

**Testimony of Susan F. Tierney, Ph.D.**  
**Before the U.S. House of Representatives**  
**Committee on Energy and Commerce, Subcommittee on Energy and Power**

**Hearing on the Impacts of EPA Regulations on Electric System Reliability**  
**September 14, 2011**  
**Summary of Testimony**

Good morning, Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee. My testimony focuses on the impacts of the Environmental Protection Agency's recent air regulations, since these are the regulations that most affect power plants in the near term. These are important regulations from a public health point of view, but can the nation get both the benefits of improved air quality while also keeping the lights on? Will jobs and other economic activity flow from the timely issuance of these regulations? I strongly believe that the answer to these questions is yes, and that the rules should proceed to implementation.

My opinion is grounded in several facts and reasonably certain conditions in energy markets:

1. The U.S. electric industry has a proven track record of doing what it takes to provide reliable power supplies.
2. EPA's Cross-State Air Pollution Rule and Utility Air Toxics come after more than a decade of notice, and allow for more technology options and approaches than expected.
3. The owners of a substantial portion of affected plants have already taken steps to modernize their facilities so that these companies will be ready for the new EPA air regulations.
4. Current fuel market conditions are already putting economic pressure on the older, least-efficient coal plants, which are now operating infrequently and can be replaced with much more efficient power plants. The nation's abundant natural gas supply will help support the modernization of the nation's electric system. .
5. The more reasonable estimates of coal plant retirements are the more recent ones, since they are better informed of EPA's proposals. These indicate that the impacts are manageable.
6. There are various tools already in place to assure that reliability will not be adversely affected. The tools include normal electric system planning, reliability assessments and requirements, diverse market and utility responses, and fundamental safeguards in existing federal laws. This rich set of tools and resources will help lead to economical electricity supplies.
7. Recent market developments provide practical evidence that the impacts of the EPA clean air regulations are manageable.
8. The industry's response to the EPA regulations and market conditions – in the form of investments in environmental control technologies, new power plants, and other responses – will stimulate much-needed economic activity and modernization of the electric system.

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Susan F. Tierney, Ph.D.  
Managing Principal, Analysis Group, Boston  
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**Hearing:  
Impacts of EPA Regulations on Electric System Reliability**

**September 14, 2011**

Good morning, Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee.

My name is Susan Tierney, and I am a Managing Principal at Analysis Group, Inc., a 500-person economic consulting firm headquartered in Boston, Massachusetts.<sup>1</sup>

I appreciate the opportunity to testify on whether the U. S. Environmental Protection Agency's new and proposed regulations will have adverse reliability impacts on the power sector and electricity users in the United States. I do not think that they will.

Under various existing federal environmental laws, the EPA has made proposals and/or issued final rules to regulate various air emissions, discharges into waterways, and other environmental issues associated with electricity production. The EPA's proposals to replace prior rules (as required by federal courts) do not put the nation in a position of having to choose between public health and keeping the lights on. Both of these important critical national

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<sup>1</sup> As indicated on my "Truth in Testimony" form, I am testifying on my own behalf, and neither on behalf of a governmental entity nor a non-governmental entity (other than myself). I have not received a federal grant (or subgrant) or contract (or subcontract) during the current fiscal year or either of the two preceding fiscal years.

objectives can be achieved as EPA moves to implement the Clean Air Act and as the industry responds creatively, responsibly, and cost-effectively so that Americans can get the benefit of clean air and reliable electricity.

This is do-able. My opinion is based on my nearly three decades of public and private-sector experience<sup>2</sup> in electric system economics and regulation and on issues at the intersection of electric system planning, system operations, economic and environmental regulation and performance, and system reliability. My opinion also stems from my analyses<sup>3</sup> of various

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<sup>2</sup> As indicated in my attached CV, I have been involved in issues related to public utilities, ratemaking and regulation, and energy and environmental economics and policy for over 25 years. During this period, I have worked on electric and gas industry issues as a utility regulator and energy/environmental policy maker, consultant, academic, and expert witness. I have been a consultant and advisor to private energy companies, grid operators, government agencies, large and small energy consumers, environmental organizations, foundations, Indian tribes, and other organizations on a variety of economic and policy issues in the energy sector. Before becoming a consultant, I held several senior governmental policy positions in state and federal government, having been appointed by elected executives from both political parties. I served as the Assistant Secretary for Policy at the U.S. Department of Energy from early 1993 through summer 1995, having been nominated by President Bill Clinton and confirmed by the U.S. Senate. I held senior positions in the Massachusetts state government as Secretary of Environmental Affairs (1991-1993); Commissioner of the Department of Public Utilities (1988-1991); Executive Director of the Energy Facilities Siting Council (during the mid-1980s); and Senior Economist for the Executive Office of Energy Resources (during the early 1980s). My Ph.D. in regional planning is from Cornell University. I previously taught at the University of California at Irvine, and recently at the Massachusetts Institute of Technology. I currently sit on several corporate and non-profit boards and commissions, including as a director of EnerNOC, Inc.; chair of the Advisory Council of the National Renewable Energy Laboratory and the Energy Foundation's Board of Directors; a director of the Clean Air Task Force, the World Resources Institute, Clean Air – Cool Planet, and the Alliance to Save Energy; and a member of the Bipartisan Policy Center's energy project, and of the NYISO's Environmental Advisory Council. I serve on the Secretary of Energy's Advisory Board, where I am a member of its Shale Gas Production Subcommittee; and I chair of the Policy Subgroup of the National Petroleum Council's study of the North American natural gas and oil resource base (which is being released on September 15, 2011). Previously, I served as co-chair of the National Commission on Energy Policy; a member of the Advisory Council of the Independent System Operator – New England; a representative to committees of the North American Electric Reliability Council; a member of the National Academy of Sciences' Committee on Enhancing the Robustness and Resilience of Electrical Transmission and Distribution in the United States to Terrorist Attack; and a member of the U.S. Secretary of Energy's Electric Reliability Task Force.

<sup>3</sup> I have published several analyses on this topic in the last year, some of which are co-authored: M. J. Bradley & Associates, LLC and Analysis Group, *Ensuring a Clean, Modern Electric Generating Fleet while Maintaining Electric System Reliability: Summer Update 2011 Update*, June 2011 (hereafter referred to as "MBA/Analysis Group Summer Reliability 2011 Update")(available at [http://www.analysisgroup.com/uploadedFiles/News\\_and\\_Events/News/MJBA\\_Reliability\\_Report\\_Update\\_Summer2011.pdf](http://www.analysisgroup.com/uploadedFiles/News_and_Events/News/MJBA_Reliability_Report_Update_Summer2011.pdf)); Susan Tierney and Charles Cichetti, "The Results in Context: A Peer Review of EEI's 'Potential Impacts of Environmental Regulation on the U.S. Generation Fleet,'" May 2011 (available at <http://www.analysisgroup.com/article.aspx?id=12468>); Susan F. Tierney, "Electric Reliability under New

studies of electric reliability that have been carried out in the past year, combined with my knowledge of competitive power markets, fuel markets (including natural gas), the processes for permitting and development new energy facilities, and the diversity of ways that the electric industry provides reliable electricity to consumers.

I focus my comments principally on the impacts of two air regulations: EPA's Cross-State Air Pollution Rule ("CSAPR") (previously called the Clean Air Transport Rule ("CATR")), which affects emissions of sulfur dioxide ("SO<sub>2</sub>") and nitrogen oxides ("NO<sub>x</sub>") from fossil-fuel power plants in the Eastern half of the U.S.; and the proposed "Mercury and Air Toxics Rule" ("Utility Toxics Rule"), which affects emissions of hazardous air pollutants emitted from most coal- and oil-fired power plants throughout the country. Together, these regulations would replace two rules (the Clean Air Interstate Rule ("CAIR") and the Clean Air Mercury Rule ("CAMR")) previously proposed by the Bush Administration and sent back to EPA by federal courts in order for EPA to revise the regulations to comply with the Clean Air Act. I focus on these two final/proposed air regulations because they will affect existing power plants within the next few years, and EPA's proposed water regulations under "316(b)" of the Clean Water Act would allow for a much-longer compliance time frame and a relatively flexible framework for

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EPA Power Plant Regulations: A Field Guide," January 18, 2011 (available at <http://www.wri.org/stories/2011/01/electric-reliability-under-new-epa-power-plant-regulations-field-guide>); and M. J. Bradley & Associates, LLC and Analysis Group., *Ensuring a Clean, Modern Electric Generating Fleet while Maintaining Electric System Reliability*, 2010 (hereinafter referred to as "MJBA/Analysis Group 2010 Reliability Analysis") (available at [http://www.analysisgroup.com/uploadedFiles/News\\_and\\_Events/News/MJBA\\_Reliability\\_Report\\_Update\\_Summer2011.pdf](http://www.analysisgroup.com/uploadedFiles/News_and_Events/News/MJBA_Reliability_Report_Update_Summer2011.pdf)). Additionally over the past year, I have been invited to speak on this topic at conferences sponsored by the National Association of Regulatory Utility Commissioners, the Bipartisan Policy Center, the Massachusetts Institute of Technology, the National Association of Clean Air Agencies, and other organizations.

determining on a case-by-case basis whether thermal power plants will need to install new cooling systems.

The CSAPR and the proposed Utility Toxics Rule are important from a public health point of view. But are they achievable? Can the industry respond effectively on time so that Americans don't have to choose between achievement of the health benefits the Clean Air Act envision and the electric system reliability that underpins the functioning of the U.S. economy? Will jobs and other economic activity flow from the nation's responses to these regulations? I strongly believe that the answer to all of these questions is yes, and that the regulations should proceed to implementation.

Several facts and reasonably certain conditions in energy markets support this conclusion, as I describe in my testimony below:

1. The U.S. electric industry has a proven track record of doing what it takes to provide reliable power supplies to consumers.
2. EPA's CSAPR and Air Toxics come after more than a decade of notice, and allow for more technology options and approaches than previously expected.
3. The owners of a substantial portion of affected plants have already taken steps to modernize their facilities so that these companies will be ready for the new EPA regulations.
4. Current fuel market conditions are already putting economic pressure on the older, least-efficient coal plants, which are now operating infrequently and can be replaced with much

more efficient power plants. The nation's abundant domestic natural gas supply and efficiency resources will help support the modernization of the electric system.

5. The more reasonable estimates of coal plant retirements are the more recent ones, since they are better informed of EPA's actual proposals. These more-recent estimates of coal plant retirements and market responses indicate strongly that the impacts are manageable.
6. There are various tools in place in the industry to assure that reliability will not be adversely affected. The tools include normal electric industry planning, reliability assessments and requirements, diverse market and utility responses, and fundamental safeguards in existing federal authorities. This rich set of tools and resources will help lead to economical electricity supplies.
7. Recent market developments provide practical evidence that the impacts of the EPA clean air regulations are manageable.
8. The industry's response to the EPA regulations and market conditions – in the form of investments in environmental control technologies, new power plants, and other responses – will stimulate much-needed economic activity and modernization of the electric system.

### **THE INDUSTRY HAS A PROVEN TRACK RECORD ON RELIABILITY ISSUES**

The starting point is that the U.S. electric industry has a proven track record of doing what it takes to provide the reliable power supplies. Regulated electric utilities, competitive electric companies, grid operators, and regulators have a strong mission orientation, which combines with regulatory requirements to ensure that reliable electricity supply is a priority.

For many decades, the U.S. electric industry has developed institutions, operating and planning requirements, system plans, operating approaches, emergency response protocols, and billions of dollars of investment to assure reliable electricity supply. The industry is keenly aware that the American economy and standard of living depend upon reliable power supplies. With some notable exceptions, utilities and other electric companies, and their workers, investors, and suppliers, have provided what Americans take for granted and what public officials insist upon: that electricity be reliably available around the clock, with increasing levels of performance to assure worker and community safety and public health.

It is normal practice in the electric industry to look ahead several years to ensure that there will be sufficient supplies available to meet anticipated customer demand under a wide range of contingencies. It can take several years to put in place the new generating equipment, transmission facilities, and other resources needed to ensure adequate supply. Forward-looking assessments by a wide variety of public and private entities provide information about future needs to decision makers in utilities, power generation companies, providers of energy efficiency services, equipment manufacturers, investment organizations, fuel suppliers, public agencies, and others. The norm is decision-making under conditions of uncertainty, given that capital commitments are made years in advance of need, and with only estimates of future fuel prices, demand levels, public policies, and other important factors.

The electric industry has responded well in prior periods (such as the mid-1990s) when Clean Air Act requirements led to investments in new pollution-control equipment and new additions to generating capacity. There were no reliability problems arising from those actions, in spite of

concerns raised that there would be equipment shortages and difficulties adding control equipment on so many power plants in a constrained period of time.

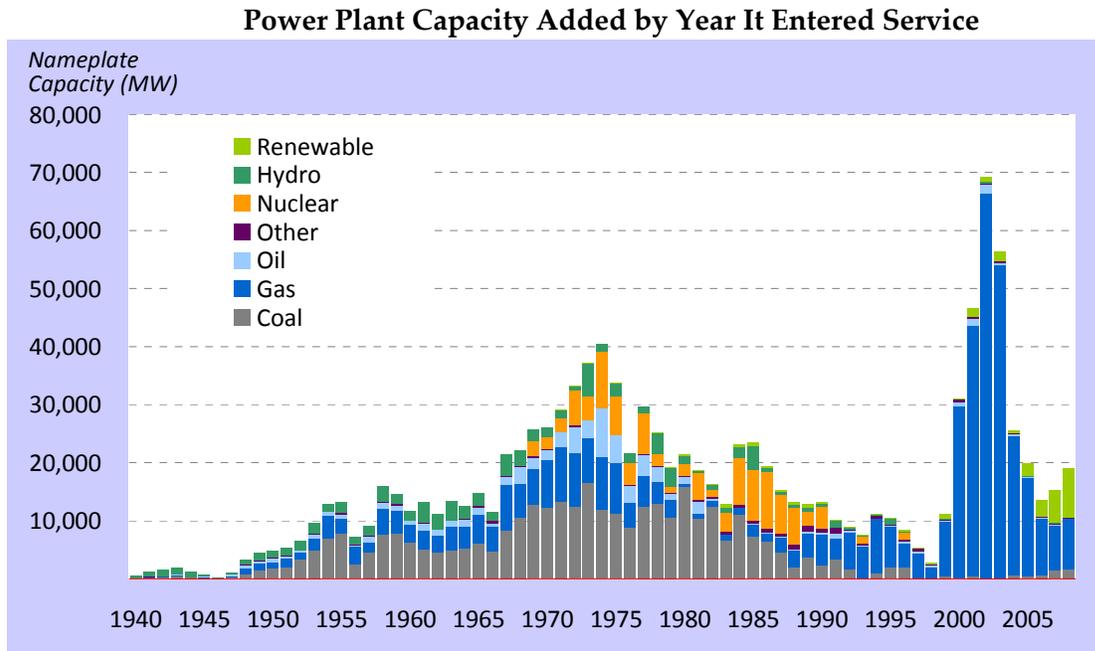
Developers of power plant have been able to attract sufficient investment and receive approvals to build far more generating capacity than is anticipated to be needed in the next decade:

Between 1999 and 2008, for example, in response to a variety of market, regulatory and economic signals, the electric sector added almost 270 gigawatts (“GW”) of natural gas-fired generating capacity, the equivalent of more than 80 percent of the entire existing U.S. coal fleet.<sup>4</sup> Indeed, in just three years between 2001 and 2003, the electric industry built over 160 GW of new generation,<sup>5</sup> many times the amount that analysts project will retire over the next five years (as I describe further below). Much of this capacity remains underutilized today – a fact that can also assist in managing power plant outages required to install pollution-control systems.

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<sup>4</sup> EIA, *Annual Electric Generator Report: Form EIA-860*, 2008. Currently, there are more than 17,000 electric generation units in the U.S. with over 1,030 GW of capacity. Using other EIA data, coal-fired generation produced 45 percent of the nation’s electricity in 2010, followed by natural gas (24 percent) and nuclear (20 percent), with the remaining amount produced through a combination of hydroelectric power, oil, wind and other miscellaneous fuel types.

<sup>5</sup> *Analysis from: MJBA/Analysis Group 2010 Reliability Analysis*, page 9.



Source: Figure 3 from MJBA/Analysis Group 2010 Reliability Analysis, page 9, with figure sourced from *Ceres, et al., Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States, June 2010.*

**EPA’S NEW CLEAN AIR RULES HAVE BEEN ANTICIPATED FOR A LONG TIME, AND EPA HAS PROPOSED RELATIVELY FLEXIBLE COMPLIANCE OPTIONS**

By 2011, EPA’s CSAPR and Utility Toxics Rule cannot reasonably be viewed as unexpected or a surprise. These regulations have been in the works for several years, with prior incarnations of these regulations (in the form of CAIR/CATR and CAMR) having been known to the industry for many years. And there are many reasons why these regulations will introduce less incremental change than has sometimes been reported:

- The proposed CSAPR would replace EPA’s 2005 CAIR, which was initially proposed in December of 2003.<sup>6</sup> In December 2008, the U.S. Court of Appeals for the D.C. Circuit ruled that EPA reconsider its CAIR proposal, but had the rule remain in place until EPA

<sup>6</sup> <http://www.epa.gov/cair/rule.html>

issued a replacement (which EPA believed, at the time, would take two years to do) to address the Clean Air Act's provisions relating to the transport of air pollutant across state boundaries.<sup>7</sup> EPA issued its newly proposed CATR in July 2010, and finalized the CSAPR in July, 2011.

- Similarly, EPA began its regulatory process relating to mercury emissions in 2003, with the CAMR proposal finalized in March 2005.<sup>8</sup> The Court of Appeals also vacated the CAMR rule in December 2008, and sent it back to the EPA for replacement. EPA issued in newly proposed Utility Toxics rule in March 2011, and is expected to finalize the regulation in November of 2011.
- Several elements of the new proposals allow for flexibility in affected companies' responses. For example:
  - The CSAPR allows intrastate and limited interstate trading of emission allowances for SO<sub>2</sub> and NO<sub>x</sub>, consistent with the Clean Air Act:
  - The Utility Toxics rule allows companies with multiple boilers and generating units at a single station to comply by averaging emissions across the units.
  - EPA has proposed a "work practice standard" (with annual performance testing of units using "good combustion practices") to control emissions of dioxins and

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<sup>7</sup> <http://www.epa.gov/cair/>. Also, EPA, "Factsheet: Proposed Transport Rule Would Reduce Interstate Transport of Ozone and Fine Particle Pollution" (available at <http://www.epa.gov/airtransport/pdfs/FactsheetTR7-6-10.pdf>).

<sup>8</sup> <http://www.epa.gov/oar/mercuryrule/rule.html>

furans, rather than setting a numeric emissions limit. Together, these various provisions allow for flexibility in meeting the new regulations.

The bottom line is that these new clean-air requirements have been anticipated for a long time. EPA has proposed relatively flexible compliance options to ensure satisfactory compliance by affected companies, the majority of which have already taken steps to reduce their emissions of regulated air pollutants.

### **MANY PLANTS ARE ALREADY – OR SOON WILL BE – EQUIPPED WITH NEEDED CONTROLS**

Many factors besides the current issuance of these clean air regulations have caused owners of many affected plants to take steps to modernize their facilities to reduce their air emissions: many states have already adopted regulations ahead of the federal standards; many of the pollution-control technologies have been tested and are in commercial application; some companies (such as AEP) with facilities affected by the CSAPR and Air Toxics rules, are already under court orders to achieve these outcomes; and many companies have already taken steps to install control appropriate equipments.

EPA's proposed standards for the Utility Toxics rule – which were based on an extensive data collection effort from companies owning coal plants – are do-able.

- Several states – including Illinois, Massachusetts, New Jersey, Connecticut, Delaware, and New York – already impose more stringent mercury-emissions limits on coal-fired power plants than have been proposed by EPA.

- Many of the technologies that are available to satisfy EPA requirements are already in commercially application, with the industry having extensive experience with the installation and operation of these control systems.
- The power plants meeting the proposed standard have a wide variety of pollution-control systems and configurations that are reducing their mercury emissions. Nearly 60 percent of these plants are currently achieving the proposed mercury-emissions standard; nearly 70 percent currently achieve the proposed emissions standard for particulate matter (“PM”) emissions; and 73 percent are currently achieving the proposed hydrogen chloride (“HCl”) emissions standard.<sup>9</sup>

Many of the companies that own a substantial amount of the nation’s coal-fired generating units have recently reported that they are well positioned to comply with the upcoming EPA regulations. Recent corporate earnings statements by chief executive officers of electric generating companies highlight several important themes : (1) companies have long anticipated these rules; (2) early investments have positioned these companies well for compliance; and (3) the impact on electricity rates can be managed. The excerpts below are from the recent analysis

I co-authored with MJ Bradley Associates for the Clean Energy Group in June 2011:

- Benjamin G.S. Fowke, III, President and Chief Operating Officer of Xcel Energy, said:  
“Like many of our peers, we are in the process of evaluating what if any impact [EPA’s

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<sup>9</sup> This translates to more than 100 units (out of a total of 178) for mercury; more than 119 units (out of a total of 172) for PM emissions; and 158 units (out of a total of 217) for HCl emissions. Note that rather than requiring companies to comply with standards for each individual hazardous air pollutant emitted from coal-fired generating units, however, EPA has proposed the use of “surrogates,” simplifying the monitoring and compliance requirements of the rule. For example, PM has been proposed as a surrogate for all non-mercury metal HAPs, including arsenic, cadmium, chromium, and lead. HCl is being used as a surrogate for all acid gas HAPs. No surrogate was used for mercury. MJBA/Analysis Summer 2011 Reliability Update.

Utility Toxics Rule] may have on our operations. Based on our preliminary review we do not anticipate that the rule will require extensive changes to our plans at [Northern States Power] and [Public Service Company of Colorado]...Our proactive steps to reduce emissions through the MERP project in Minnesota and our plans for the Clean Air-Clean Jobs Act in Colorado put us in good position to comply with these rules." April 28, 2011, Xcel Energy Inc. 1st Quarter 2011 Earnings Call.

- Jim Rogers, President and CEO of Duke Energy, said: "[T]he anticipation of more stringent environmental rules has long been part of our business plan. Over the past 10 years, we have spent \$5 billion retrofitting existing units with updated emissions controls...Today, approximately 75% of our current coal generation capacity has scrubbers in operation. This will increase to approximately 90%, once our fleet modernization program and related retirements are completed... We have really mitigated a lot of the risk and the cost associated with this program by the early steps that we took." May 3, 2011, Duke Energy 1st Quarter 2011 Earnings Call
- According to Gale Klappa, Chairman, President and CEO of Wisconsin Energy: "We really see very little impact on customer electric rates or our capital plan between now and 2015 as a result of all the new EPA regulations that have been proposed...We might see 1% to 2% increase our best guess. So that gives you an example of how well we are positioned from the environmental standpoint in terms of complying with even the new proposed rule." May 3, 2011, Wisconsin Energy Corporation 1st Quarter 2011 Earnings Call
- Theodore Craver, chairman, president and CEO of Edison International said: "We installed the necessary equipment back in 2009 and are already achieving these [mercury] limits. U.S. EPA's rule contained other draft provisions covering acid gases and non-mercury metals, which we can meet by installing the pollution control equipment we have been planning to use at Midwest Gen to meet our SO<sub>2</sub> emissions commitments to the Illinois EPA." May 2, 2011, Edison International 1st Quarter 2011 Earnings Call
- William Spence, Chief Operating Officer, Executive Vice President and President of PPL Generation, said: "Our proactive approach to environmental compliance positions the PPL fleet favorably for future EPA regulation. Ninety-six percent of the competitive coal generation is scrubbed, 88 percent has NO<sub>x</sub> controls already installed." February 4, 2011, PPL 4th Quarter 2010 Earnings Call

- Mauricio Gutierrez, Executive Vice President and Chief Operating Officer of NRG reports that: “The proposed [Utility Toxics Rule] provides flexibility in that compliance can be achieved through facility averaging and company selected control technology. It also recognizes the inherent differences in mercury emissions from lignite coal...[t]he key takeaway is that we do not expect at this time any additional environmental CapEx beyond what we have previously announced.” May 5, 2011, NRG Energy 1st Quarter 2011 Earnings Call
- The Tennessee Valley Authority (“TVA”), which owns 17,000 MW of coal-fired generating capacity, announced plans in April 2011 to retire 18 older coal-fired generation units at three power plants (2,700 MW) as part of the utility’s vision of being one of the nation’s leading providers of low-cost and cleaner energy by 2020. The utility will replace “older and less-economical generation with cleaner sources.” Tom Kilgore, TVA’s President and CEO, said that a “variety of electricity sources, rather than heavy reliance on any single source, reduces long-term risks and helps keep costs steady and predictable....In the longer term, these actions reinforce our vision to keep bills low, keep our service reliability high and further improve air quality as we modernize the TVA power system.” TVA Press Release, April 14, 2011.

At least one more company with a substantial amount of coal-fired generating capacity affected by these air rules is already under court orders to achieve similar outcomes as the new regulations:

- American Electric Power signed a consent decree with EPA and other parties in 2007 in which AEP agreed to retire, retrofit, or re-power most of the units that AEP has recently announced it plans to retire.<sup>10</sup> This reinforces the view that many environmental improvements (and potential plant retirements) have been in the works for some time. In response to questions from an investment analyst, AEP’s chief executive officer

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<sup>10</sup> Consent Decree entered in the U.S. District Court for the Southern District of Ohio, Eastern Division, with respect to U.S.A and State of New York, et. al. v. American Electric Power et al. (Civil Action No C2-99-1250 (Consolidated with C2-99-1182)), U.S.A. v. American Electric Power (Civil Action No C2-05-360), and Ohio Citizen Action, et. al. v. American Electric Power, et. al. (Civil Action No. C2-04-1098), 2007. The 2007 Consent Decree required AEP to retire, retrofit or re-power, by no later than 12/31/2015, 3,900 MWs of the units covered under the decree; of those units, AEP has chosen to retire 3,055 MW and re-power 845 MW. In the 2007 Consent Decree, AEP agreed to retire, retrofit or re-power 4,500 MWs of its generating capacity. The 2007 Consent Decree covered all units AEP has now proposed for retirement, with the exception of the Welsh unit, whose retirement appears to be related to permitting commitments associated with other generating units in Texas.

recently suggested that the retirements were reasonable: “Throughout I think almost all of 2009 those plants probably didn’t run 5% of the time because natural gas prices were such that they simply weren’t dispatching. When we shut those down there will be some cost savings as well. And on balance we think that that’s the appropriate way to go not only to treat our customers but also to treat our shareholders near and long term with that small amount of the fleet going offline.”<sup>11</sup>

## **ECONOMIC CONDITIONS IN FOSSIL FUEL MARKETS FAVOR NATURAL GAS RELATIVE TO MANY EXISTING COAL-FIRED POWER PLANTS**

New, lower natural gas prices are already putting economic pressure on coal facilities even in the absence of EPA regulations. There are many existing and under-utilized gas-fired power plants in the regions that will be affected by the clean air rules. Even taking into account the effects of the post-2008 economic downturn on power plant output, lower gas natural gas prices and higher coal prices to utilities and independent power producers (as shown in the figure below) have meant that gas-fired power plants increased their output from 20 percent of all

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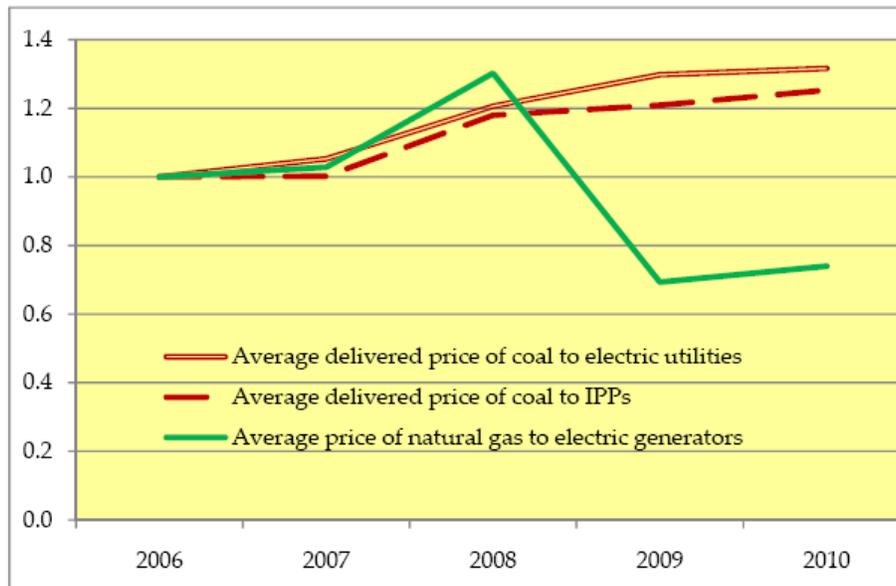
<sup>11</sup> Transcript of Sanford C. Bernstein & Co. Strategic Decisions Conference, June 1, 2011 (available at <http://ofchq.snl.com/Cache/A43E47486F11287831.pdf>):

Question (by Hugh N. Wynne, Senior Analyst, Sanford Bernstein): “So those [CATR and Mercury and Air Toxics] rules come into effect in 2014 and 2015. AEP disclosed that as a result of those rules there’s about 5.5 gigawatts of coal-fired generation capacity that would be vulnerable to closure due to the high cost of compliance. We estimate the output of those plants at about 12 million megawatt hours annually. The generation gross margin associated with AEP’s off-system sales would seem to imply that that generation is worth about \$150 million or maybe \$0.20 a share to AEP. Similarly if you were to lose the capacity revenues owned by Ohio Power on the sale of capacity from those plants it seems to me that about \$180 million of annual revenue should be at risk or about \$0.25 per share. Does AEP view the risk of the closure of these plants in similar terms? And if so what are your plans to mitigate these potential losses?”

Answer: (Michael G. Morris, Chairman & Chief Executive Officer) “Well this is probably one of those places where I saddle up with the team from FE. If in fact 80 gigawatts close, most of it in the central section of the United States, capacity prices and energy prices will more than adequately compensate us for the 5,500 megawatts going off the line. As you know those are high-cost plants and dispatch infrequently, I am not sure on your 12 million megawatt hours, we can surely supply you with data on that going forward. But, I think that going forward prices of capacity and energy would take care of that. Today – in fact, throughout I think almost all of 2009 those plants probably didn’t run 5% of the time because natural gas prices were such that they simply weren’t dispatching. When we shut those down there will be some cost savings as well. And on balance we think that that’s the appropriate way to go not only to treat our customers but also to treat our shareholders near and long term with that small amount of the fleet going offline.”

power production in the U.S. in 2007, to 24 percent in 2010, while coal-fired generation decreased from 50 percent in 2007 to 45 percent in 2010. Gas-fired generation increased in absolute terms, while coal-fired generation decreased in absolute levels over that period.

Change in Coal and Natural Gas Prices to Electric Generators  
Relative to 2006 prices

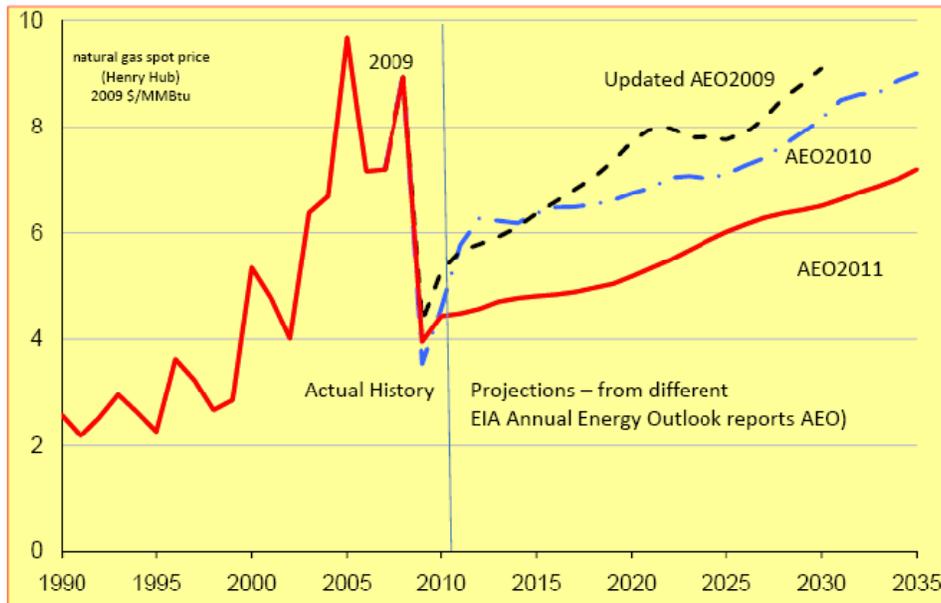


Source: Natural gas prices: EIA, [http://www.eia.gov/dnav/ng/ng\\_pri\\_sum\\_dcu\\_nus\\_a.htm](http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm);  
Coal prices: William Watson, Nicholas Paduano, Tejasvi Raghuvveer and Sundar Thapa, EIA, "U.S. Coal Supply and Demand: 2010 Year in Review," June 1, 2011 (available at <http://www.eia.gov/coal/review/pdf/feature10.pdf>)

The expectation and availability of relatively low natural gas prices in the future also help favor the replacement of much of the older, less efficient coal-fired power plants that lack emissions controls with new gas-fired generating capacity. The figure below shows the extent to which the availability of greater supplies of natural gas has lowered the Energy Information Administration's outlook for natural gas prices over the last three years (from the 2009 forecast to the 2011 forecast). If conditions were different, the gas-to-coal price differential might mean that it would be economical for the owners of many of the older coal plants to retrofit them with

pollution control equipment rather than retire them. Retirement of many of these old, inefficient coal units that lack environmental controls is simply good economic sense.

Natural Gas Prices: Actual (1990-2010) and Forecast (2010-2035)



R. Newall, EIA, The Long-term Outlook for Natural Gas, presentation to the Saudi Arabia – United States Energy Consultation, February 2, 2011

**MANY STUDIES HAVE CALLED ATTENTION TO ELECTRIC RELIABILITY ISSUES, WITH THE MORE REASONABLE STUDIES SUGGESTING THAT THE IMPACTS ARE MANAGEABLE.**

Many assessments have been published, calling attention to the potential power plant retirements and sending useful information to the markets about needed investment in new capacity in different parts of the country. These studies highlight ranges of impacts under quite-different sets of assumptions. The more reasonable estimates indicate strongly that the impacts are manageable, especially in light of responses already visible in the electric industry. The studies' results do not mean that there will be inadequate resources in the end: rather, they

serve as a sort of “call to action” in the marketplace, and several are explicit in saying that they have identified resource gaps in order to signal that action is needed.

My colleagues at MJ Bradley Associates and I performed a review of many such studies last year,<sup>12</sup> on behalf of the Clean Energy Group, and we updated it three months ago, in June of 2011.<sup>13</sup> Additionally, I have analyzed carefully many other reports written on this topic and prepared a “field guide” to their results.<sup>14</sup>

As shown in the table below, many if not most of the studies were performed prior to EPA’s issuance of both proposed clean air rules, so did not assume the amount of flexibility built into those proposals.<sup>15</sup> Most assumed a range of scenarios in which there were three basic types of analyses: (a) a base case (no EPA rules, and coal-plant retirements driven by unfavorable economics); (b) a series of “moderate” cases (in which a report’s author assumed relative flexibility in compliance options); and (c) “strict” cases (in which the reports’ analyses assumed strict, inflexible regulatory compliance). Few if any of the studies examined the extent to which new electric resource options not already formally announced would come forward, and in no case that I am aware of did a study assume that there would be a *robust* market response (including new power plants, implementation of new energy-efficiency and other demand-side

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<sup>12</sup> MJBA/Analysis Group 2010 Reliability Analysis.

<sup>13</sup> MBJA/Analysis Group Summer 2011 Reliability Update.

<sup>14</sup> See also S. Tierney and C. Cicchetti, “The Results in Context: A Peer Review of EEI’s “Potential Impacts of Environmental Regulation on the U.S. Generation Fleet,” May 2011; and S. Tierney, “Electric Reliability under New EPA Power Plant Regulations: A Field Guide,” January 18, 2011, <http://www.wri.org/stories/2011/01/electric-reliability-under-new-epa-power-plant-regulations-field-guide>.

<sup>15</sup> This point is made in a recent report published by the Congressional Research Service: “EPA’s Regulation of Coal-Fired Power: Is a “Train Wreck” Coming?” (authored by James E. McCarthy and Claudia Copeland), August 8, 2011. See page 40.

measures that may now become economical, or even transmission reconfigurations) in combination with the more moderate cases consistent with EPA regulations. Even the results I report below<sup>16</sup>, which select the more moderate cases, overstate these impacts for this reason.

Studies of Potential Retirements in Response to Upcoming EPA Air (and Other) Regulations		
Study:	Estimated Coal Retirements:	Notes and document title
PIRA (4/2010)	30-40 GW	PIRA, "North American Environmental Markets Service: EPA's Upcoming MACT: Strict Non-Hg Regs Can Have Far-Reaching Market Impacts."
ICF for INGAA (5/2010)	50 MW	Report prepared by ICF for Interstate Natural Gas Association of America, "Coal-Fired Electric Generation Unit Retirement Analysis."
ICF for EEI (5/2010)	25 GW	(Scenario 1 – CAIR and MACT) Report prepared by ICF for Edison Electric Institute, "Preliminary Reference Case and Scenario Results."
CS (7/2010)	50 GW	Credit Suisse, "A Thought...CATR is First Step in Changing the Coal Fleet."
Bernstein (10/2010)	65 GW	Hugh Wynne et al., Bernstein Research, "U.S. Utilities: Coal-Fired Generation Is Squeezed in the Vice of EPA Regulation; Who Wins and Who Loses?"
NERC (10/2010)	6 GW	Based on the "moderate" CATR and MACT cases. North American Electric Reliability Corporation, "2010 Special Reliability Scenario Assessment: Resource Adequacy Impacts of Potential U.S. Environmental Regulation."
	25 GW	Based on the "strict" CATR and MACT cases. Same document.
CRA (12/2010)	35 GW	Ira Shavel & Barclay Gibbs (Charles River Associates), "A Reliability Assessment of EPA's Proposed Transport Rule and Forthcoming Utility MACT."
ICF for EEI (1/2011)	24 GW	Scenario with CATR and MACT (flexibility) Report prepared by ICF for EEI, "Potential Impacts of Environmental Regulation on the U.S. Generation Fleet."
BPC (6/2011)	15-18 GW	BPC's estimate of incremental retirements by 2015, beyond the amount expected by economic conditions; taking into account 316(b) water impacts.
Note: Currently there are approximately 1,030 GW of generating capacity in the U.S., of which approximately 330 GW is coal-fired generation.		

<sup>16</sup> Note that my table does not include an internal "informal staff assessment" prepared by the staff of the Federal Energy Regulatory Commission during the Fall of 2010, and described in an August 1, 2011 letter to Senator Lisa Murkowski from FERC Chairman Jon Wellenhoff and Commissioners Cheryl LaFleur and John Norris.

In my opinion, these estimates likely overstate the impacts of EPA's proposed clean air regulations: for one thing, EPA's regulations are more flexible than had been anticipated by the less-recent studies. And the industry has a wider range of options for responding to capacity needs than was assumed in the studies above. Finally, low gas prices are a fundamental disadvantage for owners of older and inefficient and uncontrolled coal-fired generating capacity.

### **MANY TOOLS EXIST TO ASSURE RELIABILITY**

The industry has various tools to assure that reliability will not be adversely affected. Among others, these include:

- Well in advance of need for new electric capacity resources, there is considerable information available to decision makers to provide signals about new investment opportunities and needs:
  - Federal administrative procedures inherently provide significant advanced notice of pending changes in environmental requirements.
  - EPA has built into its proposals a reasonable level of flexibility from a technology point of view.
  - Various organizations in the electric industry routinely publish short-term and long-term assessments of resource adequacy, which call attention to situations where additional actions are needed to assure reliable electric supply. Some of these have identified regional markets where inefficient or uneconomic coal

plants may retire. They also indicate amounts of capacity needed from the market (i.e., utilities, competitive power companies and other resource suppliers (e.g., companies providing demand-side measures that reduce the amount of needed new generating capacity)).

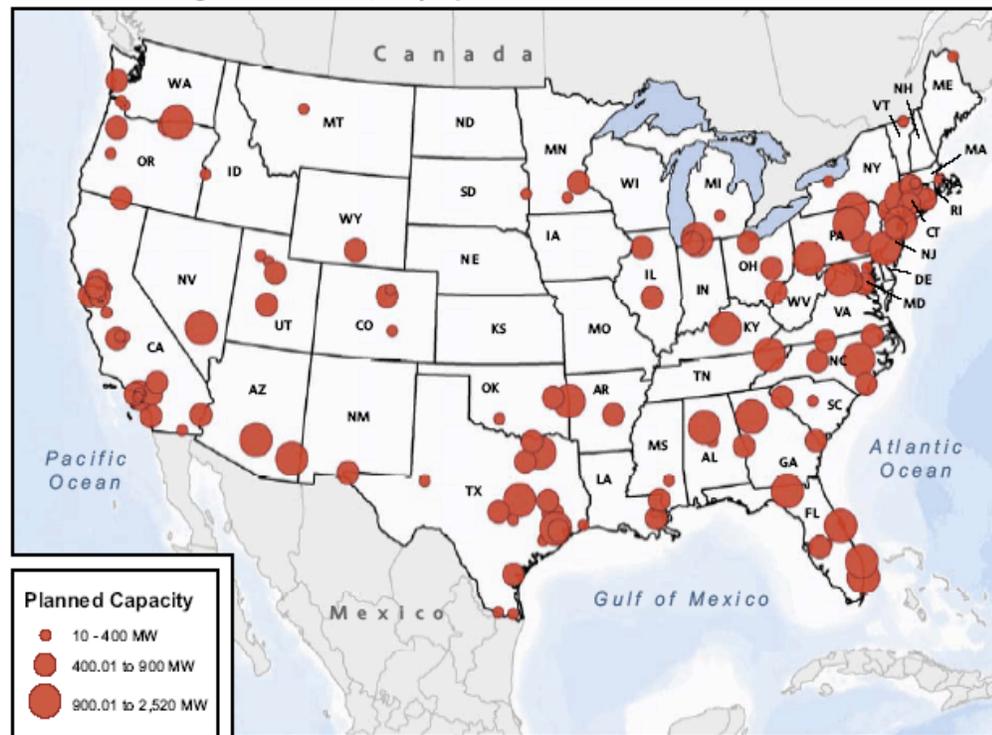
- There are long-term capacity planning processes in many of the nation's regional wholesale markets (such as in PJM, NYISO, and ISO-NE) and in virtually all of the areas where state regulators review the resource plans of traditionally regulated utility companies.
- The electric industry has proven experience in adding additional generating capacity, transmission solutions and demand-side measures when and where needed, and in coordinating effectively to address reliability concerns when and where they arise. As shown in the table below, already, 41.5 GW of new plant capacity is under construction in various regions of the country for an in-service date up through 2014 – the year when both the CSAPR and Utility Toxics Rules would be in effect. Another 26.7 GW of generating capacity is in advanced phases of permitting and in-service dates by 2014. (An additional 388 GW of new plant capacity has been announced but I have not included it here, in light of its less-advanced status.) While experience tells us that not all of this capacity will make it into commercial operation, there is a relatively high likelihood of plants already under construction moving forward to completion.

New Planned Generating Capacity Additions by Region (as of 9-2011)							
<p>Regional Reliability Councils</p>							
Reliability region	Generating Capacity (MW) Under Construction by Region						Total by end of 2014:
	2011	2012	2013	2014	2015+	Total	
TRE	453	1,003	-	-	302	1,758	1,456
FRCC	6	46	1,295	-	26	1,373	1,347
MRO	1,094	601	261	-	2	1,957	1,956
NPCC	2,057	1,788	647	640	1,404	6,536	5,132
RFC	2,646	1,892	198	139	47	4,922	4,874
SERC	2,165	6,457	3,615	681	61	12,979	12,918
SPP	580	645	7	-	-	1,232	1,232
WECC	1,613	5,449	4,379	1,109	517	13,066	12,550
<b>Total</b>	<b>10,614</b>	<b>17,881</b>	<b>10,401</b>	<b>2,569</b>	<b>2,358</b>	<b>43,823</b>	<b>41,465</b>
Reliability region	Generating Capacity (MW) in Advanced Development Phases but Not Under Construction						Total by end of 2014:
	2011	2012	2013	2014	2015+	Total	
TRE	1	2,030	-	1,000	3,635	6,666	3,031
FRCC	30	48	117	1,395	4,638	6,228	1,590
MRO	225	600	-	-	1,068	1,892	825
NPCC	203	917	1,324	1,187	1,416	5,046	3,631
RFC	101	1,036	859	15	5,250	7,262	2,011
SERC	-	939	29	1,452	10,698	13,117	2,419
SPP	8	777	-	-	763	1,547	784
WECC	944	1,901	4,244	5,341	14,146	26,576	12,430
<b>Total</b>	<b>1,512</b>	<b>8,246</b>	<b>6,572</b>	<b>10,390</b>	<b>41,614</b>	<b>68,334</b>	<b>26,720</b>
Source of data: SNL Financial							

- o Much of the new power plant capacity under construction or in advanced development is natural-gas combined cycle facilities, which are power plants

that are highly efficient and capable of providing power not only around the clock but also in ways that work well with other resources (like wind and solar power) that provide intermittent power. Such facilities take capital investment and less time to permit than new baseload coal or nuclear facilities. As of August 2011, approximately 11.6 GW of new gas-fired combined cycle were under construction with an expected commercial operation by the end of 2014, with another 6.4 GW in advanced permitting. The map below shows this capacity, including another 18.4 GW of announced projects.<sup>17</sup>

**Planned natural gas combined-cycle projects in the US**



As of Aug. 24, 2011  
Source: SNL Energy

<sup>17</sup> Source: SNL Energy, as of August 24, 2011. An additional 10.8 GW of gas-fired combined cycle projects that are in advanced permitting or announced by project developers, for an in-service date of 2015.

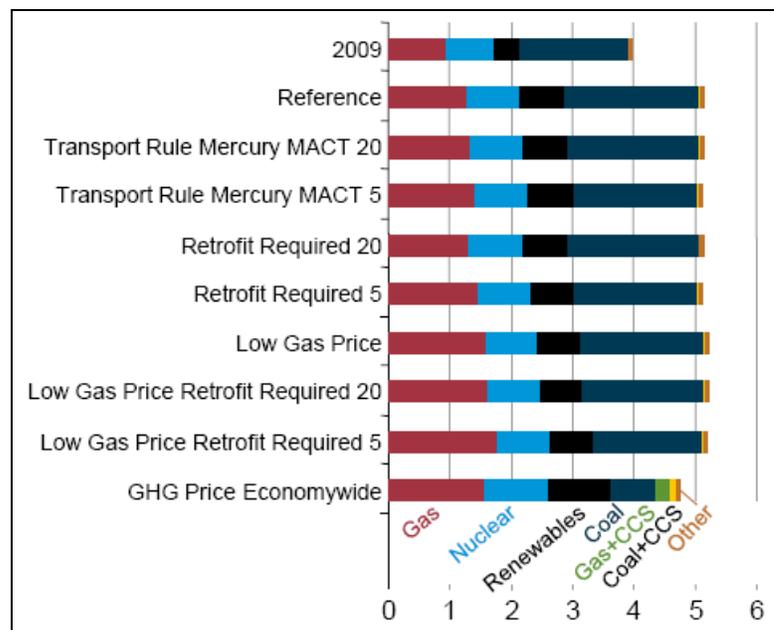
- The availability of abundant domestic natural gas supply is important for enabling the U.S. to rely on currently under-utilized capacity at existing gas-fired power plants (described previously) and on new combined-cycle plants to help meet reliable electricity supplies. The size of the technically recoverable resource base has grown dramatically over the past decade, with the application of new technologies that allow economical access to unconventional gas supply. These abundant resources will be characterized in the new study to be issued publicly by the National Petroleum Council tomorrow,<sup>18</sup> and have been previously reported by various organizations including the U.S. Geological Service and the EIA.
- The availability of natural gas, however, does not mean that coal is not expected to play a significant role in the nation's energy mix. As stated in a recent Congressional Research Service study of the impact of the EPA regulations on the power sector, "Virtually all the analyses agree that coal will continue to play a substantial role in powering electric generation for decades to come. EPA, for example, in the Utility MACT RIA, concluded that coal-fired generation will be roughly the same in 2015 as it was in 2008, despite the impact of the MACT and other rules.[footnote in the original] .... EEI [Edison Electric Institute] projected that coal will be responsible for 36% to 46% of electricity generation in 2020,

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<sup>18</sup> As I noted above, I have served as chair of the Policy Subgroup of the National Petroleum Council's fuel study over the past year. The study will be presented to the Secretary of Energy on September 15, 2011, and reflects the work of over 400 participants from industry, academia, states, environmental, and other organizations.

depending on the scenario.”<sup>19</sup> Additionally, in the most recent Annual Energy Outlook (2011, released in April 2011), the EIA examined the implications for coal-fired generation under varying assumptions about the degree of stringency in upcoming EPA regulations. EIA concluded that “[d]espite the decline in coal-fired capacity in all the analysis cases above, coal remains the largest single source of generation through 2035 in all but one of the cases” (with the latter case assuming an economy-wide cap on greenhouse gas emissions, which is not part of the EPA proposals and has not been adopted by Congress). These scenarios are depicted in the figure below, from EIA’s study:

Electricity generation by fuel in nine cases, 2009 and 2035 (trillion Kwh)



Source: EIA, Annual Energy Outlook 2011, page 51.

<sup>19</sup> Congressional Research Service, “EPA’s Regulation of Coal-Fired Power: Is a “Train Wreck” Coming?,” (authored by James E. McCarthy and Claudia Copeland), August 8, 2011. See page 40.

- Other tools are available to ensure reliability as time gets closer to compliance deadlines in the EPA regulations:
  - State and federal regulators, and grid operators:
    - State and federal regulations have a strong track record of taking steps necessary to ensure that the companies they supervise are meeting their obligation to provide reliable electric service.
    - As noted in a recent letter by leadership at the FERC,<sup>20</sup> there are active discussions underway by many federal agencies (EPA, FERC, the Department of Energy) with an interest in reliability issues and the EPA regulations.
    - State agencies with responsibility for energy, utility and environmental regulations are in discussions to learn about each others' authorities and potential actions that the various agencies in affected states may take to assure smooth industry responses in their states. The national associations of public officials in those states (the National Association of Regulatory Utility Commissioners, the National Association of State Energy Offices, and the National Association of Clean Air Agencies) are assisting the states in these efforts.

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<sup>20</sup> These discussions are described in three letters sent on August 1, 2011 letter to Senator Lisa Murkowski from members of the FERC: from Chairman Wellinghoff and Commissioners LaFleur and Norris; from Commissioner Philip Moeller; and from Commissioner Marc Spitzer.

- At its July 2011 summer meeting, NARUC adopted a second resolution on electric reliability and the EPA regulations, in which NARUC's Board supported a number of actions to assure reliable electricity supply without calling for a delay in implementation of the EPA rules.<sup>21</sup>
- Grid operators (e.g., Regional Transmission Organizations) and regional reliability councils in various regions are conducting studies to assess the timing of reliability issues, and to get ready for additional actions in later years. The grid operators will be able to coordinate scheduling of outages to support reliable operations. Notably, on August 4, 2011, the grid operators that represent systems that serve approximately 146 million Americans requested that EPA include in its final regulations on the Utility Toxics Rule a provision that would "authorizing a targeted

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<sup>21</sup> The July 2001 NARUC Resolution closes with the following "resolves" – that NARUC's Board "supports efforts to promote State and federal environmental and energy policies that will enhance the reliability of the nation's energy supply and minimize cost impacts to consumers by:

- Allowing utilities to coordinate the closure and/or retrofitting of existing electric generating units in an orderly manner that will ensure the continued supply of electricity and that will allow power generators to upgrade their facilities in the most cost effective way, while at the same time achieving attainable efficiency gains and environmental compliance; *and*
- Allowing regulatory options for units that are necessary for grid reliability that commit to retire or repower; *and*
- Allowing an EPA-directed phasing-in of the regulation requirements; *and*
- Establishing interim progress standards that ensure generation units meet EPA regulations in an orderly, cost-effective manner; *and be it further*

**RESOLVED**, That commissions should encourage utilities to plan for EPA regulations, and explore all options for complying with such regulations, in order to minimize costs to ratepayers; *and be it further*

**RESOLVED**, That FERC should work with the EPA to develop a process that requires generators to provide notice to FERC, system operators, and State regulators of expected effects of forthcoming EPA regulations on operating plants to allow an opportunity for meaningful assessment and response to reliability issues; *and be it further*

**RESOLVED**, That NARUC and its members should actively coordinate with their environmental regulatory counterparts, FERC, and the electric power sector ensuring electric system reliability and encourage the use of all available tools that provide flexibility in EPA regulation requirements reflecting the timeline and cost efficiency concerns embodied in this resolution to ensure continuing emission reduction progress while minimizing capital costs, rate increases and other economic impacts while meeting public health and environmental goals."

backstop reliability safeguard, on a unit-specific basis, to ensure that the compliance deadlines set forth in the Proposed Rule do not cause electric grid reliability issues that cannot be remedied within the proposed compliance deadline.” Notably, these grid operators (including ERCOT, MISO, NYISO, PJM, and the SPP<sup>22</sup>) called for this provision to be included in the final regulations, and not for a wholesale delay in the implementation of the rule.<sup>23</sup>

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<sup>22</sup> ERCOT is the Electric Reliability Council of Texas; MISO is the Midwest Independent Transmission System Operator; NYISO is the New York Independent System Operator; PJM is PJM Interconnection; and SPP is the Southwest Power Pool. These correspond roughly with the following regional reliability councils noted on the map above: TRE (ERCOT); RFC (PJM); SPP (SPP); MRO (MISO); NPCC (includes NYISO, among other regions).

<sup>23</sup> As noted in the comments of ERCOT, MISO, NYISO, PJM and SPP, “RTOs and ISOs are responsible for ensuring the continued reliability of the bulk power system in order to “keep the lights on” to millions of Americans in our respective footprints. ...The RTOs and ISOs are independent entities with no financial stake in any generator or other market participant....[The RTOs and ISOs] urge that the EPA consider authorizing a targeted backstop reliability safeguard, on a unit-specific basis, to ensure that the compliance deadlines set forth in the Proposed Rule do not cause electric grid reliability issues that cannot be remedied within the proposed compliance deadline.....FERC has indicated that due to the deregulated status of generation, the RTOs do not have authority to simply prohibit units from retiring.[Footnote in original] Similarly, under the deregulated structure of the ERCOT market, ERCOT does not have the authority to outright prohibit generation retirements. When an ISO/RTO receives notice of a generation retirement, it assesses the reliability impact....Admittedly, it is difficult to assess the full scope of local and regional reliability impacts absent information from each of the asset owners as to their intentions to retrofit or retire their units. Unfortunately, those decisions are not fully known at this point because they will be driven, in part, by the provisions of the final EPA rules, their relationship to other environmental rules and future market conditions such as the projected costs of competing fuels and forms of generation. Even if overall regional or national levels of capacity remain sufficient, local reliability impacts, the extent of which are still unknown, can have a profound effect on ensuring system reliability within specific areas that can serve substantial load, such as urban areas.[footnote in original] Although the impacts cannot be stated with certainty, given the potential reliability issues that could result from the impact of this rule within the context of several EPA rulemakings, the Joint RTO Commentors respectfully request that the EPA consider revisions that provide for an extension process that would, in essence, allow for the continued operation of units – “Reliability Critical Units” -- identified by the ISO/RTO through its retirement analysis as necessary to maintain grid reliability. ...[T]he extension would be tailored to the specific reliability need, and would only be effective until such time the reliability issue is remedied via the most expeditious and efficient means available, whether that is transmission reinforcements and/or through replacement resources.” Joint Comments submitted to the EPA regarding “National Emission Standards for Hazardous Air Pollutants From Coal and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units, EPA-HQ-OAR-2009-0234, EPA-HQ-OAR-2011-0044, FRL-9286-1, August 4, 2011.

- Some states have begun to call for and review utility plans to comply with EPA regulations and to assure local reliability requirements. Some states (like New York State) have recently updated statutes to support timely reviews of proposals to site new power plant projects. Other states (e.g., California) have experience with streamlining permitting processes to assure timely state agency reviews of plans.
  
- As a bottom line, there are several fundamental safeguards that prevent reliability problems from occurring in the end. There are many existing statutory authorities and regulatory/risk-management tools that exist to ensure that electric system reliability can be maintained, even as the industry responds to the EPA regulations. Congress has already provided the tools needed to ensure that implementation of regulations designed to protect public health do not end us in a clash with other critical objectives, such as reliable electricity supply. The principal tools that can provide for extra time for compliance, in order to ensure electric reliability, are as follows:
  - Under Section 112(i)(3)(B) of the Clean Air Act,<sup>24</sup> EPA has the ability to extend the compliance deadlines in the Utility Toxics Rule for individual companies for one year on a case-by-case basis, for affected generating units where the owner

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<sup>24</sup> “(B) The Administrator (or a State with a program approved under subchapter V of this chapter) may issue a permit that grants an extension permitting an existing source up to 1 additional year to comply with standards under subsection (d) of this section if such additional period is necessary for the installation of controls. An additional extension of up to 3 years may be added for mining waste operations, if the 4-year compliance time is insufficient to dry and cover mining waste in order to reduce emissions of any pollutant listed under subsection (b) of this section.”

has taken steps to comply in a timely fashion but still needs more time to assure reliable system operations.

- Under FERC supervision, grid operators can provide financial incentives to companies that file a request to retire a power plant, where such plant closures would raise reliability concerns. There are examples where the parties have negotiated consent decrees to allow continued operation while steps are taken to mitigate the reliability issues. Examples are: PJM's provision of financial incentives to Exelon, the owner of the Eddystone plant in Pennsylvania, to keep that plant in operator pending resolution of reliability issues; and ISO-NE's provision of financial incentives to Dominion, to support continued operation of the Salem Harbor power plant in Massachusetts while steps were taken to address local reliability issues that would arise in the event the plant retired.
- The Clean Air Act (Section 112(i)(4))<sup>25</sup> gives the President of the United States the authority to extend compliance deadlines for the Toxics Rule where such extensions are necessary to assure electric system reliability.
- The Federal Power Act (Section 202(c)) gives the U.S. DOE the authority to override Clean Air Act control requirements in limited emergency circumstances where there is a finding that an electric emergency exists.<sup>26</sup>

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<sup>25</sup> "(4) Presidential exemption. The President may exempt any stationary source from compliance with any standard or limitation under this section for a period of not more than 2 years if the President determines that the technology to implement such standard is not available and that it is in the national security interests of the United States to do so. An exemption under this paragraph may be extended for 1 or more additional periods, each period not to exceed 2 years. The President shall report to Congress with respect to each exemption (or extension thereof) made under this paragraph. "

- Under such existing legal authority, even a power plant planned to be retired for economic reasons – and not because of EPA regulations – could be required to remain in service pending actions to mitigate the reliability issues. For example, there is a notable recent situation in which the Secretary of Energy used this authority to order that that the Potomac River Generating Station remain in operation so as to assure reliability of the electric supply to the District of Columbia, even though the plant had been found to be in violation of state air pollution requirements. The plant was ordered to remain open until the regional grid operator provided a plan to assure electric reliability. As described in regulatory orders at the time:

On December 20, 2005, the Secretary of Energy entered an order finding that an emergency exists under section 202(c), and ordered the Plant to generate electricity.<sup>27</sup> The December 20 Order found that an emergency situation exists in

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<sup>26</sup> “§ 205.371 Definition of emergency. “Emergency,” as used herein, is defined as an unexpected inadequate supply of electric energy which may result from the unexpected outage or breakdown of facilities for the generation, transmission or distribution of electric power. Such events may be the result of weather conditions, acts of God, or unforeseen occurrences not reasonably within the power of the affected “entity” to prevent. An emergency also can result from a sudden increase in customer demand, an inability to obtain adequate amounts of the necessary fuels to generate electricity, or a regulatory action which prohibits the use of certain electric power supply facilities. Actions under this authority are envisioned as meeting a specific inadequate power supply situation. Extended periods of insufficient power supply as a result of inadequate planning or the failure to construct necessary facilities can result in an emergency as contemplated in these regulations. In such cases, the impacted “entity” will be expected to make firm arrangements to resolve the problem until new facilities become available, so that a continuing emergency order is not needed. Situations where a shortage of electric energy is projected due solely to the failure of parties to agree to terms, conditions or other economic factors relating to service, generally will not be considered as emergencies unless the inability to supply electric service is imminent. Where an electricity outage or service inadequacy qualifies for a section 202(c) order, contractual difficulties alone will not be sufficient to preclude the issuance of an emergency order.”

<sup>27</sup> Footnote 2 in the original: “U.S. Department of Energy, Order No. 202-05-2 (December 20, 2005) (December 20 Order). Authority under section 202(c) was transferred to the Secretary of Energy in 1980 by the Department of Energy Organization Act, Pub. L. 95-91, 91 Stat. 565 (42 U.S.C. § 7101). *Public Utility District No. 2 of Grant County, Washington*, 95 FERC ¶ 61,338 at n. 49 (2001). Here, we will therefore substitute “Secretary of Energy” for references to the Commission. Section 202(c) states that “[d]uring the continuance of any war in which the United States is engaged, or whenever the [Secretary of Energy] determines that an emergency exists by reason of a sudden increase in the demand for electric energy, or a shortage of electric energy of facilities for the generation or transmission of electric energy, or of fuel or water for generating facilities, or other causes, the [Secretary of Energy] shall have the authority, either upon its own motion or upon complaint, with or without notice, hearing, or report, to require by

the Washington, D.C. area, due to shortages in electric energy, facilities for the generation of electric energy, and facilities for the transmission of electric energy, as well as other causes. The Secretary of Energy directed Mirant to operate in a manner that provides reasonable electric reliability but that also minimizes any environmental harm from operation of the Plant.<sup>28</sup>

### **RECENT MARKET DEVELOPMENTS PROVIDE PRACTICAL EVIDENCE THAT THE IMPACTS ARE MANAGEABLE.**

There are already practical signs that the market is responding to the expectation that the EPA clean air regulations will go into effect. Examples include:

- The previously mentioned recent statements of CEOs of companies that own coal-fired generating units, which indicate that their companies are reasonably well-positioned and that the impacts are manageable.
- The expeditious actions of states and utility companies to implement steps deemed to be important for cleaner energy production and public health. A prime example is the recent effort in Colorado to implement a state law (the Colorado Clean Energy – Clean Jobs Law) that required the state’s utilities to take actions similar to those required by the EPA’s clean air regulations. Within one year of enactment of that act, the state’s largest utility (Xcel Energy) had filed plans to comply by shutting down a coal plant and replacing it with a new gas-fired generating station, which the state’s public health

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order such temporary connections of facilities and such generation, delivery, interchange, or transmission of electric energy as in its judgment will best meet the emergency and serve the public interest.”

<sup>28</sup> Source: Federal Energy Regulatory Commission, *District of Columbia Public Service Commission*, 114 FERC ¶ 61, 017 (Docket No. EL05-145-000), Order on Petition and Complaint, January 9, 2006.

agency and utility commission reviewed for compliance with that new law as well as the state's long-standing requirements for least-cost planning.

- The recent results of the PJM May 2011 “forward capacity auction,” which confirm that the 13-state PJM region will have ample electricity supply after proposed EPA clean air rules take effect on or before January 2015. This last example deserves a longer explanation, below, because it exemplifies some of the creative ways that the industry is responding to the EPA regulations in conjunction with other long-standing electric requirements.
  - PJM operates the nation's largest integrated power market that includes hundreds of generating units providing electric power to 54 million customers in 13 mid-Atlantic and Midwestern states, as well as the District of Columbia. With over one-sixth of total U.S. generating capacity, PJM is also home to many of the plants that will be affected by the CSAPR and the Utility Toxics rules. Each year, to assure that there is sufficient generating capacity to meet future demand in upcoming years, PJM solicits proposals from power suppliers willing to provide capacity to the market three years forward. The winners in each year's PJM Reliability Pricing Model (“RPM”) auction commit to being available to provide electric service during that future time period, and to receive compensation (capacity payments) for doing so.
  - As indicated by the results of the May 2011RPM auction for power supply for the period from May 31, 2014 through June 1, 2015, PJM will have more than enough

capacity to meet federal reliability standards set by NERC in the year in which both the EPA's proposed clean air rules would be in effect. Notably, more than 4 GW of new capacity came into the market with this auction, including new generation and new demand-side resources such as energy efficiency and demand response. This outcome shows the variety of ways in which market participants are providing efficient responses to power requirements as well as environmental requirements.

- In addition, power companies in PJM (such as AEP and Duke-Ohio) that do not participate in the capacity auction are required to certify that they have adequate capacity to ensure reliable service. These companies have confirmed that they have sufficient electric capacity to meet their needs through June 1, 2015 – more than five months after the EPA rules are expected to take effect.
  
- In my opinion, the PJM auction results reinforce the fundamental point that the electric industry has the tools to address the retirement of old, inefficient coal-fired units, preserve reliable service for customers.

#### **INVESTMENT BENEFITS RESULT FROM THE INDUSTRY'S RESPONSE TO EPA REGULATIONS, WITH A MORE MODERN ELECTRIC SYSTEM A FEW YEARS FROM NOW**

In my experience as a state utility regulator and a state cabinet officer responsible for implementing environmental regulations, I am aware of the tensions that often exist on the eve of implementing new regulations that will impose costs of an industry (and sometimes on the

consumers of its products), and the fears that such regulations will lead to jobs losses. Often, though, the very capital investments and expenditures that will be made by the industry to respond to regulatory requirement can – and do - produce positive economic activities in the local and regional communities affected.

I note two recent studies that have examined the job impacts of the EPA's air regulations. One is a report ("New Jobs, Cleaner Air: Employment Effects Under the Planned Changes to the EPA's Air Pollution Rules") published in February 2011 by CERES, and co-authored by J. Heintz, H. Garrett-Peltier and B. Zipperer of the Political Economy Research Institute (PERI) of the University of Massachusetts). The other is a report ("Why EPA's Mercury and Air Toxics Rule is Good for the Economy and America's Workforce") is authored by Charles Cicchetti, Navigant Consulting, July 2011.

The forward to the CERES/PERI study summarizes that "Since 1970, investments to comply with the Clean Air Act have provided \$4 to \$8 in economic benefits for every \$1 spent on compliance, according to the nonpartisan Office of Management and Budget. Since the passage of the Clean Air Act Amendments in 1990, U.S. average electricity rates (real) have remained flat even as electric utilities have invested hundreds of billions of dollars to cut their air pollution emissions. During the same period, America's overall GDP increased by 60 percent in inflation-adjusted terms."

The PERI researchers found that if the electric industry were required to comply with "stringent" EPA compliance rules with capital investments reaching almost \$200 billion

between 2010-2015 (“including almost \$94 billion on pollution controls and over \$100 billion on about 68,000 megawatts of new generation capacity), there would likely be net positive benefits:

Constructing such new capacity and installing pollution controls will create a wide array of skilled, high-paying jobs, including engineers, project managers, electricians, boilermakers, pipefitters, millwrights and iron workers....[B]etween 2010 and 2015, these capital investments in pollution controls and new generation will create an estimated 1.46 million jobs or about 291,577 year-round jobs on average for each of those five years....[T]ransforming to a cleaner, modern fleet through retirement of older, less efficient plants, installation of pollution controls and construction of new capacity will result in a net gain of over 4,254 operation and maintenance (O&M) jobs across the Eastern Interconnection. Distribution of these O&M jobs will vary from state-to-state, depending on where coal plants are retired (O&M job reduction) and where new generation capacity is installed (O&M job gains).”

- Over the five years, investments in pollution controls and new generation capacity will create significant numbers of new jobs in each of the states within the Eastern Interconnection, more than offsetting any job reductions from projected coal plant closures.
- The largest estimated job gains are in Illinois, (122,695), Virginia, (123,014), Tennessee, (113,138), North Carolina (76,966) and Ohio (76,240).
- In states with net O&M job reductions, projected gains in capital improvement jobs will provide enough work to fully offset the O&M job reductions. The construction of pollution controls will create a significant, near-term increase in new jobs. O&M job reductions are likely to occur later in the period.”<sup>29</sup>

Dr. Cicchetti’s study reviewed the EPA’s benefit/cost estimates prepared as part of the proposed Utility Toxics Rule, and concluded that the methodology understated the net economic benefits of the proposed rule:

This report evaluates EPA’s benefit-cost analysis as well as quantifies additional benefits that EPA chose not to monetize or include in their final benefit-cost results. EPA’s analysis is both comprehensive and conservative, and the proposed Toxics Rule would

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<sup>29</sup> CERES/PERI report, Executive Summary.

result in an additional \$10.5 billion in annual benefits that EPA did not quantify or include in its analysis.

EPA, nevertheless, concluded that the annual benefits of the proposed Toxics Rule would dwarf the compliance costs, yielding net benefits (benefits minus costs) of about \$42 billion to \$129 billion per year. Some have argued that EPA's benefit-cost analysis is faulty because it includes co-benefits from SO<sub>2</sub>, NO<sub>X</sub>, particulate matter (PM), and greenhouse gas (GHG) emissions, which are not directly regulated by the proposed Toxics Rule. Those who suggest that it is improper for EPA to calculate co-benefits from reductions of non-hazardous pollutants, which are regulated under other sections of the Clean Air Act, have a fundamental lack of knowledge of the core economic concept of opportunity benefits and a poor understanding of how to conduct an benefit-cost or economic impact analysis.<sup>1</sup> EPA's benefit-cost analysis is comprehensive and relies upon sound and proven scientific methods and data.

Moreover, EPA's benefit-cost analysis was extremely conservative. EPA ignores the likely overestimate of compliance costs and likely underestimate of realized benefits of the proposed Toxics Rule and fails to substitute a reasonable degree of new energy efficiency and demand-side management. Because it already had enough information to conclude that the benefits of the proposed Rule far outweigh the costs, EPA also chose not to quantify many additional benefits. In this Report, we identify an additional \$8.2 billion in annual benefits plus \$2.3 billion in likely energy efficiency savings resulting from EPA's proposed Toxics Rule. These include the combined employer business savings for lost workdays, employee recruiting, training, integration, and replacement, and avoided restricted outdoor activities; reduced health care and insurance costs, and increased employment at a time when the economy is stressed. ...This study also examines some of the second and third order effects that EPA did not calculate. The additional analysis in this Report shows that the proposed Toxics Rule would add 115,520 jobs, GDP growth of \$7.170 billion, and additional tax receipts of \$2.689 billion.

These results are summarized in the following table from the Cicchetti study (executive summary):

	EPA Calculations in Regulation Impact Analysis	Adding Energy Efficiency (\$2.3 million in 2015)	Adding Additional Analysis in this Report
Net Benefits	\$42 - \$129 billion	\$44.3 - \$131.3 billion	\$52.5-\$139.5 billion
Job Increases	35,970	n/a	115,520
Healthcare Savings	\$3.445 billion	n/a	\$4,513 billion
GDP Increases	n/a	n/a	\$7.170 billion
Increased Tax Revenues	n/a	n/a	\$2.689 billion

## CONCLUSION

For these reasons, I strongly believe that the nation does not need to trade off improvements in public health for lower electric reliability. Both of these are essential “givens” for Americans.

I urge the Committee to continue to take interest in this important topic, but to do so with an expectation that the industry will respond innovatively and effectively, and with confidence that Americans can get the benefits of both clean air and reliable electricity. This investment in cleaning up and modernizing the nation’s power supply system is important and do-able. In my opinion, there is no reason to delay the implementation of the Clean Air Transport Rule or the Utility Toxics Rule.