and CAIR concentrates on SO_2 and NO_x, Illinois has taken a combined approach that exceeds the goals in the context of a single regulatory framework, accommodating engineering and construction issues and outage schedules, as well as financing issues.

On February 8, 2008, the United States Court of Appeals for the District of Columbia Circuit vacated the federal CAMR. The Illinois mercury rule is separate from the federal CAMR and therefore the vacatur of CAMR had minimal impact on the Illinois rule.

However, this court action raised concerns regarding the status of certain federal provisions dealing with the monitoring of mercury emissions. Given the uncertainty surrounding federal mercury monitoring provisions, the Illinois EPA determined that a revision to the Illinois mercury rule was appropriate. The revisions focused on the methods used to measure or monitor mercury emissions, and did not include any revisions to the control standards themselves. The Illinois mercury rule was amended to allow a source to demonstrate compliance for a three year period using stack testing. The Illinois mercury rule remains in full effect and all Illinois companies began complying with the rule on July 1st of this year.

Although Illinois relied upon CAIR Phase I as part of our 8-hour ozone (85 ppb) and annual PM2.5 attainment plans, air quality in Illinois' two 8-hour ozone (85 ppb) and annual fine particulate matter nonattainment areas has improved to a very significant degree without these expected reductions. As a result, all but one monitor is in attainment for these standards, and it is expected to be in attainment in 2012. Because the MPS and CPS result in significant reductions before 2015, Illinois is not dependent on CAIR Phase II reductions for the newest 8-hour standard (75 ppb) or the newest daily fine particulate matter standards, and for which attainment plans are not yet due. Despite the improvement in air quality, Illinois would have much more significant problems in demonstrating attainment in our state implementation plan if CAIR Phase I was not reinstated.

There is some concern that Illinois coal-fired power plants may delay or cancel some controls that were being installed to comply with CAIR Phase I due to the loss of value in SO_2 and NOx allowances.

The market value of these allowances is uncertain, because there is controversy over whether the DC Court of Appeal's opinion has disallowed an emissions trading program. As a result, companies have no incentive to go beyond the reductions required by CAIR Phase I because the incentive to install controls early due to the cost recovery benefit of the allowances obtained is removed. Also, many companies have a significant number of banked allowances available for their use or for sale, and these banked allowances will be depleted rather than companies meeting the "emissions cap" through installation and operation of pollution control equipment, perhaps even to the extent of not operating existing or recently installed controls. However, we believe the MPS and CPS should keep Illinois sources on track for installation and operation of the planned control devices and reductions.

The vacatur of both CAMR and CAIR emphasizes the high risk associated with moving forward with federal regulations subject to widespread opposition and controversy. Federal regulations will almost certainly be challenged, potentially resulting in further delay of a vital strategy for the states to achieve attainment of the federal air quality standards. Section 126 petitions will surely also be filed by any state that believes its neighbor and upwind states could do more to address nonattainment, even if the complaining state's air quality issues are largely a result of emissions from its own sources (area, mobile and point) and even if the targeted other state(s) has done more to address emissions from its coal-fired power plants than the complaining state. Section 126 petitions will use precious resources that are needed to address the newest recent daily PM2.5 standard, the revised 8-hour standard (75 ppb), the newest lead standard, and the recently-announced, revised NO2 standard.

Federal multi-pollutant legislation represents the best option for addressing the points of disagreement among the states, without being bound by interpretations of the scope and flexibility provided under the 1990 Clean Air Act amendments, and in a way that best serves the goal of obtaining the greatest reductions in SO_2, NOx and Hg, in the shortest possible time frame, while taking into account electric costs and reliability.

Recent discussions with representatives of Illinois' coal-fired power plant operators indicate that they are all preparing and on track to meet the requirements of the MPS and CPS, which initiate in 2010.

A wide array of emissions control equipment costing billions of dollars will come on-line in Illinois over the next several years. Illinois coal-fired power plants have already installed and begun operating numerous halogenated activated carbon injection systems for mercury control.

The first of many new sulfur dioxide scrubbers will begin operation shortly. Fabric filter controls and selective catalytic reduction devices and other new N0 x controls are being scheduled for installation across Illinois. The shutdown of a few older, most polluting, generating units began in December 2007 with more units scheduled for shutdown by December 2010.

As a result of the knowledge and experience gained through Illinois' efforts, the Illinois EPA supports a comprehensive national strategy for reducing emissions of multiple pollutants from electric generating units. A comprehensive, integrated approach benefits both regulators and the regulated community. Multi-pollutant approaches should, where practicable, address all significant emissions from electric generating units.

They should supplement, not replace, the existing Clean Air Act programs such as New Source Review (NSR), Maximum Achievable Control Technology (MACT) standards and regional haze, as well as other important statutory requirements for achieving and sustaining clean air.

Whereas CAMR single-mindedly tackled mercury emissions, and CAIR addressed SO_2 and NOx, Illinois was able to use a multi-pollutant strategy within a unified regulatory framework accounting for planning, engineering, availability of financing and other issues that accompany a multi-pollutant control strategy.

Any federal multi-pollutant strategy must also ensure that regions, states and localities retain their authority to adopt and implement measures which are more stringent than those of the federal government and provide flexibility.

Thank you for inviting me to testify before you today to share our experience in Illinois and to comment on the CAMR and CAIR court decisions. I would also like to commend and thank Senator Carper and other members of the Subcommittee for continuing to work on addressing these very important air quality issues.

Senator CARPER. Thank you, Mr. Scott. We are going to do our best to make sure it does not get lost. And thank you for the good work you are doing in Illinois.

Mr. SCOTT. Thank you.

Senator CARPER. Mr. Korleski, from the Buckeye State, Ohio.

STATEMENT OF CHRIS KORLESKI, DIRECTOR, OHIO ENVIRONMENTAL PROTECTION AGENCY

Mr. KORLESKI. Good morning. My name is Chris Korleski, and I am the Director of the Ohio Environmental Protection Agency.

Chairman Carper, thank you so much for having me here, Ranking Member Vitter, who has had to leave, my own Senator Voinovich—it is always a pleasure to be here and be working with you on a project—and Senator Alexander, it is nice to work with you as well. I thank you all for the opportunity to meet with you again to come and discuss the CAIR issue.

As we all know, the Clean Air Act requires States to develop approvable State implementation plans, SIPs, which set forth the emission reduction measures that States will implement in order to achieve attainment with the air standards. Stated simply, the initial CAIR rule served, and thankfully continues to serve, as an integral component of Ohio's SIP to achieve necessary reductions in both NO_x and sulfur dioxide from power plants.

Now, based on U.S. EPA's projected emission reductions for Ohio, the initial CAIR rule was anticipated to reduce NO_x from power plants in Ohio from about 355,000 tons a year in 2003 to 93,000 tons a year by 2009, and 83,000 tons per year by 2015. Similarly large decreases for SO_2 emissions were projected.

It is critical to remind ourselves that a State's obligation to timely achieve the standards for ozone and $PM_{2.5}$ remain firmly in place despite whatever might happen with CAIR. For example, Ohio was required to achieve compliance with the old ozone standard, meaning 84 parts per billion, in marginal non-attainment areas by June 2009, and in moderate non-attainment areas by June 2010.

I am happy to tell you that Ohio has attained the old ozone standard in all but one of our non-attainment areas. However, our delight over this significant progress must be short-lived because new, more stringent standards for ozone, that is 75 parts per billion, are now in place. Indeed, under the new more stringent ozone standard, we expect some of our urban areas to be designated non-attainment in 2010, including some areas that only just recently achieved timely compliance with the old standard.

All of this means that Ohio needs the reductions achieved by CAIR to not only maintain compliance with the old standards, but to help us achieve the new standards as well.

Now, I should emphasize that a number of power plants in Ohio have installed NO_x controls and SO_2 scrubbers on their largest newer units in anticipation of the 2009 compliance deadline under the first phase of CAIR. However, we know that this first phase of controls will not be sufficient for Ohio to meet the revised ozone and $PM_{2.5}$ standards. But while we know that some form of enhanced CAIR is unquestionably needed to help States like Ohio meet their attainment targets, we don't know what the final version of CAIR will look like.

I can tell you, as Director Scott has indicated, that several Midwestern States, including Ohio, have been having discussions with the Northeastern States in an attempt to try and develop joint recommendations to U.S. EPA for a CAIR replacement rule. Although these discussions have not concluded, I believe there is recognition by Midwestern and Northeastern States that additional controls on power plants beyond the initial version of CAIR will be necessary to achieve the revised air quality standards for ozone and $PM_{2.5}$. The issue of contention is likely to be the degree to which power plant emissions can reasonably be expected to be lowered.

Further, Ohio believes firmly that when revising CAIR, U.S. EPA must recognize that power plant emissions are not the main contributor to ozone non-attainment in urban areas. Rather, it is primarily the impact of transportation-related emissions that continues to hamper Midwestern and Northeastern States from achieving the ozone standard.

Additionally, U.S. EPA must carefully consider what level of impact from one State on another's non-attainment should be deemed unacceptable; 1 percent of the problem; 4 percent of the problem; as well as the issue of the proper remedy to be applied when the threshold is exceeded.

Even more importantly, Ohio continues to believe that U.S. EPA must when replacing CAIR squarely address the issue of emission trading. However, given the language of the court's decision, it appears that without additional legislative authority, a comprehensive uniform region-wide trading program cannot be developed. And to put it very simply, we know such a program works. As other people have pointed out, the Acid Rain Program is an excellent example where trading has produced significant additional emission reductions for SO_2.

As non-attainment with air quality standards threatens both public health and economic development, I would be concerned by a revised CAIR that does not include a regional trading plan. In our view, since there is recognition that a level of control beyond CAIR is needed, it becomes imperative that a trading program be enacted.

In short, while we don't believe that there will ultimately be any large uncontrolled power plants in Ohio, we also believe that the smaller plants, those that are the least effective or least cost-effective to control, will best be able to obtain emission reductions through the application of a trading program.

As noted above, it will be difficult, to say the least, for U.S. EPA to include a regional trading plan, given the court's July, 2008 decision and the language of the Act. Therefore, let me again respectfully suggest the solution.

As we know, the heart of the court's concern with the initial version of CAIR derived from the court's interpretation of a single section of the Clean Air Act. In interpreting that section, the court concluded that trading was not appropriate.

I again respectfully suggest to this subcommittee that Congress address the loss of the significant flexibility embedded in the initial version of CAIR by a surgical laser-like amendment to section 110. Such an amendment would allow U.S. EPA to successfully promulgate a revised CAIR such that certain and significant emission re-

ductions would be achieved, while at the same time, the flexibility needed in order to obtain significant reductions would be preserved.

Indeed, Ohio will again take the liberty of respectfully proposing a new section 110(a)(2)(E), set forth below, which I will not read, which would provide the authority for a regional trading approach to serve as a starting point for consideration and discussion.

In conclusion, Ohio respectfully requests that Congress provide clear authority to U.S. EPA to promulgate a CAIR rule which incorporates regional emission trading. The previous multi-State rule promulgations by U.S. EPA have included trading, resulted in significant emission reductions, and most importantly, were successful in improving air quality.

I thank you very much.

[The prepared statement of Mr. Korleski follows:]

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Testimony of Christopher Korleski
Director of the Ohio Environmental Protection Agency

Before the
U.S. Senate Subcommittee on Clean Air and Nuclear Energy;
Senate Environment and Public Works Committee

July 9, 2009

Good Morning. My name is Chris Korleski and I am the director of the Ohio Environmental Protection Agency (Ohio EPA). I would like to thank Chairman Carper, Ranking Member Vitter, and all the members of the subcommittee for the opportunity to meet with you again to discuss the status of CAIR and its potential impacts on Ohio.

As we all know, the Clean Air Act requires states to develop approvable state implementation plans ("SIPs") which set forth the emission reduction measures that states will implement in order to achieve attainment with the air standards. Stated simply, the initial CAIR rule served, and continues to serve, as an integral component of Ohio's SIP to achieve necessary reductions in both nitrogen oxides ("NO_x") and sulfur dioxide ("SO_2") from power plants. Based on US EPA's projected emission reductions for Ohio, the initial CAIR rule was anticipated to reduce NO_x from power plants in Ohio from 355,000 tons per year in 2003 to 93,000 tons per year by 2009 and 83,000 tons per year by 2015. Similarly large decreases for SO_2 emissions were projected.

It is critical to remind ourselves that a state's obligation to timely achieve the standards for ozone and $PM_{2.5}$ remain firmly in place despite whatever might happen with CAIR. For example, Ohio was required to achieve compliance with the "old" ozone standard (*i.e.*, 84 ppb) in marginal non-attainment areas by June of 2009 and in moderate non-attainment areas by June of 2010. Now, I am happy to tell you that Ohio has attained the old ozone standard in all but one of our non-attainment areas. However, our delight over this significant progress must be short-lived, because new, more stringent standards for ozone (*i.e.*, 75 ppb) are now in place. Indeed, under the new, more stringent ozone standard, we expect some of our urban areas to be designated nonattainment in 2010, including some areas that only just recently achieved timely compliance with the old standard. All of this means that Ohio needs the reductions achieved by CAIR to not only maintain compliance with the old standards, but to help us achieve the new standards too.

Now, I should emphasize that a number of power plants in Ohio have installed NO_x controls and SO_2 scrubbers on their largest, newer units in anticipation of the 2009

compliance deadline under the first phase of CAIR. However, we know that this first phase of controls will not be sufficient for Ohio to meet the revised ozone and $PM_{2.5}$ air quality standards. But, while we know that some form of enhanced CAIR is unquestionably needed to help states meet their attainment targets, we do not know what the final version of CAIR will look like.

I can tell you that several mid-western states, including Ohio, have been having discussions with the northeastern states in an attempt to try and develop joint recommendations to U.S. EPA for a CAIR replacement rule. Although these discussions have not concluded, I believe there is recognition by mid-western and northeastern states that additional controls on power plants beyond the initial version of CAIR **will** be necessary to achieve the revised air quality standards for ozone and $PM_{2.5}$. The issue of contention is likely to be the degree to which power plant emissions can reasonably be expected to be lowered. Further, Ohio believes firmly that when revising CAIR, US EPA must recognize that power plant emissions are not the main contributor to ozone non-attainment in urban areas. Rather, it is primarily the impact of transportation-related emissions that continues to hamper mid-western and northeastern states' from achieving the ozone standard. Additionally, US EPA must carefully consider what level of impacts from one state on another's non-attainment should be deemed unacceptable (*i.e.*, 1% of the problem? 4% of the problem?) as well as the issue of the proper remedy to be applied when the threshold is exceeded.

Even more importantly, Ohio continues to believe that US EPA must, when replacing CAIR, squarely address the issue of emission trading. However, given the language of the Court's decision, it appears that without additional legislative authority, a comprehensive, uniform, regionwide trading program cannot be developed. And, to put it very simply, we know such a program works. The acid rain program is an excellent example where trading has produced significant additional emission reductions for SO_2.

As non-attainment with air quality standards threatens both public health and economic development, I would be concerned by a revised CAIR that does not include a regional trading plan. In Ohio's view, since there is recognition that a level of control "beyond CAIR" is needed, it becomes imperative that a trading program be enacted. In short, while we do not believe that there will ultimately be any large uncontrolled power plants in Ohio, we also believe that the smaller plants (*i.e.*, those that are the least cost-effective to control) will best be able to obtain emission reductions through the application of a trading program.

As noted above, it will be difficult, to say the least, for US EPA to include a regional trading plan given the Court's July 2008 decision and the language of the existing Clean Air Act. Therefore, let me again respectfully suggest a solution to this issue.

The heart of the Court's concern with the initial version of CAIR derived from the Court's interpretation of a single section of the Clean Air Act: Section 110(a)(2)(D)(i)(I). In essence, the Court concluded that the cost-effective "regionwide" trading approach on which CAIR was originally based did not accord with the requirement in Section

110(a)(2)(D)(i)(I) of the Act that SIPs must prohibit sources "within a state" from contributing significantly to non-attainment in another state. [a]

I again respectfully suggest to this subcommittee that Congress address the loss of the significant flexibility imbedded in the initial version of CAIR by a surgical, laser-like, amendment to section 110. Such an amendment would allow US EPA to successfully promulgate a revised CAIR such that certain and significant emission reductions would be achieved while, at the same time, the flexibility needed in order to obtain significant reductions in a cost-effective manner would be preserved. Indeed, Ohio will again take the liberty of proposing a new Section 110(a)(2)(E) (set forth below) which would provide the authority for a regional trading approach to serve as a starting point for consideration and discussion:

> *Nothing in section 110(a)(2)(D) shall be construed to prohibit the Administrator from requiring the development and implementation of a regional emission reduction approach (including but not limited to an emission reduction trading approach), that, in the Administrator's judgment, will eliminate or minimize any significant contribution to nonattainment caused by the impacts of pollution from upwind states on downwind states. Inclusion in an implementation plan of the regional emission reduction approach may, in the judgment of the Administrator, satisfy a state's obligations under 110(a)(2)(D).*

In conclusion, Ohio respectively requests that Congress provide clear authority to U.S. EPA to promulgate a CAIR rule which incorporates regional emission trading. The previous multistate rule promulgations by U.S. EPA have included trading, resulted in significant emission reductions, and most importantly, were successful in improving air quality.

I thank you for your time and the opportunity to speak to you about this important issue.

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[a] The Court rejected US EPA's approach of achieving significant emission reductions on a regional basis because it concluded that, in violation of Section 110, CAIR failed to:

> *[r]equire elimination of emissions from sources that contribute significantly ... [to] downwind nonattainment areas. To do so, it must measure each state's "significant contribution" to downwind nonattainment even if that measurement does not directly correlate with each state's individualized air quality impact on downwind nonattainment relative to other upwind states.*

Environment and Public Works Committee Hearing
July 9, 2009
Follow-Up Questions for Written Submission

Questions for Korleski

Questions from:

Senator James M. Inhofe

1. Do you believe that with appropriate legislative authority a trading program could be developed which accommodates changing ambient air quality standards? For example, you talk of meeting the "old" ozone standard and now having to contend with the "new" one. Do you envision a trading program which accounts for the possibility of change?

Response: Yes, a trading program could be developed to adjust to more stringent air quality standards. Currently, the Clean Air Markets Division (CAMD) develops rules that set up emission budgets for states. These state budgets contain allowances that are distributed to regulated facilities. The amount of allowances distributed by CAMD can be reduced to reflect a change in air quality standards. However, any change in allowance allocations must be done with sufficient technical analysis to know that reducing allowances from a certain source sector is technically achievable and will actually produce the expected air quality improvement. As an example, reducing emissions from power plants will not significantly improve air quality if the primary sources of emissions causing the air quality problems are transportation sources.

(Submitted August 17, 2009.)

Senator CARPER. Thank you, Mr. Korleski, very much.

Mr. Schneider. All ready for this presentation? Got some visual aids here? That is good.

STATEMENT OF CONRAD G. SCHNEIDER, ADVOCACY DIRECTOR, CLEAN AIR TASK FORCE

Mr. SCHNEIDER. Thank you, Senators. Senator Carper, Senator Alexander, and I am sorry that Senator Voinovich had to leave. Thank you for the opportunity to address you today.

Mr. Chairman, I want to thank you personally for the leadership and commitment that you have shown, the persistence that you have shown on this issue. I recognize Senator Voinovich, who also has persevered through this, and Senator Alexander.

The three of you who were here just moments ago I think of as the A-Team in terms of if this problem is going to get solved, it is going to be the three of you that take the leadership role.

Senator CARPER. We have been called a lot of things. That is actually one of the nicer things, Lamar. We have the L.A. team and the T.A. team.

[Laughter.]

Mr. SCHNEIDER. I represent the Clean Air Task Force, which is a national nonprofit environmental advocacy organization. And our mission, in fact our founding mission, was to clean up power plants. Today's hearing revisits the status of emission controls 1 year after the D.C. Circuit struck down the Clean Air Interstate and Clean Air Mercury Rules. And I want to commend EPA for its statement here that it intends to follow the requirements of the Clean Air Act and issue stringent power plant regulations to replace those rules.

There is no question that EPA should do that, including regulations on carbon dioxide consistent with its statutory duty as expressed by the Supreme Court in Massachusetts v. EPA. But we know that just as the Bush CAIR and CAMR rules were challenged and struck down, any new rules may founder on the shoals of court challenges and delays. And so to guarantee the certainty that public health and the environment demand and that industry craves, we believe that Congress should act now to solve this problem.

In preparing for my testimony today, I really had a sense of déjà vu all over again. I know that this date marks about the 1-year anniversary of the court cases, but it also is about the eighth anniversary of my first testimony before this committee on this very issue. And at that time in support of multi-pollutant legislation, I testified that power plants are the biggest contributor to the single largest environmental health risk that we face. They cause over 30,000 preventable premature deaths each year due to inhalation from particulate matter that that pollution creates.

In addition, that pollution causes tens of thousands of respiratory and cardiovascular emergency room visits and hospital admissions; contributes to unhealthy levels of ozone smog that triggers many more asthma attacks; damages forests, lakes, bays and crops due to acid rain; contaminates our wildlife with mercury; and shrouds our national parks in a veil of haze—I would put up Great Smoky—a veil of haze unnecessarily; and of course last, contributes

significantly to climate change. My written testimony documents these effects in detail.

After 8 years from my first testimony here, we are back where we started, with nothing except the continued death, disease and damage caused by these plants. In that time, according to EPA's own analysis, approximately 240,000 Americans have died unnecessarily due to this pollution. Let me say that again. In the 8 years since I testified here, 30, 60, 90, 120, 150, 180, 210, 240,000 Americans have died unnecessarily due to this pollution. And when we realize that today technology exists, as it did then, that can reduce this pollution by 90 percent or more, we have to conclude that we all share a measure of responsibility.

It is high time for all power plants in this country to be well controlled or shut down to make way for cleaner energy sources.

Consistent with the emission controls technology that are available today, we believe the appropriate level of emission reduction would include a SO_x, a sulfur dioxide cap of 2 million tons per year; a nitrogen oxide emissions cap of no more than 1.6 million tons per year, but subject to the point that the gentlemen from the States made, which is to bring their States into attainment, and I know that there are studies ongoing right now to pinpoint that number more specifically.

With respect to mercury, we strongly support allowing EPA to finish its rulemaking on MACT for all coal-and oil-fired power plant hazardous air pollutants, but we would support that Congress backstop that process by requiring a 95 percent plant by plant mercury emission reduction at all currently existing coal-fired plant if that rule is not in place by 2012. These caps should supplement—not replace—existing Clean Air Act authorities.

We would oppose the so-called technical fix which would merely give EPA the authority to allow emissions trading in the CAIR replacement rule, without at the same time setting specific limits. The reductions in CAIR were too little too late, and I would note that it sounds like the old war between the States, between the Northeast, Midwest and Southeast, is largely over. Today, States in each of those regions agree that we need more than CAIR to meet attainment.

Senator Carper, your bill, the Clean Air Power Act, last year EPA did an analysis of the bill vintage 2005 that said its benefits would be $160 billion a year in 2020, and only at the cost of $9.5 billion at the same year. That means the benefits of your bill would be roughly 15 to 1.

We are also aware that this debate takes place in the context of climate and energy legislation that the full committee is taking up right now and the full Senate is scheduled to take up later this year. And we commend the House of Representatives for its action in passing a climate bill, and we support an economy-wide cap-and-trade approach, and will work to strengthen it as it moves forward here.

But we also know that addressing the climate bill, or passing the climate bill, will not remedy the SO_x, NO_x and mercury emissions; only flue gas desulferization scrubbers, only selective catalytic reduction, only activated carbon injection for mercury and other measures can do this.

And if under a climate bill existing coal plants are to be retrofitted to control their CO_2 emissions, we are being told that they must virtually eliminate their sulfur, nitrogen and mercury emissions to allow those post-combustion CO_2 controls to function properly. So we support this as part of a climate bill or separately, because it needs to happen.

And I would just note one other thing, and here is an idea. One of the chief criticisms of the Waxman-Markey bill is that it gives away carbon dioxide allowances to the power sector for free. And although that issue is a bit more complicated than the one I just stated, Clean Air Task Force believes that any giveaway of carbon allowances should be conditioned on plants meeting the best available technology and the maximum available control technology for hazardous air pollutants.

Indeed, adding that provision to the Waxman-Markey climate bill would only add a small increment to its cost, while multiplying many times its calculable benefits. But regardless of whether it is accomplished through a climate bill or through separate legislation, Congress must commit to finishing this job. It is not too much to ask to save 30,000 lives a year, clear our national parks, restore the health of our forest ecosystems, cut ozone smog, and virtually eliminate the power sector's contribution to the mercury contamination in fish.

We submit the costs of the bill is a small price to pay and many years overdue.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Schneider follows:]

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

OVERSIGHT: EPA'S CLEAN AIR REGULATIONS – ONE YEAR AFTER THE CAIR AND CAMR FEDERAL COURT DECISIONS

THE NEED FOR COMPREHENSIVE FEDERAL POWER PLANT AIR EMISSIONS CONTROL POLICY

TESTIMONY OF CONRAD G. SCHNEIDER
ADVOCACY DIRECTOR, CLEAN AIR TASK FORCE

July 9, 2009

Summary of Testimony

Mr. Chairman, 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 power plants. Our staff and consultants include scientists, attorneys, economists, and engineers.

Mr. Chairman, I want to thank you personally for the commitment and persistence that you have shown on this issue. Today's hearing revisits the status of power plant emissions controls one year after the D.C. Circuit court decisions in the challenges to the Clean Air Interstate and Clean Air Mercury Rules. We commend EPA for its commitment, restated here, that it intends to follow the requirements of the Clean Air Act and issue stringent power plant regulations to replace those rules. 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*. But, we know that just as the Bush CAIR and CAMR rules were challenged and struck down in court, 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 public health and the environment demand and the regulatory certainty that the electric power industry craves, Congress should act now to solve this problem.

In preparing for my testimony today, I had a sense of "déjà vu all over again". I realized that not only does this date mark the one-year anniversary of the D.C. Circuit's decisions; it very nearly marks the eighth anniversary of my first testimony before this Committee on the health and environmental damage from power plant emissions. At that time, in support of multipollutant legislation, I testified that power plants were the biggest contributor to the single largest environmental health risk we face: they cause over 30,000 preventable premature deaths each year due to inhalation of the fine particles that their pollution creates. In addition, this pollution causes many tens of thousands of respiratory and cardiovascular emergency room visits and hospital admissions. The pollution from these plants also contributes to unhealthy levels of ozone smog that trigger millions of asthma attacks each summer; damages to forests, lakes, bays and crops due to Acid Rain; contaminates our fish and wildlife with mercury; shrouds our national parks in a veil of haze; and contributes significantly to climate change.

Since that time, we have seen the Jeffords "Clean Power Act" pass the Committee but fail to be enacted, the Bush Administration's proposal of the "Clear Skies" bill -- a misguided half-measure which would have resulted in significant weakening of the Clean Air Act, and the promulgation and subsequent overturning of the Clean Air Interstate Rule, the Clean Air Mercury Rule, and the Clean Air Visibility Rule. After eight years, we are back where we started – with nothing, except the continued death, disease, and damage

caused by these plants. In that time, according to EPA's own analysis, approximately 240,000 Americans have died unnecessarily due to this pollution. When we realize that the technology exists today, as it did then, to reduce these pollutants by well over 90 percent, one has to conclude that we all share a measure responsibility. It is high time for all power plants in this country to be well-controlled or shut down to make way for cleaner energy sources.

Consistent with the emissions control technologies available today, a multi-pollutant bill such as the Clean Air Power Act (CAPA) targeting power plant sulfur dioxide, nitrogen oxides and mercury should cap sulfur dioxide emissions at no more than 2 million tons per year, and cap nitrogen oxide emissions at no more than 1.6 million tons per year. With respect to mercury, CATF strongly supports EPA's recently announced intentions to complete a MACT rulemaking for all coal and oil-fired power plant hazardous air pollutants. Congress can, however provide an important "backstop" to that effort, by requiring a 95 percent plant-by-plant mercury emissions reductions at all currently-existing coal-fired power plants if the rule is not in place by 2012.

CATF opposes a so-called CAIR technical "fix" which would merely give EPA the authority to allow emissions trading in the CAIR replacement rule 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. Note too that the old "war between the states" i.e., between the Northeast vs. the Midwest and Southeast, is largely over. Today, states in each of these regions 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.

EPA's 2005 analysis of the Clean Air Power Act (CAPA) suggests that the health and environmental benefits of the bill will range from $137 to $161 billion in 2020. EPA also estimated the incremental cost of CAPA would be approximately $9.5 billion in 2020 – less if the carbon dioxide target in that bill is omitted in favor of an economy wide approach. That means that the benefits of the bill therefore outweigh the costs by roughly 14 to 1.

CATF is aware that this debate takes place in the context of climate and energy legislation that the full Committee will be taking up later this month and the full Senate later this year. CATF commends the House of Representatives for its action passing a climate bill and supports the approach represented by the Waxman-Markey bill -- an economy-wide carbon cap and trade program – which we will work to strengthen as the bill moves forward in the Senate. But we also know that passage of the climate bill will not remedy sulfur, nitrogen, and mercury emissions from power plants. Only the installation of, for example, sulfur scrubbers, selective catalytic reduction for nitrogen oxides reduction, and activated carbon injection for mercury control – post-combustion controls that are added to power plant smokestacks -- can do this. 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. As noted above, CATF supports addressing the major problems associated with conventional power plant air pollutants as part of climate legislation such as through the bi-partisan CAPA approach.

We would note that one of the chief criticisms of the Waxman-Markey bill is that it gives away carbon dioxide allowances to the power sector for free. CATF believes that any giveaway of carbon allowances should be conditioned on power plants meeting at least Best Available Control Technology (BACT) or Lowest Achievable Emissions Rate (LAER) emissions limits (as applicable), for sulfur dioxide and nitrogen oxides, and Maximum Achievable Control Technology (MACT) for mercury and the other power plant hazardous air pollutants. Indeed, adding this requirement or CAPA to the Waxman-Markey climate bill would add only a small increment to the costs of the bill while multiplying its calculable benefits.

But, regardless of whether it is accomplished as part of the climate legislation or separately, Congress must commit to finishing the job of cleaning up sulfur, nitrogen, and air toxics from power plants. Congress should act now to save 30,000 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 the cost of the bill is a small price to pay and many years overdue.

I would be happy to answer any questions.

Mr. Chairman, 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 environmental impacts of fossil-fuel electric generating plants. Our staff and consultants include scientists, attorneys, economists, 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 propose and finalize stringent power plant regulations to replace those rules. 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 any case, 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 enact steep reduction in these three power plant pollutants.

Consistent with the emissions control technologies available today, a multi-pollutant bill like the Clean Air Power Act (CAPA) targeting power plant sulfur dioxide, nitrogen oxides and mercury should cap sulfur dioxide emissions at no more than 2 million tons per year, cap nitrogen oxide emissions at no more than 1.6 million tons per year, and require a 95 percent reduction in mercury emissions from each plant. With respect to mercury, CATF strongly supports EPA's recently announced intentions to complete a MACT rulemaking for all coal and oil-fired power plant hazardous air pollutants. Congress can, however provide an important "backstop" to that effort, by requiring a 95 percent plant-by-plant mercury emissions reductions at all currently-existing coal-fired power plants if the rule is not in place by 2012.

CATF opposes a so-called CAIR technical "fix" which would give EPA the authority to allow emissions trading in the CAIR replacement rule 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.

EPA's 2005 analysis of the Clean Air Power Act (CAPA) suggests that the health and environmental benefits of the bill will range from $137 to $161 billion in 2020.[5] EPA estimates the incremental cost of CAPA would be approximately $9.5 billion in 2020.[6] That means that the benefits of the bill therefore outweigh the costs by roughly 14 to 1.

The cost of this bill is not too much to pay to save 30,000 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.[7] But, even enactment of the Waxman-Markey bill legislation will not appreciably reduce power plant sulfur dioxide, nitrogen oxides, or mercury emissions. This is because the Waxman-Markey bill does 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, 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 public health and environmental goals 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

CATF supports addressing the sulfur, nitrogen, and mercury impacts from coal plants as part of climate legislation such as through the bi-partisan Clean Air Power Act (CAPA). One of the chief criticisms of the Waxman-Markey bill is that it gives away carbon dioxide allowances to the power sector for free. At a minimum, CATF believes that any giveaway of allowances to electric utilities should be conditioned on plants meeting Best Available Control Technology (BACT) for sulfur dioxide and nitrogen oxides and MACT for mercury and the other power plant hazardous air pollutants. But, regardless of whether it is accomplished as part of the climate legislation or separately, Congress must commit to finishing the job of cleaning up sulfur, nitrogen, and mercury from power plants.

Because this hearing is focused on the three pollutants addressed in the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR) i.e., sulfur dioxide, nitrogen oxides, and mercury, 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 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.[8]

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

- Reductions in power plant emissions of sulfur dioxide down to 2 million tons per year;
- Reductions in power plant emissions of nitrogen oxides down to 1.6 million tons per year;
- Mercury emission reductions of at least 95 percent below from current levels on a plant-by-plant basis at new and existing plants.

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.

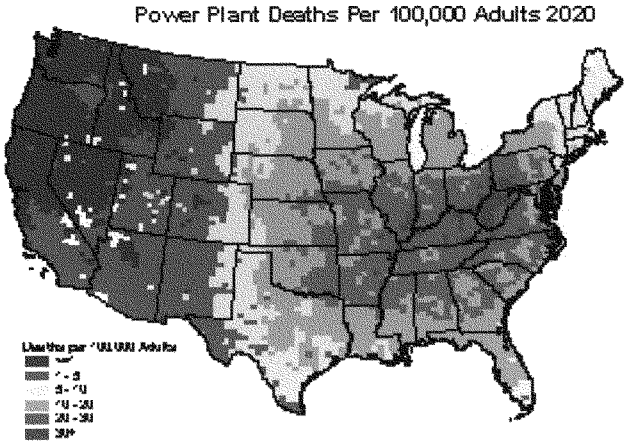
A 2 Million Ton Per Year Sulfur Dioxide Emissions will Avoid Over 30,000 Particulate-Related Premature Deaths Each Year

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.[9] 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.[10]

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 gas 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.[11] 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.

In 2005, USEPA analyzed the benefits of a 2 million ton per year power sector sulfur dioxide cap and concluded that capping emissions at this level would save an estimated 30,000 lives per year along with avoiding tens of thousands of other adverse health effects such as asthma attacks and chronic bronchitis.[12]

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.[13]

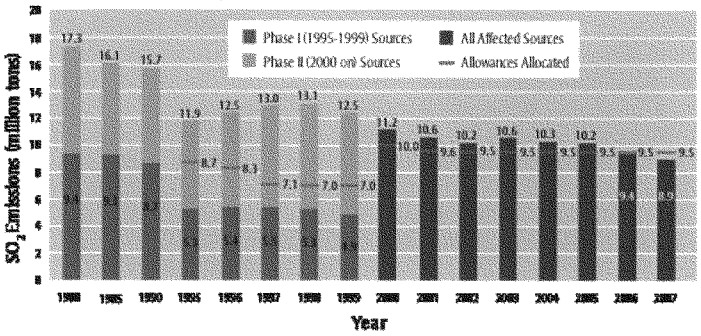


In addition, work by researchers at the Harvard School of Public Health found that the risk from power plant pollution is not evenly distributed geographically.[14] The risk was found to be greatest in relatively close proximity to the power plants: people living within 30 miles of a plant were found to face a risk of mortality from the plant's emissions 2-3 times greater than people living beyond 30 miles do.[15] 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 in CAPA that requires each facility to meet modern pollution standards by a date certain.

Only a 2 Million Ton Per Year Sulfur Dioxide Cap Will Allow Ecosystem Recovery from Acid Rain by Mid-Century

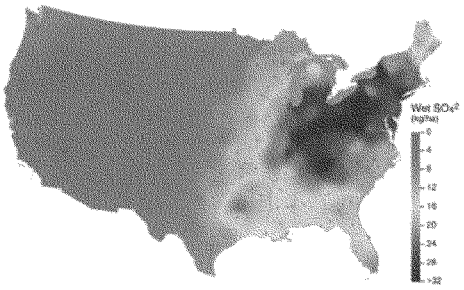
Although sulfur dioxide emissions have been reduced by approximately 50 percent since 1980 through the 1990 Clean Air Act Amendment's Acid Rain program, the program has now reached its emissions target[16] – a target that scientists say is far higher than the level necessary to allow for full ecosystem recovery in the Adirondacks and Southern Appalachian mountains.

Figure 2: SO_2 Emissions from Acid Rain Program Sources



Source: EPA, 2008

Annual Mean Wet Sulfate Deposition, 1989–1991



Source: NADP, 2008

Annual Mean Wet Sulfate Deposition, 2005–2007

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.[17,18,19,20,21]

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[22] and high-elevation western lakes.[23] 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 (acids 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.[24]

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. [25,26,27,28,29]

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% 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. [30,31,32,33,34,35].

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. [36,37,38]

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. [39,40,41,42,43].

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 this bill, chemical conditions would approach recovery thresholds by mid-century. [44,45,46].

The Need to Monitor the Benefits of Emission Controls

Environmental monitoring is a critical tool to help track the effectiveness of past controls of emissions of air pollutants and to guide future air quality management in the U.S. There are several national programs that are widely used by the research and policy communities to evaluate the extent and change in atmospheric deposition and to assess changes in surface water chemistry in response to changes in emissions of air pollutants. Without these critical monitoring programs it will be difficult if not impossible to track the response of atmospheric chemistry and acid-sensitive surface waters to current and future controls on emissions of air pollutants. There is also a critical need to develop a national program for monitoring ecosystem response to controls on emissions of mercury to the atmosphere.

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.[47] 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.[48]

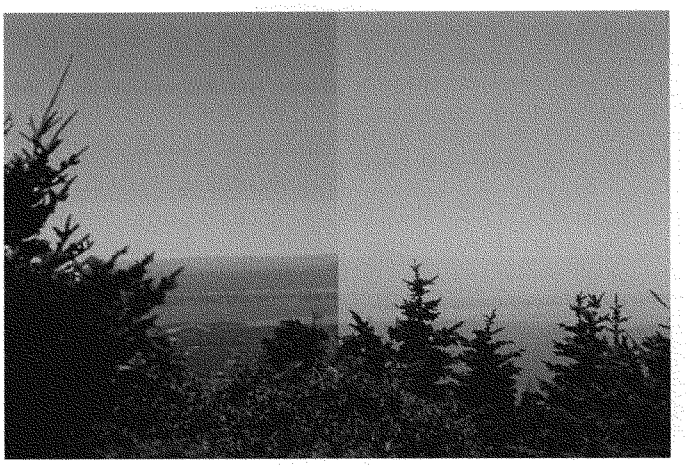
What will it take to reverse the impacts of nitrogen saturation, ozone and Acid Rain? Work by scientists with the Hubbard Brook Research Foundation found that an additional 80 percent reduction in sulfur from levels achieved by Phase II of the Acid Rain program of the Clean Air Act Amendments of 1990 would be needed to allow biological recovery to begin by mid century in the Northeastern U.S.[49] 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.[50] 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.[51,52] The Title IV Acid Rain cap under the current Clean Air Act is 8.9 million tons per year.

Meeting a 2 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. At the Hubbard Brook Cooperators meeting this week, Dr. Charles Driscoll is presenting research results making it clear that there is an urgent need to reduce levels of sulfur dioxide and nitrogen oxides to arrest soil acidification, which continues because of all the buffering capacity that has already been lost. 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

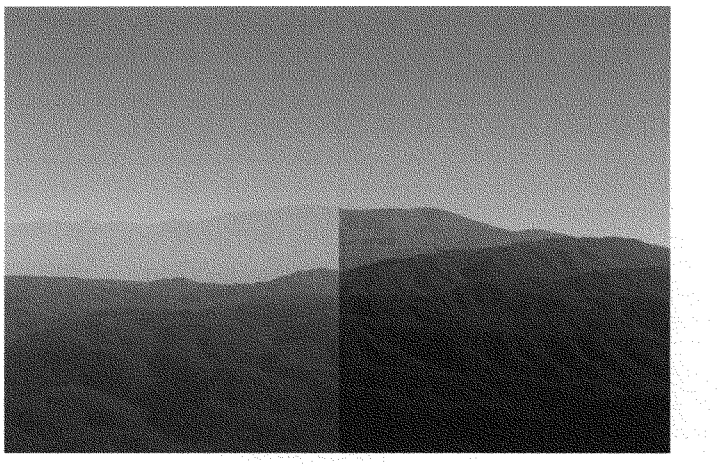
sensitive areas. And, the longer we wait for the reductions to begin, the longer we will await recovery of these precious systems.

A 2 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 2 million ton per year reduction target in CAPA. 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.[53] 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[54], 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. ***In fact, 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,[55] for example, 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.

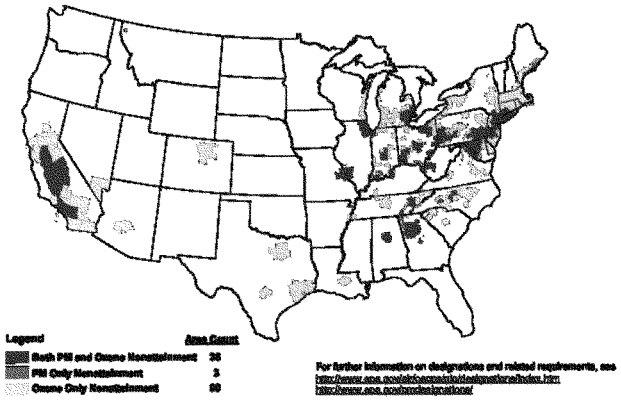
The reason is not hard to discern. There is a high correlation between elevated ground level ozone and proximity to power plants – especially in the Midwest and Southeast where roughly 60 percent of the nation's coal-fired generating capacity is located. In the Ohio Valley area studied, for example, 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.[56] 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 CAIR will be necessary to bring their areas into attainment with the new ozone standards.

> ***Only a Cap on Nitrogen Oxides of 1.6 Million Ton Per or less (Coupled with a 2 Million Ton Per Year Sulfur Dioxide Cap) will Allow Attainment in Virtually All Eastern U.S. Counties That Violate Ambient Air Quality Standards.***

States currently face deadlines for submitting State Implementation Plans (SIPs) for ozone and fine particulate matter.[57] As part of EPA's 2005 analysis of the Clean Air Power Act, the Agency modeled the estimated number of areas that would remain in nonattainment for these pollutants in 2020 under the bill. EPA found that of the 129 areas designated as nonattainment for 8-hour ozone and/or PM2.5, the pollution caps in the CAPA bill would eliminate nonattainment in all but 21 areas urban areas where

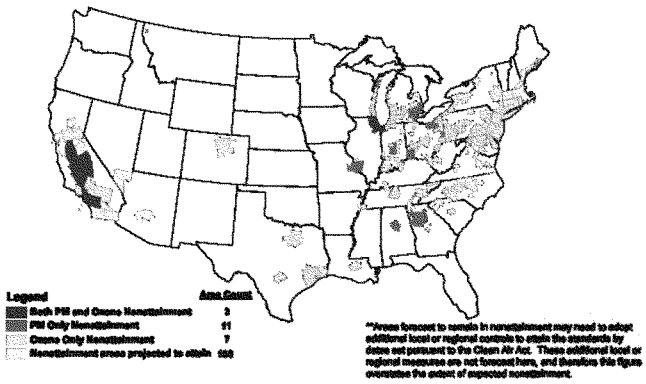
additional industrial and mobile source emission reduction may be needed to achieve attainment. See maps below.[58]

129 Areas Designated as Nonattainment for 8-Hour Ozone and/or $PM_{2.5}$



108 Areas Projected to Meet the $PM_{2.5}$ and 8-Hour Ozone Standards in 2020

with the Clean Air Planning Act (Carper, S.843) and Some Current Rules* Absent Additional Local Controls



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 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.[59]

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.[60] 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.[61]

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.[62] 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.[63]

Mercury

A 95 Percent Reduction in Mercury and other Power Plant Hazardous Air Pollutants is Achievable and Necessary to Minimize the Risk to Children

The threats posed by toxic chemicals in power plant air emissions are both serious and long lasting. The electric power industry emits more than 65 air toxics. Of these pollutants, mercury often has received the most attention. This is so, in part, because the coal-fired utility industry is the single largest industrial emitter of mercury air pollution: nationwide, approximately 1,100 coal-fired units at more than 450 existing power plants emit approximately 48 tons of mercury into the air each year -- over one-third of U.S. mercury emissions.[64]

But, coal-fired power plants also emit annually to the air 56 tons of arsenic, 62 tons of lead compounds, 62 tons of chromium compounds, 23,000 tons of hydrogen fluoride, and 134,000 tons of hydrochloric acid, all of which are among the hazardous air pollutants listed by Congress in Clean Air Act section 112(b).[65] Coal-fired power plants also emit

dioxins, which are cancer-causing agents that are highly toxic even in very small amounts.[66] Oil-fired power plants emitted 320 tons of nickel in 1994.[67]

Mercury contamination is a persistent and widespread problem with devastating effects on some of the most vulnerable Americans. Mercury is a potent neurotoxin. Human exposure to mercury most commonly occurs through the consumption of contaminated fish. High maternal blood levels of mercury are linked to particularly toxic effects in children exposed as developing fetuses, including delayed developmental milestones, reduced neurological test scores and, at high doses, cerebral palsy.[68] The scope of the problem is broad: hundreds of thousands of children born in the U.S. each year are at risk of serious harm from exposure to high maternal blood-mercury levels resulting from contaminated fish consumption.[69] Mercury's risks include delayed developmental milestones, reduced neurological test scores and, at high doses, cerebral palsy.[70]

Native Americans who rely on fish or contaminated mammals for food, as part of their cultural experience, and low-income persons for whom locally caught freshwater fish is an important source of inexpensive protein, also are at higher risk. Significant evidence also links methylmercury exposure to cardiovascular disease in adults.[71] A large body of scientific literature exists documenting numerous risks to wildlife.[72]

According to EPA, all 50 states now have issued mercury fish consumption advisories urging children and women who are pregnant, may become so, or are nursing, and other vulnerable populations – to avoid eating or limit intake of specific kinds of fish. In 35 of these states the mercury warnings apply to all waters statewide.[73] Advisories blanket significant segments of our recreational waterways: approximately 38 percent of the nation's total lake acreage and 26 percent of the nation's total river miles were subject to advisories in 2006.[74]

The economic impact of this mercury contamination is significant: total costs of lost U.S. population IQ points due to *in utero* exposure to methylmercury from all sources has been estimated at $3.1 billion to $19.9 billion per year.[75] By contrast, estimated benefits from $86 million to $4.9 billion per year could accrue from the avoided cardiovascular events and premature mortality from even a modest 70 percent cut in power plant mercury.[76]

What can be done to limit air toxics, including mercury? After years of delay, including promoting the unlawful CAMR and delisting rules that were recently vacated in their entirety by the D.C. Circuit, EPA finally has indicated its plans to develop maximum achievable control technology-based emissions standards under the existing Clean Air Act, for all the hazardous air pollutants emitted by the coal- and oil-fired utility industry.[77]

During the period between EPA's issuance of CAMR and the appellate court's decision, some states issued emissions limits for mercury from coal-fired electric generating units. Additionally, applications have been submitted for upwards of 22,000 MW of new coal-fired capacity.[78] These plants are likely to operate for many years, and the pollution control technology choices made by plant owners and operators represent significant capital investments. Under Clean Air Act section 112(g) and EPA regulations, each of

these plants must demonstrate it will meet MACT emission limitations, determined on a case-by-case basis. Those limits must be equal to or better than those achieved by the best performing similar source, for mercury and for other air toxics as well. Experience under certain states' regulations demonstrates that coal-fired power plant mercury emission reductions of up to 95 percent below intake levels of mercury in the combusted coal are being met at existing older coal-fired power plants using commercially available technologies.[79] Reductions of 98 percent and more can be achieved at new units. Technical means for controlling mercury include using advanced coal technologies with carbon capture beds, or at conventional combustion units, combinations of coal cleaning, the co-benefits associated with scrubbers for the control of sulfur dioxide, fabric filters, carbon sorbent injection, adoption of cleaner fuels, and, of course, the replacement of coal-fired electricity generation with greater reliance on energy efficiency and clean renewable energy resources.

We strongly support the development of MACT standards by EPA and will engage the Agency in that effort. Because the long record of delay and industry litigation associated with this particular rulemaking, however, CATF would support a statutory backstop to the rule. Specifically, if by January 1, 2012 a MACT standard for this industry is not in place, all existing coal-fired electricity generating units should be required to control mercury emissions levels to achieve at least 95 percent reductions from inlet coal mercury content by a date no later than January 1, 2015. Emissions limits for new units, of course, would continue to be governed by the section 112(g) case-by-case MACT requirements mandated by the Act, and required to meet the emissions limit achieved in practice by the best-performing similar source. Certainly nothing in the proposed statutory backstop provision should be construed to abrogate the right of the permitting agencies to set tighter standards for mercury as appropriate.

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 2 million tons per year will save 30,000 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 1.6 million tons per year as will year round nitrogen and Acid Rain impacts.
- Mercury is highly toxic in small amounts, and, as for other industries, maximum available control thresholds should be pursued consistent with the best-performing mercury removal technology – upwards of 95 percent on a plant-specific basis.

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 2 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 1.6 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.
- Power sector reductions of mercury upwards of 95 percent have been achieved on older coal plants in compliance with Massachusetts law.[80] Technical means include coal cleaning, sulfur dioxide and nitrogen oxides scrubbing co-benefits, fabric filters, activated carbon injection, and adoption of cleaner fuels.

The Time For Action Is Past Due

The discussion we are having today is hardly new. It goes back at least to 1995, when EPA initiated its "Clean Air Power Initiative" designed to bring stakeholders together around a comprehensive set of pollution reductions. It continued in the Jeffords "Clean Power Act – S. 556", which passed the Environment and Public Works Committee in 2002. For the last eight years, the debate has focused largely on the Bush Administration's controversial "Clear Skies" proposal and its set of "Clean Air" rules (CAIR, CAMR, and CAVR). Now, in the wake of the suite of court opinions that struck down each of those regulations, we are back where we started -- with EPA beginning the process of issuing power plant regulations anew. In the meantime, the public health and environmental damage wreaked by the nation's power plants continues unabated. It is high time – and the right time -- for Congress finally to act to reduce this damage once and for all.

ENDNOTES

[1] Massachusetts v. Environmental Protection Agency, 549 U.S. 497 (2007).
[2] *New 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] http://www.epa.gov/airmarkets/progsregs/cair/docs/carper.pdf at slide 26.
[6] http://www.epa.gov/airmarkets/progsregs/cair/docs/carper.pdf at slide 30.
[7] Available online at: http://www.epa.gov/climatechange/emissions/co2_human.html
[8] 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

[9] See e.g., Pope. C.A., Burnett, R.T., Thun, M.J, Calle, E.E., Krewski, D., Ito, Kaz, Thurston, G.D., (2002). Lung cancer, cardiopulmonary mortality, and long term exposure to fine particulate air pollution. Journal of the American Medical Association, vol. 287, p. 1132-1141; Peters, A., Pope, A.C. (2002). Cardiopulmonary mortality and air pollution. The Lancet v. 360, p. 1184 October 19, 2002. Gold, D. et al., "Ambient Pollution and Heart Rate Variability," Circulation, v. 101, 1267-1273, American Heart Association (March 21, 200); Peters, A. et al., "Increases in Heart Rate Variability During an Air Pollution Episode," 150 American Journal of Epidemiology, p. 1094-1098 (1999); Peters, A. et al., "Air Pollution and Incidence of Cardiac Arrhythmia," 11 Epidemiology, no. 1, p. 11-17 (2000); Schwartz, J., "Air Pollution and Hospital Admissions for Heart Disease in Eight U.S. Counties, 10 Epidemiology 17-22 (1999).

[10] Pope, C.A., "Epidemiology of Fine Particulate Air Pollution and Human Health: Biologic Mechanisms and Who's at Risk?" 108 Env. Health Persp. (Supp 4) 713-723 (August 2000).

[11] Thurston, George, "Determining the Pollution Sources Associated with PM Health Effects," Air And Waste Management Association (January 1998); Laden F, Neas LM, Dockery DW, Schwartz J. Association of fine particulate matter from different sources with daily mortality in six U.S. cities. Environ. Health Perspect. 108: 941-947(2000).

[12] http://www.epa.gov/airmarkets/progsregs/cair/docs/carper.pdf at slide 25.

[13] Clean Air Task Force, Dirty Air, Dirty Power: Mortality and Health Damage Due to Air Pollution from Power Plants (2004) available online at: http://www.catf.us/publications/view/24.

[14] Levy JI, Chemerynski SM, Tuchmann JL. Incorporating concepts of inequality and inequity into health benefits analysis. Int. J. Equity Health. 2006 5:2. Levy JI, Greco SL, Spengler JD. The importance of population susceptibility for air pollution risk assessment: A case study of power plants near Washington, DC. Environ. Health Perspect. 2002; 110:1253–1260.

[15] Levy, J., Spengler, J., Hlinka, D. and Sullivan, D., "Estimated Public Health Impacts of Criteria Pollutant Air Emissions from the Salem Harbor and Brayton Point Power Plants." Available online at www.hsph.harvard.edu

[16] http://www.epa.gov/airmarkt/progress/docs/2007ARPReport.pdf at 6 and 29.

[17] Lynch, J.A., V.C. Bowersox, and J.W. Grimm. "Acid Rain Reduced in the Eastern United States." Environmental Science and Technology, Volume 34 (2000): 940-49.

[18] Butler, T.J., G.E. Likens, and B.J.B Stunder. "Regional-scale impacts of Phase I of the Clean Air Act Amendments in the USA: the relation between emissions and concentrations, both wet and dry." Atmospheric Environment, Volume 35 (2001): 1015-28.

[19] Likens, G.E., T.J. Butler, and D.C. Buso. "Long- and short-term changes in sulfate deposition: Effects of the 1990 Clean Air Act Amendments." Biogeochemistry, Volume 52 (2001): 1-11.

[20] Driscoll, C.T., G.B. Lawrence, A.J. Bulger, T.J. Butler, C.S. Cronon, C. Eagar, K.F. Lambert, G.E. Likens, J.L Stoddard, and K.C. Weathers. "Acidic Deposition in the Northeastern United States: Sources and Inputs, Ecosystem Effects, and Management Strategies: The effects of acidic deposition in the northeastern United States include the acidification of soil and water, which stresses terrestrial and aquatic biota." Bioscience, Volume 51 (2001): 180-98.

[21] Driscoll, C.T., D. Whitall, J. Aber, E. Boyer, M. Castro, C. Cronan, C.L. Goodale, P. Groffman, C. Hopkinson, K. Lambert, G. Lawrence, and S. Ollinger. "Nitrogen Pollution in the Northeastern United States: Sources, Effects, and Management Options." Bioscience, Volume 53 (2003): 357-74.

[22] US EPA 1995. Acid Deposition Standard Feasibility Study Report to Congress. EPA 430-R-95-001a. http://www.epa.gov/acidrain/effects/execsum.html

[23] National Acid Precipitation Assessment Program (NAPAP). 1998. Biennial Report to Congress: an Integrated Assessment. http://www.nnic.noaa.gov/CENR/NAPAP/NAPAP_96.htm

[24] Heard, R.M., W.E. Sharpe, R.F. Carline and W.G. Kimmel. 1997. Episodic acidification and changes in fish diversity in Pennsylvania headwater streams, Transactions Am. Fisheries Soc. 126: 977-984.
[25] Zhai, J., C.T. Driscoll, T.J. Sullivan, and B.J. Crosby. "Regional Application of the PnET-BGC model to assess historical acidification of Adirondack lakes." Water Resources Research, Volume 44 (2008).
[26] Brakke, D.F., A. Henriksen, and S.A. Norton. "Estimated background concentrations of sulfate in dilute lakes." Journal of American Water Resources, Volume 25 (1989): 247-53.
[27]Chen, L., and C.T. Driscoll. "Regional applications of an integrated biochemical model to northern New England and Maine." Ecological Applications, Volume 15 (1995): 1783-97.
[28] Stoddard, J.L., et al. "Regional trends in aquatic recovery from acidification in North America and Europe." Nature, Volume 401 (1999): 575-78.
[29] Stoddard, J.L., J.S. Kahl, F.A. Deviney, D.R. DeWalle, C.T. Driscoll, A.T. Herlihy, J.H. Kellogg, P.S. Murdoch, J.R. Webb, and K.E. Webster. "Response of surface water chemistry to the Clean Air Act Amendments of 1990." U.S. Environmental Protection Agency, 2003.
[30] Cronan, C.S. and C.L. Schofield. "Relationships between Aqueous Aluminum and Acidic Deposition in Forested Watersheds of North America and Northern Europe." Environmental Science and Technology, Volume 24 (1990): 1100-05.
[31] Driscoll, C.T., N.M Johnson, G.E. Likens, and M.C. Feller. "The effects of acidic deposition on stream water chemistry: a comparison between Hubbard Brook, New Hampshire and Jamieson Creek, British Columbia." Water Resources Research, Volume 24 (1988): 195-200.
[32] Driscoll, 2001., Op. Cit.
[33] Cronan, C. S. and Grigal, D.F. "Use of calcium/aluminum ratios as indicators of stress in forest ecosystems." Journal of Environmental Quality, Volume 24 (1995): 209-26.
[34] MacAvoy, S.E., and A.J. Bulger. "Survival of brook trout (Salvelinus fontinalis) embryos and fry in streams of different acid sensitivity in Shenandoah National Park, USA." Water, Air, and Soil Pollution, Volume 85 (1995): 445-50.
[35] Driscoll, C.T., N.M Johnson, G.E. Likens, and M.C. Feller. "The effects of acidic deposition on stream water chemistry: a comparison between Hubbard Brook, New Hampshire and Jamieson Creek, British Columbia." Water Resources Research, Volume 24 (1988): 195-200.
[36] Lynch, 2000.Op. Cit.
[37] Driscoll, 2001, Op. Cit.
[38] Dricoll, 2003. Op. Cit.
[39] McNulty, S.G., et al. "Estimates of critical acid loads and exceedances for forest soils across the conterminous United States." Environmental Pollution, Volume 149 (2007): 281-92.
[40] Likens, G.E., C.T. Driscoll, D.C. Buso. "Long-Term Effects of Acid Rain: Response and Recovery of a Forest Ecosystem." Science, Volume 272 (1996): 244-46.
[41] Likens, G.E., C.T. Driscoll, D.C. Buso, T.G. Siccama, C.E. Johnson, W.A. Reiners, D.F. Ryan, C.W. Martin, and S.W. Bailey. "The biogeochemistry of calcium at Hubbard Brook." Biogeochemistry, Volume 41 (1998): 89-173.
[42] Bailey, S.W., J.W. Hornbeck, C.T. Driscoll, and H.E. Gaudette. "Calcium inputs and transport in a base-poor forest ecosystem as interpreted by Sr isotopes." Water Resources Research, Volume 32 (1996): 707-19.
[43] Lawrence, G.B., M.B. David, G.M. Lovett, P. S. Murdoch, D.A. Burns, J.L. Stoddard, B.P. Baldigo, J. H. Porter, and A.W. Thompson. "Soil calcium status and the response of stream chemistry to changing acidic deposition rates." Ecological Applications, Volume 9 (1999): 1059-72.
[44] Chen L, Driscoll CT, "Regional application of an integrated biogeochemical model to northern New England and Maine." Ecological Applications 15 (2005):1783-1797.

[45] Chen L, Driscoll CT., Regional assessment of the response of the acid-base status of lake watersheds in the Adirondack region of New York to changes in atmospheric deposition using PnET-BGC. Environmental Science and Technology 39 (2005):787-794.
[46] Gbondo-Tugbawa, S.S., and C.T. Driscoll. "Evaluation of the effects of future controls on sulfur dioxide and nitrogen oxide emissions on the acid–base status of a northern forest ecosystem." Atmospheric Environment, Volume 36 (2002): 1631-43.
[47] Stoddard, 1999. Op. Cit.
[48] "Acid Rain Revisited: Advances in Scientific Understanding Since the Passage of the 1970 and 1990 Clean Air Act Amendments, Hubbard Brook Research Foundation (2000); Driscoll, Charles T., et al., Acid Deposition in the Northeastern U.S.: Sources and Inputs, Ecosystems Effects, and Management Strategies. BioSience. Vol. 51, no. 3; Likens, G.E., C.T. Driscoll and D.C. Buso. 1996. Science. Long-Term Effects of Acid Rain: Response and Recovery of a Forest Ecosystem. 272: 244-46.
[49] Driscoll, C.T, Op. Cit.
[50] Ibid.
[51] Cosby, B.J. and T.J. Sullivan. 1998. Final Report: Application of the MAGIC Model to Selected Catchments: Phase I, Southern Appalachian Mountain Initiative (SAMI).
[52] Munson, R.K. 1998. Application of the NuCM Model to Noland Divide, White Oak Run and Shaver Hollow for SAMI Phase I. Final Report.
[53] Chameides, W.L., H. Yu, M. Bergin, X. Zhou, L. Meqarns, G.Wang, C.S. Kiang, R.D. Saylor, C. Luo, Y. Huang, A. Steiner and F. Giorgi. 1999. Case Study of the Effects of Atmospheric Aerosols and Regional Haze on Agriculture: An Opportunity to Enhance Crop Yields in China through Emission Controls? PNAS. 96(24): 13626-13633.
[54] Abt Associates, "Out of Breath: Adverse Health Effects Associated with Ozone in the Eastern United States," Abt Associates (October 1999).
[55] "Ozone Alley," Ohio Environmental Council (2000) available online at: http://www.theoec.org/PDFs/Air/cage_reports_ovalley.pdf
[56] "Ozone Alley" supra.
[57] http://www.epa.gov/pmdesignations/2006standards/documents/2008-12-22/timeline.htm; http://www.epa.gov/oar/particlepollution/naaqsrev2006.html;
[58] http://www.epa.gov/airmarkets/progsregs/cair/docs/carper.pdf at slides 19 and 22.
[59] Production and yield figures come from 1997 United States Department of Agriculture, National Agricultural Statistics Service. Ozone impact data comes from EPA 1996. Office of Air Quality Planning and Standards Staff Paper. Review of National Ambient Air Quality Standards for Ozone. EPA-452/R-96-007.
[60]US EPA 1999 Office of Water, Oceans and Coastal Protection Division, Air Pollution and Water Quality, Atmospheric Deposition Initiative http://www.epa.gov/owow/oceans/airdep/
[61] US EPA 1997. Deposition of Air Pollutants to the Great Waters. Second Report to Congress, Office of Air Quality Planning and Standards.
http://www.epa.gov/oar/oaqps/gr8water/2ndrpt/execsumm.html
[62] Valigura, Richard, Winston Luke, Richard Artz and Bruce Hicks. 1996. Atmospheric Nutrient Input to Coastal Areas. Reducing the Uncertainties. National Oceanic and Atmospheric Administration Coastal Ocean Program.
[63] Paerl, Hans, 1999. Atmospheric Nitrogen in North Atlantic Ocean Basin. Ambio (Royal Swedish Academy of Sciences Journal) (June 1999). Summary online:
http://www.seagrantnews.org/news/19990630_n.html
[64] 69 Fed. Reg. 4,652, 4,691 (Jan. 30, 2004), 65 Fed. Reg. 79,825, 79,827 (Dec. 20, 2000).
[65] U.S. EPA, Study of Hazardous Air Pollutant Emissions for Electric Steam Generating Units," Final Report to Congress (1998) ("1998 HAP Report to Congress"), at ES-2, Table ES-1; 42 U.S.C. § 7412(b).

[66] *Id.*
[67] *Id.*
[68] National Research Council, *Toxicological Effects of Methylmercury* (prepublication, July 2000) ("NRC Report"), at 12-14, 44, 60.
[69] Kathryn R. Mahaffey *et al.*, *Blood Organic Mercury and Dietary Mercury Intake: National Health and Nutrition Examination Survey, 1999-2000*, 112 Environ. Health Persp. 562-570 (Apr. 2004) & Kathryn R. Mahaffey, *Methylmercury: Epidemiology Update*, Presentation at Fish Forum (Jan. 26, 2004) *available at* (http://www.epa.gov/waterscience/fish/forum/2004/presentations/monday/mahaffey.pdf).
[70] NRC Report at 4, 12-14.
[71] U.S. EPA, *Regulatory Impact Analysis of the Clean Air Mercury Rule: Final Report*, Appendix C (March 2005).
[72] *See generally* Biodiversity Research Institute, *Mercury Connections: The Extent and Effects of Mercury Pollution in Northeastern North America*, at 12-13, 16, 18 & 20 (2005) (documenting high mercury levels in loons, forest songbirds and otters).
[73] U.S. EPA, *Fact Sheet: National Listing of Fish Advisories* (2006), available online at http://www.epa.gov/waterscience/fish/advisories/factsheet.pdf (last visited July 5, 2009).
[74] U.S. EPA, *Fact Sheet: National Listing of Fish Advisories* (Aug. 2006), available online at http://www.epa.gov/waterscience/fish/advisories/factsheet.pdf (last visited July 5, 2009).
[75] G. Rice & J.K. Hammitt, Harvard University Center for Risk Analysis, *Economic Valuation of Human Health Benefits of Controlling Mercury Emissions from U.S. Power Plants* (2005) ("Harvard Risk Center Study").
[76] Letter from Arthur Marin, Northeast States for Coordinated Air Use Management ("NESCAUM"), to EPA Air Docket OAR-2002-0056, item 5747, at 6 (Feb. 22, 2005) (summarizing findings of Harvard Risk Center Study).
[77] U.S. EPA, Sector Policies and Programs Division, Supporting Statement Information Collection Request for National Emission Standards for Hazardous Air Pollutants (NESHAP) for Coal- and Oil-fired Electric Utility Steam Generating Units (June 17, 2009), EPA-HQ-OAR-2009-0234-02, *public comment solicited at* 74 Fed. Reg. 31725 (July 2, 2009).
[78] http://www.sierraclub.org/environmentallaw/coal/plantlist.asp.
[79] February 5, 2009 letter from Cathy C. Taylor, Dominion Energy to James Belsky, Massachusetts Department of Environmental Protection re: Dominion Energy Salem Harbor, LLC 2008 310 CMR 7.29 Compliance Report; February 6, 2009 letter from Cathy C. Taylor, Dominion Energy to John Winkler, Massachusetts Department of Environmental Protection re: Dominion Energy Brayton Point LLC 2008 310 CMR 7.29 Compliance Report.
[80] 310 CMR 7.29 (2004).

Clean Air Subcommittee Hearing Oversight: EPA's Clean Air Regulations

Slides Accompanying Testimony of
the Clean Air Task Force

July 9, 2009

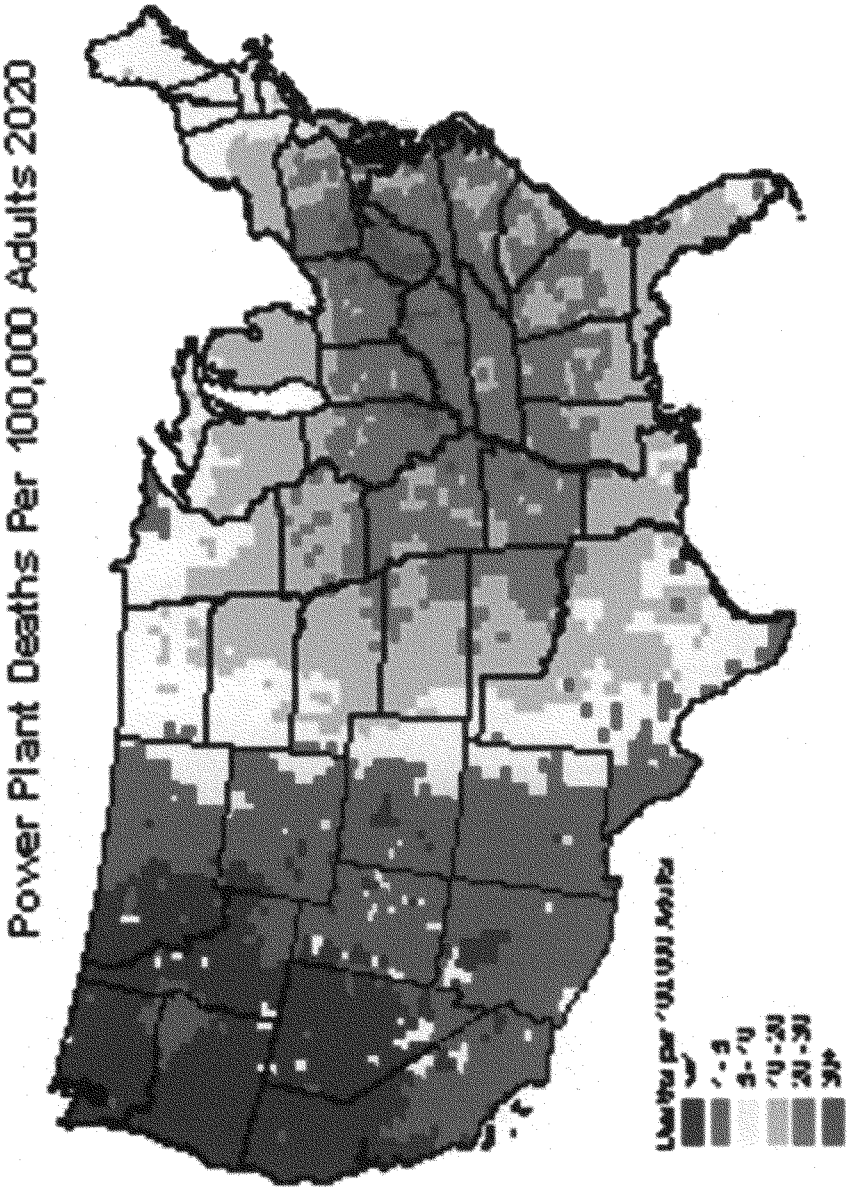
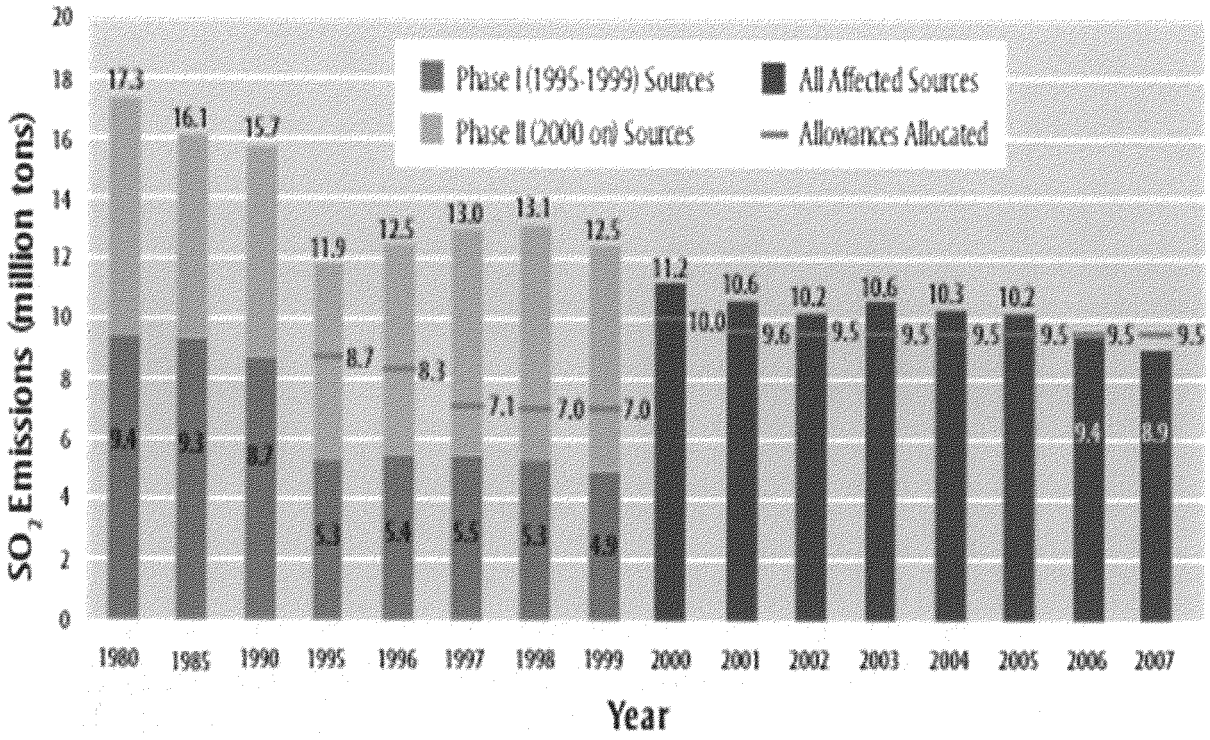
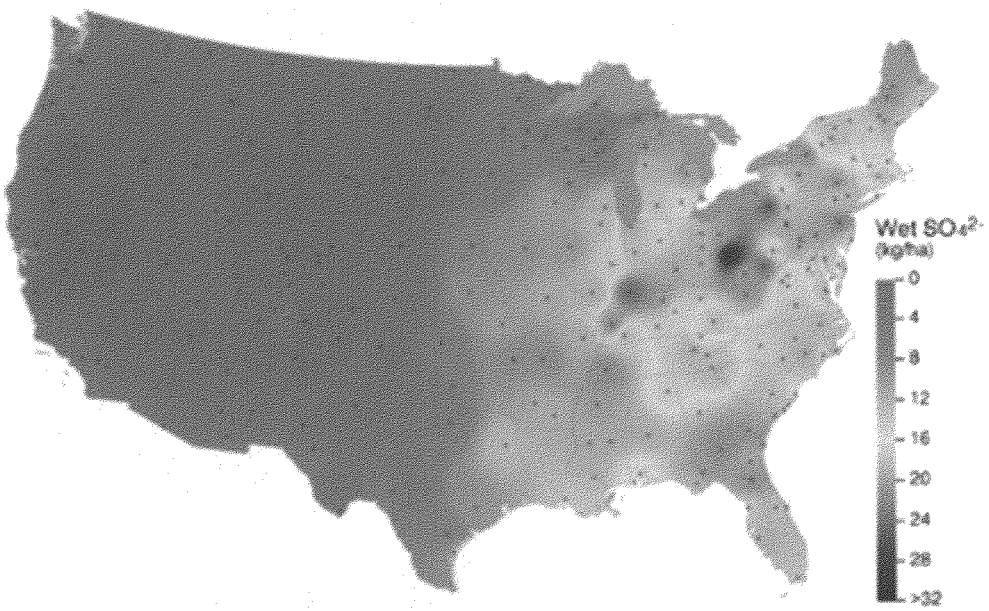

Power Plant Deaths Per 100,000 Adults 2020

Figure 2: SO_2 Emissions from Acid Rain Program Sources



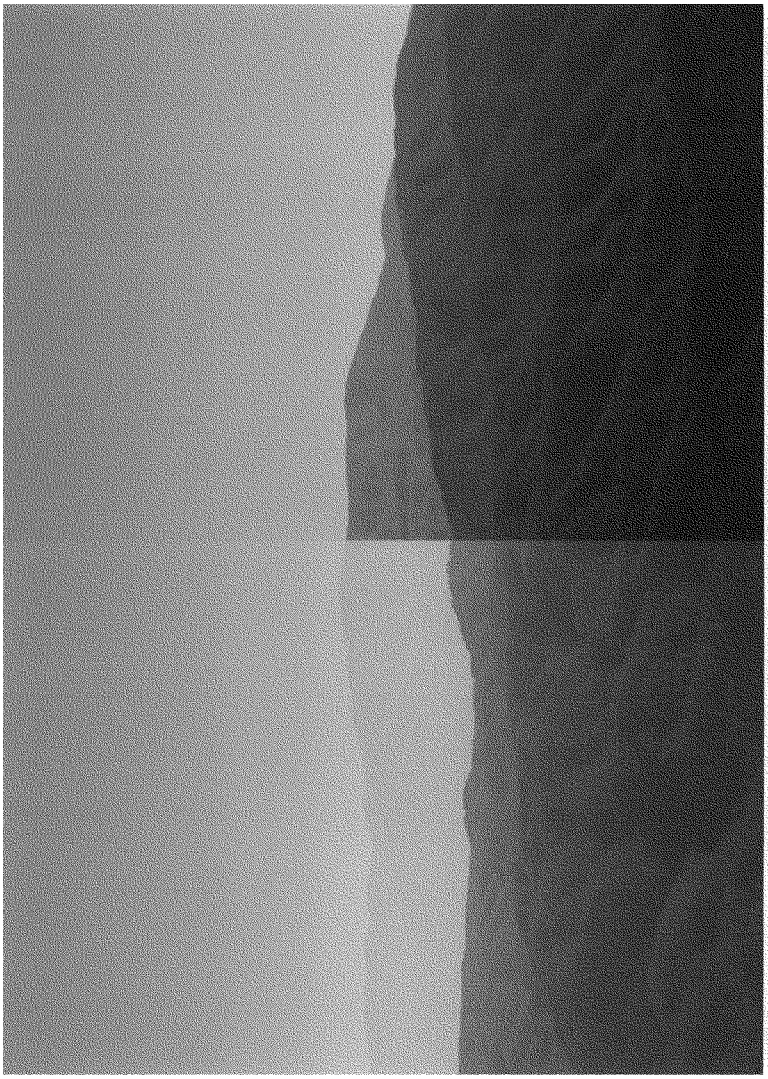
Source: EPA, 2008

Annual Mean Wet Sulfate Deposition, 2005–2007



Source: NADP, 2008

Acadia National Park on a Clear and a Polluted Day



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

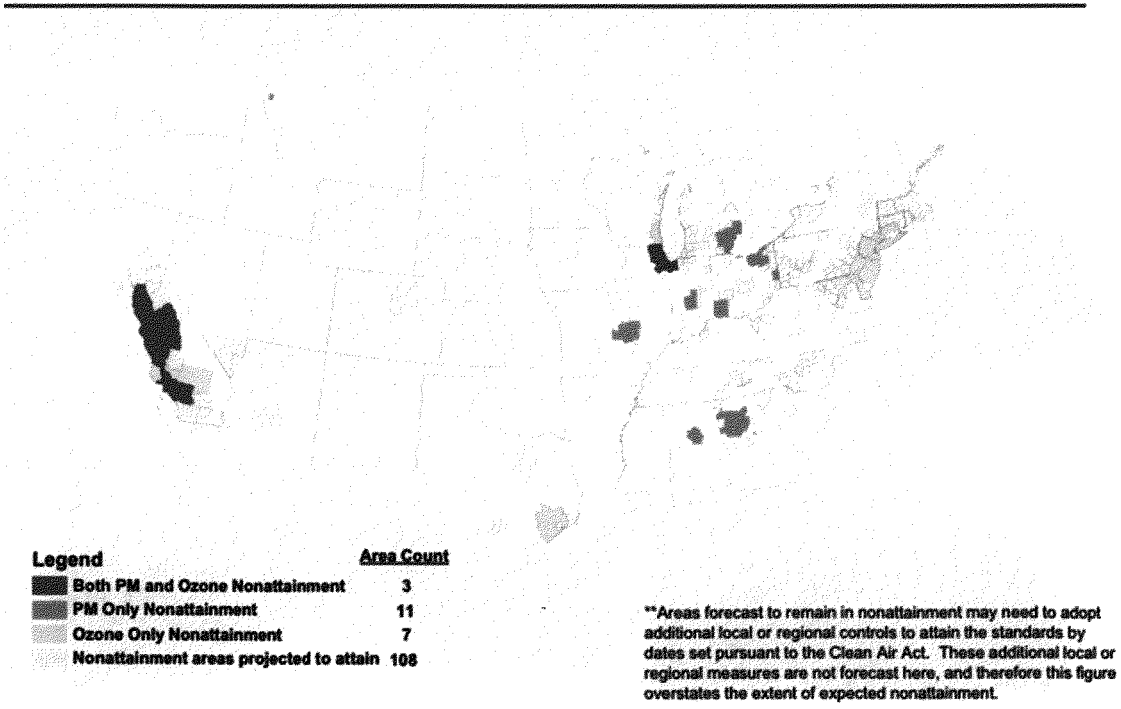
129 Areas Designated as Nonattainment for 8-Hour Ozone and/or $PM_{2.5}$

Legend	Area Count
Both PM and Ozone Nonattainment	36
PM Only Nonattainment	3
Ozone Only Nonattainment	90

For further information on designations and related requirements, see
http://www.epa.gov/air/oaqps/gio/designations/index.htm
http://www.epa.gov/pmdesignations/

108 Areas Projected to Meet the $PM_{2.5}$ and 8-Hour Ozone Standards in 2020

with the Clean Air Planning Act (Carper, S.843) and Some Current Rules* Absent Additional Local Controls



**Areas forecast to remain in nonattainment may need to adopt additional local or regional controls to attain the standards by dates set pursuant to the Clean Air Act. These additional local or regional measures are not forecast here, and therefore this figure overstates the extent of expected nonattainment.

Senator CARPER. Thank you very, very much for that statement.

We have a vote underway. I have a few minutes to get to the floor to vote. I will be right back. So this hearing is not adjourned, but in recess until I get back. I will be back shortly.

Thank you very much.

[Recess.]

Senator CARPER. Thank you for your patience. We are voting on one of our appropriations bills, trying to get those moving along, but I think we will have time to finish. No more votes before we finish, so I thank you for that.

This is a question I would ask of the entire panel, and that is, it sounds like all of you support some sort of legislative action to address sulfur dioxide and nitrogen oxide emissions. Is that correct? Every head has nodded yes. OK.

Some of you support only a technical fix. And let me just ask for those of you who feel that way, why wouldn't you want more certainty with targets and timetables if you think technical fix is better? Why not more certainty with targets and timetables? And maybe you don't share this concern, but wouldn't the litigation continue without providing as much direction as possible?

Anyone, please.

Mr. Korleski.

Mr. KORLESKI. Senator, if I may, I am one who does support, I think I used the phrase surgical and laser-like fix.

Senator CARPER. I remember you saying that.

Mr. KORLESKI. I know some of the other panelists disagree and would seek a more comprehensive approach. Very frankly, my view is that, and I think we have seen this over the last number of years, the more comprehensive, the larger it is, the more complex it is, it will require agreement by a larger number of parties, many of whom I think at the end of the day will not come to agreement. And my fear is, just to put it in the most candid terms, it would be gridlock to try to get there.

So my recommendation has been, again I think sitting at this panel I think I heard, as you did, everyone say trading, make trading OK. Some people said, OK, that is a small part of it. Someone like me said that is a big part of it. I didn't hear anybody say it was a bad idea. That is something that everyone could agree upon and therefore something that could hopefully and presumably be accomplished, I don't even want to say presumably, hopefully be accomplished in legislation.

Once you get beyond that, I think all bets are off.

Senator CARPER. OK. All right. Thanks.

For panel members who may have a different view, just without being argumentative, but just a different view on this point.

Mr. LaBauve.

Mr. LABAUVE. Thank you, Senator.

From our view, Senator, I think we do all support the need for legislation and the need to support additional trading. From our perspective, however, I think you can see what was in the rule and what the court said of the rule, and I think it will not provide the type of certainty, the type of comprehensive solution that we all need on this particular type of issue.

Even as we look at going forward, if we were to get at technical fix, there is no guarantee, as the court found, that all the areas that are currently non-attainment under the old standard would necessarily be brought back into attainment under that standard, since there have been new standards passed, as well as additional elements that EPA has to look at under the hazardous air pollutant requirements and the MACT requirements.

We would like to see a more comprehensive fix to the whole solution to give us the type of certainty so that we can move forward with our planning.

Senator CARPER. OK.

Mr. Corneli.

Mr. CORNELI. Yes, and we tend to agree with FPL on that point. But with respect to the target——

Senator CARPER. You tend to agree with whom?

Mr. CORNELI. With what FPL just said.

Senator CARPER. OK.

Mr. CORNELI. Part of the target or part of the objective of legislation should be to remove as much of the litigation risk as possible. And you know, the difference between the Michigan decision and the one a year ago shows that stuff can pop up that you weren't aware of yet. So we think there are, as I mentioned in my testimony, several areas of legal fixes that are needed.

In addition, we would support the target and timetable of the introduction of a reducing cap over time. And I think if that is discussed broadly enough, very few people would oppose it because from the environmental side, you get more environmental benefits.

From the business side, you get better economic certainty that there will be a continued price signal to support the validity of the investments we are making and the ability to recover them, especially with a reasonable approach to allocations, which help assure there is a positive incentive to make those investments, because you can then monetize some of the emission allowances you have allocated.

And I think on that point, while several of us talked about different aspects of that, from what I have heard here and from what I have seen in related debates in the climate change area, I think there is room for consensus for building agreement around how to have a reasonable and moderate allocation approach as well.

Senator CARPER. Good. Thank you. All right.

Mr. Schneider, I have a question. My next question is for you, if you really want to respond to this.

Mr. SCHNEIDER. Please, Senator.

Senator CARPER. OK. Next question, if we look at the court's decision on the CAIR case, let me just ask, do you believe that EPA can rewrite rule on their own that continues the Acid Rain Program for sulfur dioxide? And do you think they could write a rule that allows for interstate cap-and-trade for sulfur dioxide and nitrogen oxide?

Mr. SCHNEIDER. Senator, I think it would be very difficult. And I think it would be vulnerable to court challenge. I was heartened to hear Assistant Administrator McCarthy today say that she thinks she can create a hybrid approach, and I would be very inter-

ested in listening to what her OGC lawyers say about that. That was a heartening thing to hear.

Our reading of the case is it is going to be very difficult to thread that needle. And you know, that is very different. The litigation posture, that is very different compared to the settled precedent in the MACT area, where we think there is a pretty clear road path for EPA to move forward. And we have differentiated that in our testimony to sort of say maybe that could go forward and maybe Congress helpfully could set a backstop in case that is not in place. But on the CAIR side, frankly it is a mine field.

Senator CARPER. All right. Just a follow up; if the Acid Rain Program cannot be extended, what happens to the banked allowances from previous years?

Mr. SCHNEIDER. Well, I mean, the conditionalism on that is that the market collapses. And one fear is that you see people dumping allowances, which basically means that it is cheaper for them to emit and not run scrubbers. Right? So that would be a concern.

The fact of the matter is there are some limits on that with respect to people's individual Federal and State permits and other State requirements. So I can't here tell you that, you know, we are going to from 1 day to the next see this spike in emissions as a result of that. But certainly, it is not a helpful thing. What we are trying to do is get an emissions trajectory that goes down to protect public health and the environment. So that would not be a good outcome.

That is another reason is makes sense, and this sort of goes back to your previous question that the other gentleman addressed, why it makes sense to move beyond just a technical fix or surgical fix and to set specific emission rate limits and so forth on these pollutants so there is certainty and especially not the litigation risk that would be faced otherwise, and the risk of what you are hinting at in your question.

Senator CARPER. All right. Thanks.

Let me ask my next question, this is really for the broad panel, but especially for Mr. Scott, if I could.

In the past, I have introduced legislation with others that has regulated mercury, including Senator Alexander, who has been a champion on this, but we introduced legislation that regulated mercury at the stack, calling for 90 percent reductions.

According to the GAO study, which we have heard from earlier this morning, it looks like most plants are easily able to get to 90 percent reductions. Let me just ask somebody who has dealt with this issue for some time, do you think that 90 percent is realistic? Is it too high? Is it too low?

Mr. SCOTT. We think it is very realistic, Senator. It is interesting. When we were negotiating these agreements early on, we started with a strong mercury rule that called for 90 percent, and that is actually what led to all of the discussions about a multi-pollutant solution. And we were told at that time by most of the companies that they didn't think that it was achievable. But our findings from the testing and the actual installations that have been done would indicate that it is quite doable, and that it is a realistic number.

So we think that that 90 percent figure is not only realistic, but it is showing up in the testing that has been done, and even at less sorbent injection in an activated carbon injection system than even we had anticipated being necessary to accomplish that 90 percent. So we have been very encouraged by the results that we have seen.

Senator CARPER. OK.

Anybody else want to be heard on this issue?

Mr. Corneli and then Mr. Schneider.

Mr. CORNELI. Yes, we have cooperated with the GAO on some of their work. We have done sorbent injection control initially ourselves and have plans to do it on our entire fleet of coal plants. And we think it works. We agree basically with the GAO perspective. We think it works. We think it is economical, and at least on our plants and coal types. And we think it is something that can definitely be done under the MACT approach and should be done under the MACT approach.

I would say that at a somewhat more technical level, we think that other hazardous air pollutants that come out of power plants could interfere with the efficient cap-and-trade and removal technologies for SO_2 and NO_x. So we think that in addition to a MACT approach for mercury, power plants should be removed from section 112 with respect to other HAPs to avoid that kind of interference between MACT for other things that are not quite such serious pollutants.

Senator CARPER. OK. Thank you.

Mr. Schneider, last word on this issue.

Mr. SCHNEIDER. Sure. I do want to respond to that very point because I know that has been a subject of some discussions. And we would vigorously oppose the idea of removing the other hazardous air pollutants from section 112. In their own right, dioxins, furans, acid gases, and heavy metals, they are serious environmental threats, and they should go through the MACT process. And I think we will have a better outcome both in environment and in terms of ultimate control on these plants if they are subject to that. So we would oppose that. Thanks.

Senator CARPER. All right. Thank you.

Mr. Corneli, can you talk with us little bit about what NRG is doing to mitigate mercury at your coal plants? You talked a little bit about this, but if you don't mind. You folks have a big plant down in southeastern Sussex County in Delaware. But what kind of reductions are you seeing in your plants? Again, you talked about this a little bit, but could you talk about the benefit of certainty for pollution controls, not just what the country needs, but also for your company?

Mr. CORNELI. Well, two things. First, on the sorbent injection for mercury, the 90 percent reduction levels seem to be attainable. We have begun to use that at our plant in Delaware and are seeing good results. I don't have the latest details of the actual results there, but I would be glad to get those to you.

Senator CARPER. All right. Thank you.

Mr. CORNELI. In terms of the——

Senator CARPER. You have a number of plants there, a couple of smaller ones and larger units, too.

Mr. CORNELI. Yes, in New York as well, and also installed sorbent injection. The question of certainty I think is particularly important for us because we are a merchant power plant. We don't have rate base. We don't have regulated rates that allow us to turn around and recover our costs from retail customers. That tends to be good news for customers because they don't have to accept the costs that a regulated utility would just pass through, but it makes cost recovery challenging for us.

So one of the things that we need in certainty really is to know what the rules are. And the second thing goes back to the allocation provisions, is that we need to have a reasonable way of being sure that we can recovery our costs through the cap-and-trade system or mitigate our costs by selling allowances when we make the emission reductions. And that relates both to the existing bank from reductions we have made in the past that we would like to be able to use that for compliance, although we do think that there needs to be this two for one or 2.85 for one discount in the future.

And it also goes to features of what you can do or what the EPA can do in making a new rule and a new law. And that is to continue that same sort of incentive, positive incentive that if you make emission reductions, if you invest billions of dollars in emission reductions, you will have some way to recover that or a portion of those costs by actually selling allowances that you got for free, without creating windfalls or without creating too much of a good thing.

And the last piece of certainty for us really relates to the thing you have already talked about, Senator, and with your colleagues, is litigation risk. If you do invest billions of dollars or hundreds of millions of dollars in pollution control equipment and you are relying on selling allowances at a market price to recoup some of that expense, and a court case comes along and vacates or remands the rule, as other witnesses have said, that can lead the market to collapse.

And all of a sudden the way you thought you were going to make back money for your investors in terms of paying for those hundreds of millions of dollars investment evaporates. And that is something that we think is critically urgent to avoid, to having a market-oriented powerful incentive for the private sector to really jump on board, not only with the controls, but actually with the legislation itself.

So we think those features will be very, very helpful in moving this forward politically, legally and commercially.

Senator CARPER. Good.

I am sitting here today remembering a hearing that goes back maybe 5 or 6 years ago, and the hearing focused on mercury emissions and if we could find a way to cost-effectively reduce those emissions by 80 percent over a reasonable period of time. A number of people sat at this table and said, no way; that is just not, we are not going to do that anytime soon. I am just struck by how far we have come, and really struck by how cost-effective this can be.

Could someone just take a minute and explain to me how does sorbent injection work? Can somebody just explain it to me, very briefly? Anyone want to take a shot at that, so even a Senator might understand it?

Mr. CORNELI. Well, I will have to explain it extremely simply because that is the extent of my understanding, Senator. But basically, a sorbent is something that chemically attracts or bonds with certain other chemicals. And activated carbon, for example, is a sorbent that will attract and bond with things. That is why people filter whiskey through charcoal. It is a good sorbent.

And the activated carbon injection blows ground up carbon that has been treated to make it especially sorbent into the exhaust stream of a coal plant before it gets filtered out through part of the filtration system that captures fly ash and particulates and other things. And in that process, the vaporized mercury that is in the exhaust stream gets bonded onto the little carbon particles and filtered out. You know, that is the extent of my knowledge about it.

Senator CARPER. Well, good. Thank you. I think I understood that.

Another question, if I could, and maybe we will just direct this one to Mr. Scott.

In your testimony, I think you mentioned that Illinois has implemented multi-pollutant regulations for your power plants, including regulations for mercury. Have you seen a dramatic increase in your customers' electric bills? Have you seen any increase in your customers' electric bills as a result? And do you believe that the multi-pollutant approach costs more money, or does it actually save money in the end?

Mr. SCOTT. I think it would actually save money in the end, under the assumption that all of these different pollutants are going to be regulated at some point. The reason I say that is because we were able to sit down with the companies individually, which is obviously something that would be very difficult to do on a Federal level, but for us, we were able to do it, to actually sit down and go plant by plant and make sure that we were accommodating the companies in terms of things like outages and when they had to install equipment so that they were doing it at the most cost-effective time for them, rather than us coming along with multiple regulations and slapping them on at different times, them having to comply with them all, which may include moving equipment that you have installed once and reinstalling it a second time.

So I believe doing this comprehensively is actually more cost-effective for the companies. The larger expense in all of this is not the mercury, it is the equipment that deals with NO_x and SO_x. It is things like scrubbers, which are, you know, the very expensive equipment that is there. The mercury injection alone, we are talking about in the millions of dollars to install, and when you spread that out over the number of kilowatt hours that are there, you are talking about a really, really small expense as compared to the billions that we are talking about, we think that the controls that are on for NO_x and SO_x are somewhere in the neighborhood of, for these three companies, somewhere in the neighborhood of $5 billion.

So obviously, even as you spread that out, that becomes something that does get seen in the rates, as opposed to the mercury, which is a very, very small cost. But it is difficult to say how much of this is, Illinois is at an interesting juncture with re-regulating the utility companies. That period ended about 3 years ago, and we

have gone through a lot of new regulations now, so it is difficult to attribute any particular cost to any particular stream. But just from doing some analyses of how much it cost, you know, we can come to the conclusion obviously it is going to cost something to do that. But again, we think it is more cost-effective than doing these regulations piecemeal.

Senator CARPER. OK. Thank you.

And if I could, for Mr. LaBauve, a question. Your company has I think had difficulties with the allocation scheme for CAIR. Is that true?

Mr. LABAUVE. Yes, that is correct, Senator.

Senator CARPER. Why is that?

Mr. LABAUVE. Under the proposed rule that came out from EPA originally, they allocated allowances to units across the country in the initial allocation. And when the final rule was actually developed, they applied what was called a fuel adjustment factor. And under that fuel adjustment factor, they made an adjustment to the allocation such that if you generate electricity from oil or from gas, you got only 60 percent or 40 percent of the previously allocated allowances that you formerly were going to get. And so that remainder that you didn't get was actually shifted and moved over to those who generated electricity from coal.

It basically, in EPA's words, was their effort to try to adjust on an equity basis, shift some of the allowance value over to those coal units because they felt like they were going to have a larger percentage of reduction responsibilities in the long run.

We think, one, that was not consistent with the Clean Air Act under section 110, which was supported by the court because they recognized that 110 has no element of equity adjustment in it. It is really just a matter of getting the areas into attainment as required by the Act.

And second, the court said in terms of doing an equity adjustment, this was not within your authority, EPA, to do so. From our vantage point, we have always felt like from our perspective as a company, we have invested in clean generation. Our customers have paid for that clean generation. And the allowance values, whatever that may be that we were going to get, was going to be their way of getting some value of allowances to compensate them for the technology that they had installed in those units.

We didn't feel like it was appropriate for those allowances to be shifted over to the coal generators.

Senator CARPER. All right. Thank you.

A follow up maybe, if I could, for Mr. Corneli, and maybe for you again, Mr. LaBauve. Let me go over to Mr. Corneli first.

In the Waxman-Markey climate legislation, I think the allocation for the cap-and-trade program for greenhouse gases combines an auction with free allowances. That is correct, isn't it?

Mr. CORNELI. Yes.

Senator CARPER. OK. The free allocations are split between historical emissions and electrical output to the local electric distributors. Is that correct? OK.

Mr. CORNELI. The allocations for the regulated distribution company is split that way, although there is additional just for certain fuel emitters, fuel-based emitters.

Senator CARPER. OK. And here is where I am leading. What are your thoughts about this particular allocation process? And could we do something similar for other pollutants? And what about auctioning the allowances?

Mr. CORNELI. Well, that is a really good set of questions, and I will try to be precise and quick. First, I think one of the reasons that the Waxman-Markey bill has the allocation system for the power sector it does, which I would describe as one bucket for regulated distribution companies, which is every electric company that owns a meter on somebody's house and pushes electricity through it, whether it is a co-op, municipal utility, a restructured distribution company in a State like yours, or a vertically integrated utility in the South or the West.

Every LDC gets some allocations, and specifically has to pass the value of that through to their customers. That is the first bucket.

The second bucket is coal-based merchant power plants get some allowances, not 100 percent, but some to reflect the fact that they will typically not be able to pass through all of their costs into higher power prices, unlike gas or oil-fired power plants.

And so I think the reason for that system is partly to recognize the significant concerns that Randy just expressed, that customers of companies that have invested in cleaner assets deserve some recognition for that based on an output kind of allocation, and customers who are subject to high compliance costs because they are served by heavier emitters deserve some protection from that.

So the LDC allocation addresses both those issues through a mix. The emitter allocation, which goes just to the folks who cannot pass through costs and just to an estimate of how much they cannot pass through, is designed to buffer the impact on compliance costs for companies like ours so we can invest these billions of dollars in new technology without creating any windfalls for us.

And I think the same basic concepts, maybe applied quite differently in the case of NO_x and SO_2, could certainly be applied. The equity issues that are important to low emitting fleets could be recognized through a partial output-based allocation. The cost recovery issues that are important to heavily fossil fleets could be addressed through an allocation that is adjusted for their expected compliance costs. And this package would avoid windfalls, would stimulate investment, and would address equity concerns.

So we are confident that that same basic approach could be used, you know, with recognition that the States are involved with the NO_x allocation; that this is a different piece. But we think something like that makes sense, and we could get beyond sort of the old input versus output fight and look at the results—equity investment, fairness that really matter—and try to figure out a way to solve those issues.

Mr. LABAUVE. Senator, I would concur with most of what Steve said. We support overall the Waxman-Markey bill and we support the allocation formulas that were included in the bill. I would say that early on in the debate, we were one of those companies that were advocating for 100 percent auction of allowances. We thought it was the appropriate methodology to follow.

However, in the context of trying to get to a bill and trying to get something passed, we were working through USCAP. We were

working through EEI. And eventually worked our way with other companies to come up with a compromise that would as quickly as possible maybe start with a free allocation of allowances that would then eventually transition to an auction. And in that initial free allocation, as Steve noted, there was this balance between those allowances that would be allocated based upon sales and those allowances that would be based upon emissions.

At the end of the day, while we could all differ as to the details, at the end of the day we do support overall the Waxman-Markey approach. And I do think it is a precedent that could be used in the context of discussing a three-pollutant bill and how to handle the allocation allowances.

Senator CARPER. OK. Thank you.

I think I am going to wrap it up here. Does anybody have something really burning that you feel like you need to get out on the floor? One last comment? I would yield to you.

Mr. LABAUVE. Senator, I would just like to say from the perspective of FPL Group we have been working with you for years on the three-pollutant bill issue. We appreciate your leadership on this. We are excited about the opportunity to work with you in the future as we move forward to try to give EPA the clear certainty that they need to move forward with their rule.

Senator CARPER. Thank you. And I appreciate very much your participation, and really what you said there at the end is that we have had this battle on input versus output, and whether to have auctions or not to have auctions. At the end of the day, I think we are going to get something done, and it is because of really the participation of everybody at this table and a lot of other folks as well, and the willingness to work hard, to use good science, but to also use good common sense, and to enable us to do some good things hopefully at a reasonable price for the folks who live in this country and on this planet.

It has been a very good hearing, and I appreciate your willingness to stay as long as you have, and we look forward to continuing to work with you going forward.

The hearing record I think will be left open for how long? Three years. No, just kidding.

[Laughter.]

Senator CARPER. A while. A while, not too long. And if you do receive any other follow up questions from my colleagues, I would just ask that you respond to those promptly.

And again, we appreciate very much your being with us today. Thank you all so much.

And with that, this hearing is adjourned.

[Whereupon, at 12:30 p.m. the subcommittee was adjourned.]

[An additional statement submitted for the record follows:]

STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA

I want to thank Subcommittee Chairman Carper and Ranking Member Vitter for calling this timely hearing to discuss the aftermath of the D.C. Circuit's decision to overturn EPA's Clean Air Interstate Rule and Clean Air Mercury rule. I welcome this opportunity to discuss the impacts of these cases and the tools needed to achieve greater reductions in criteria pollutants.

Of course, I welcomed the opportunity 4 years ago when this committee debated, and ultimately failed to pass, the Clear Skies bill, which would have locked in a

70 percent reduction in emissions of mercury, nitrogen oxides, and sulfur dioxide for the next two decades. Instead, the last Administration was forced to get those reductions through regulation. I argued then that the regulatory path was uncertain and prone to litigation. Here's what I actually said, and what I predicted, 4 years ago:

"CAIR is significantly more vulnerable to court challenges than Clear Skies would have been and will undoubtedly be held up, not unlike the Clinton administration's 1997 air quality standards. This latest round of litigation demonstrates the need for a strong national Clear Skies law more than ever."

So here we are in 2009, without the substantial health benefits of Clear Skies and with no CAIR and CAMR rules because of litigation. We are left with an EPA that some believe lacks legal authority to permit region-wide emissions trading. We are left with uncertainty for States developing State Implementation Plans, or SIPs, that relied on CAIR to comply with national ambient air quality standards. We are left with uncertainty on, among other things, mercury reductions, conformity, new source review, and its effects on reductions for the Regional Haze Rule, which may impact my State of Oklahoma. In the final analysis, all we have are court decisions, which lawyers can certainly argue about for a substantial fee—but they don't clean the air.

Let's put it bluntly: we have a colossal mess on our hands, created in large part by litigation. Ironically enough, the outcome of the CAIR litigation was something no one wanted—not environmentalists, not the States, and not industry. Now we face an uncertain regulatory future, and more important, we could lose the health and environmental benefits that CAIR would have achieved. I would note that EPA estimates such benefits to be 25 times greater than their costs.

For all involved, it's quite clear that the status quo is unacceptable. So what can we do to change it? Obviously, I would prefer a comprehensive legislative solution, such as that proposed in the Clear Skies bill, but that's not politically feasible now or in the near future. So I believe in the short run, it's imperative that we provide EPA with authority to implement CAIR, or at least something very much like CAIR.

Why is such a course imperative? As you will hear today from several witnesses, without additional legislative authority, it's unclear whether, under section 110 of the Clean Air Act, EPA can implement a comprehensive, region-wide trading program. I would note that the alternatives to trading under the Clean Air Act are unpalatable.

So to make things crystal clear, I intend to join my colleague Senator Voinovich, who has taken the lead in drafting legislation that would provide EPA with narrowly tailored authority to implement CAIR, or its replacement. This legislation will help remedy significant price erosion in the SO_2 and NO_x markets, and provide incentives for plants to install pollution control equipment. Many companies have delayed such projects because of uncertainty over the future value of SO_2 and NO_x allowances.

A comprehensive legislative plan is needed, but that will take time. So in the meantime, let's lock in market certainty and clean air benefits for the next decade. As was true 4 years ago, Congress needs to act, or else uncertainty, confusion, and litigation will rule the day.

[Additional material submitted for the record follows:]

July 9, 2009

The Honorable Tom Carper
Chairman
Subcommittee on Clean Air & Nuclear Safety
United States Senate
Washington, DC 20510

Dear Senator Carper,

Entergy welcomes the re-introduction of the Clean Air Planning Act in the 111th Congress. We are long-time advocates for action on the very important environmental issues surrounding clean air and climate change. In light of our firsthand experience with hurricanes, storm surges, and disappearing coastline in our service territory, we understand that reducing GHG emissions is a critical step toward mitigating the impacts of climate change on our population and natural resources.

A legislative "3Ps" approach that clearly authorizes EPA to oversee a market-based program for NOx and SO2 and that provides certainty on required levels of mercury controls will create the pragmatic blend of market-based flexibility, price signals, and regulatory certainty needed to encourage and allow the industry to reduce emissions at the lowest cost possible and in the most efficient manner possible.

Currently, it is difficult to forecast the compliance cost of these reductions because of the confusion inherent in overlapping and often inconsistent rulemakings and judicial interpretations, all within the context of often ambiguous Clean Air Act language. To the extent that reductions in these pollutants are necessary for the protection of health, welfare, and the environment, we see legislation such as the Clean Air Planning Act as the best mechanism to protect consumers from higher rates that would be caused by less efficient means of air pollution control regulation. .

We applaud your bipartisan leadership on this issue. As the EPA moves ahead with CAIR and CAMR replacement rules, we look forward to working with you to ensure that clear and integrated federal regulation emerges – regulation that will achieve meaningful reductions, offer certainty to the industry, and insulate ratepayers from rate increases caused by inefficient regulation.

Best regards,

J. Wayne Leonard
Chairman & CEO