

**Summary of Testimony of
Susan F. Tierney, Ph.D.
Managing Principal, Analysis Group, Boston
Before the
U.S. Senate Environment and Public Works Committee
Subcommittee on Clean Air and Nuclear Safety
June 30, 2011**

Oversight Hearing:
Review of EPA Regulations Replacing the Clean Air Interstate Rule (CAIR)
and the Clean Air Mercury Rule (CAMR)

Chairman Carper, Ranking Member Barrasso, and members of the Subcommittee:

I appreciate the opportunity to testify on the U. S. Environmental Protection Agency's implementation of various provisions of the Clean Air Act and address the question of whether the newly proposed regulations will adversely affect reliability in the power sector and its ability to serve electricity users in the United States.

Of specific interest to the Subcommittee are impacts of the EPA's proposed "Clean Air Transport Rule" ("CATR"), affecting emissions of sulfur dioxide and nitrogen oxides from fossil-fuel power plants in the Eastern half of the U.S., and the proposed "Mercury and Air Toxics Rule" ("Utility Toxics Rule"), affecting emissions of hazardous air pollutants emitted from most coal- and oil-fired power plants throughout the country. Acting upon court orders, EPA's two new regulations would replace the Clean Air Interstate Rule ("CAIR") and the Clean Air Mercury Rule ("CAMR") and would address the problems of interstate transport of air pollution and the emissions of toxic air pollutants that are damaging to human health.

These are important regulations from an air quality and public health point of view. But are they achievable? Can the nation get both the benefits of lower pollution and improved air quality, while also keeping the lights on? Can the industry respond effectively within the allowable time frames, so that Americans don't have to choose between achievement of the health benefits the Clean Air Act requires and the electric system reliability that underpins the U.S. economy? I strongly believe that the answer to all of these questions is yes.

My testimony offers the following reasons why I answer those questions in the affirmative:

1. The U.S. electric industry has a proven track record of doing what it takes to provide the nation with reliable electricity. Regulated electric utilities, competitive electric companies, grid operators, and regulators have a strong mission orientation, along with regulatory requirements, that together ensure that reliable electricity supply is a priority.
2. By 2011, it is not reasonable to suggest that EPA's CATR and Utility Toxics Rule are a surprise, or that EPA's proposed regulations will require actions that are technically and economically infeasible. These regulations have been in the works for many years. EPA's proposals allow more flexibility in compliance approaches than previously anticipated.

3. Many factors besides these new regulations have encouraged owners of coal-fired power plants to take steps to reduce their air emissions. Many states have already adopted regulations as strict as those proposed by EPA. Some companies with facilities affected by the CATR and Utility Toxics rules are already under court orders to achieve similar outcomes even without the new regulations. And many companies have already taken steps to install appropriate control equipment: in recent months, chief executive officers of some of the most affected utility companies in different parts of the country have told their investors that they are already or will be ready to meet the new EPA air regulations. These facts occur within a context in which low natural gas prices are putting pressure on many of the oldest, least-efficient and uncontrolled coal plants to retire for economic reasons.
4. Much attention has been, and will continue to be, paid to the impacts of the regulations on electric system reliability. Many assessments published in the past year have called attention to potential gaps that could arise in the absence of market, utility and regulators' responses. These studies highlight potential plant retirements under different sets of assumptions, with the more reasonable estimates indicating strongly that the impacts are manageable, as long as industry and its regulators respond in a timely fashion.
5. The industry has various tools to assure that reliability will not be adversely affected. Among the more important tools are: the strong system-planning processes of utility transmission companies and regional transmission organizations (grid operators); the opportunities for companies to obtain power resources through the wholesale power markets that exist in many of the affected parts of the country; the strong least-cost planning processes that exist for utilities in other affected areas; the interest and ability of developers of new power projects to bring new supplies to the market; the fact that state and federal have a strong track record of taking the steps necessary to ensure that the companies they supervise are meeting their obligation to provide reliable electric service; the large reservoirs of untapped cost-effective energy efficiency in affected states that can be mined relatively rapidly and can help ease impacts on consumers' electricity bills; and the statutory tools available to EPA, the Federal Energy Regulatory Commission ("FERC"), the U.S. Department of Energy ("DOE"), and the President to take actions to ensure reliable system conditions when all else fails.
6. Finally, recent market developments provide practical, real-world evidence that the EPA clean air regulations are manageable. Notably, the nation's largest competitive wholesale power market – PJM, serving much of the mid-Atlantic and Midwest regions affected by the EPA regulations – has recently conducted its annual auction to purchase capacity so that it will be available far in advance of need. The PJM auction elicited far more capacity offers from existing and new suppliers than is needed for reliability purposes during the period when EPA's new air rules will go into effect.

For these reasons, I urge the Senate 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 benefit of clean air and reliable electricity. This is doable.

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Good morning, Chairman Carper, Ranking Member Barrasso, and Members of the Subcommittee.

My name is Susan Tierney, and I am a Managing Principal at Analysis Group, Inc., an economic consulting firm headquartered in Boston, Massachusetts.

I appreciate the opportunity to testify on whether the U. S. Environmental Protection Agency's proposals to replace the Clean Air Interstate Rule and the Clean Air Mercury Rule will have adverse reliability impacts on the power sector and electricity users in the United States. I do not think that they will. The EPA's proposals to replace those prior rules (as required by the courts) do not put the nation in a position of having to choose between public health and keeping the lights on. Both can be achieved as EPA moves forward 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 in part on my nearly three decades of public and private-sector experience¹ on electric system economics and regulation, on the economics of air and water policy, and on

¹ 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, 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 co-taught a course at the Massachusetts Institute of Technology. I currently sit on several corporate and non-profit boards and commissions, including as a director of Evergreen Solar, Inc., and 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, World Resources Institute, Clean Air – Cool Planet, and the Alliance to Save Energy; and a member of the

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 analyses² of various studies of electric reliability that have been carried out in the past year, combined with my knowledge of competitive power markets, the electric industry and its economic and environmental regulation.

I understand that the Subcommittee is particularly interested in the impacts of the EPA's proposed "Clean Air Transport Rule" ("CATR"), which affects emissions of sulfur dioxide ("SO₂") and nitrogen oxides ("NO_x") 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 two proposed regulations would replace the Clean Air Interstate Rule ("CAIR") and the Clean Air Mercury Rule ("CAMR"), as ordered by the courts, in order for the new rules to properly address the problems of interstate transport of air pollution and the emissions of toxic air pollutants that are damaging to human health.

These are important regulations from an air quality and public health point of view. But are they achievable? Will the nation be able to get the benefits of lower air pollution and improved air quality, while also keeping the lights on? Can the industry respond effectively within the allowable time frames, so that Americans don't have to choose between achievement of the health benefits the Clean Air Act requires and the electric system reliability that underpins the functioning of the U.S. economy? I strongly believe that the answer to all of these questions is yes.

NYISO's Environmental Advisory Council. I serve on the Secretary of Energy's Advisory Board, where I am a member of its Gas Subcommittee that is examining shale gas development; and I chair of the Policy Subgroup of the National Petroleum Council's study of the North American natural gas and oil resource base. Previously, I served as co-chair of the National Commission on Energy Policy; a director of the Electric Power Research Institute; chair of the Electricity Innovation Institute's Board of Directors; 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.

² 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 "MJB/Analysis Group Summer Reliability 2011 Update")(available at http://www.analysisgroup.com/uploadedFiles/News_and_Events/News/MJBA_Reliability_Report_Update_Summer2011.pdf); Susan Tierney and Charles Cicchetti, "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 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 "MJB/Analysis Group 2010 Reliability Analysis") (available at 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.

I offer the following reasons why I answer those questions in the affirmative, and describe each of these reasons 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.
2. By 2011, EPA's CATR and Air Toxics are not surprises: they have been anticipated for some time, and now offer more flexible options than previously expected.
3. Many things besides these new regulations have caused owners of affected plants to have taken steps already to modernize their facilities so that their facilities will be ready for the new EPA regulations.
4. Much attention has been, and will continue to be, paid to the impacts of the regulations on electric system reliability. This has helped send signals to affected parties about the need for action. The more reasonable estimates indicate strongly that the impacts are manageable.
5. There are various tools in place in the industry to assure that reliability will not be adversely affected.
6. Finally, recent market developments provide practical evidence that the impacts of the EPA clean air regulations are manageable.

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, along with regulatory requirements, which together 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 to run computers, lighting systems and lamps, clocks and cell phones, TVs and radios, air conditioners and refrigerators, streetlights and traffic signals, clocks, ATMs and security systems, high-precision equipment, agricultural machines, factory production processes, and countless other devices. 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 environmental 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. The North American Electric Reliability Corporation ("NERC"), for example, works with regional

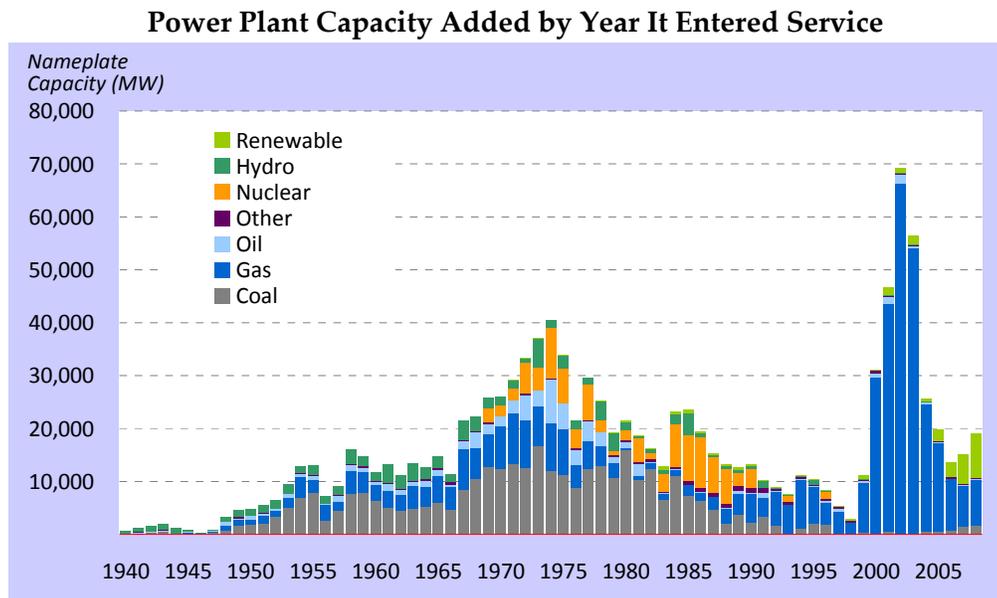
reliability organizations representing all parts of the U.S. to assess conditions in upcoming years. These assessments provide information about future needs to decision makers in utilities, power generation companies, providers of energy efficiency services, equipment manufacturers, investment organizations, fuel suppliers, public agencies, and others. The norm is decision-making under conditions of uncertainty, given that capital commitments must be made years ahead of a power plant going into operation 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.

Further, 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.³ Indeed, in just three years between 2001 and 2003, the electric industry built over 160 GW of new generation,⁴ 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.

³ EIA, *Annual Electric Generator Report: Form EIA-860*, 2008. Currently, there are more than 17,000 electric generation units in the United States with a combined nameplate capacity of over 1,030 GW. In 2010, coal-fired generation produced 45 percent of the nation's electricity, 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. Analysis of monthly and annual power generation data in Energy Information Administration ("EIA"), "Electric Power Generation and Consumption Data by Month and State, 2001 to the Present" (available at http://www.eia.gov/cneaf/electricity/epa/epa_sprdshts_monthly.html).

⁴ *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 CATR 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 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 CATR would replace EPA’s 2005 CAIR, which was initially proposed in December of 2003.⁵ 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 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.⁶ EPA issued its newly proposed CATR in July 2010.
- Similarly, EPA began its regulatory process relating to mercury emissions in 2003, with the CAMR proposal finalized in March 2005.⁷ The Court of Appeals also vacated the CAMR rule in December 2008, and sent it back to the EPA for replacement. EPA issues in newly proposed Utility Toxics rule in March 2011.

⁵ <http://www.epa.gov/cair/rule.html>

⁶ <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>).

⁷ <http://www.epa.gov/oar/mercuryrule/rule.html>

- Several elements of the new proposals allow for flexibility in affected companies' responses. For example:
 - The CATR allows intrastate and limited interstate trading of emission allowances for SO₂ and NO_x, consistent with the Clean Air Act:
 - The Utility Toxics rule allows companies with multiple boilers and generating units at a single station to demonstrate compliance through emissions averaging across the units.
 - And EPA has proposed a “work practice standard” (with annual performance testing of units using “good combustion practices”) to control emissions of dioxins and 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, AND ECONOMIC CONDITIONS IN FOSSIL FUEL MARKETS FAVOR NATURAL GAS RELATIVE TO MANY EXISTING COAL-FIRED POWER PLANTS

Many factors besides these new clean air regulations have caused owners of affected plants to take steps to modernize their facilities and 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 CATR 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. These conditions occur within a backdrop in which supplies of natural gas have caused gas prices to drop, putting pressure on many of the oldest, least-efficient and uncontrolled coal plants to retire for economic reasons.

- 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.⁸

⁸ MJBA/Analysis Summer 2011 Reliability Update; Northeast States for Coordinated Air Use Management, *Control Technologies to Reduce Conventional and Hazardous Air Pollutants from Coal-Fired Power Plants*, March 31, 2011, page 2.

- The data collected by EPA in the course of developing the replacement to the CAMR indicate that that power plants meeting the proposed standard have a wide variety of pollution-control systems and configurations that are reducing their mercury emissions. Analysis of the plants that submitted stack-test data to EPA indicate that: 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.⁹
- New, lower natural gas prices are already putting economic pressure on coal facilities even in the absence of EPA regulations
 - As mentioned previously, 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 prices¹⁰) to utilities and independent power producers have meant that gas-fired power plants increased their output from 20 percent of all 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.¹¹
 - Expected low natural gas prices also contribute to basic economic conditions that favor replacing 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

⁹ 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.

¹⁰ The average prices (in nominal dollars per short ton) of coal to power companies from 2006 through 2010 were:

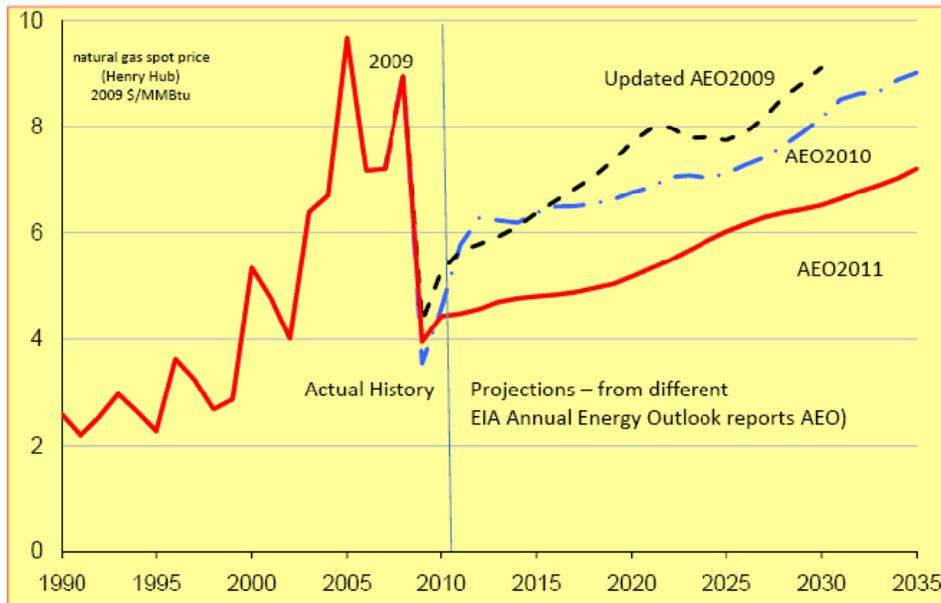
Average delivered price of coal to:	2006	2007	2008	2009	2010
Electric utilities	\$34.26	\$36.06	\$41.32	\$44.47	\$45.09
Independent power producers	\$33.04	\$33.11	\$38.98	\$39.94	\$41.40

Source: William Watson, Nicholas Paduano, Tejasvi Raghuvver 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>)

¹¹ Analysis of monthly and annual power generation data in EIA, “Electric Power Generation and Consumption Data by Month and State, 2001 to the Present” (available at http://www.eia.gov/cneaf/electricity/epa/epa_sprdshts_monthly.html).

lowered the Energy Information Administration’s outlook for natural gas prices over the last three years (from the 2009 forecast to the 2011 forecast).

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

- At least some 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. As reported in a recent analysis I co-authored with MJ Bradley Associates for the Clean Energy Group, 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 our study (MJBA/Analysis Group Summer 2011 Reliability Update):
 - 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 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 SO₂ 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_x 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.¹² 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 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.”¹³

¹² 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.

¹³ 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

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

Much attention has been, and will continue to be, paid to the impacts of the regulations on electric system reliability – in part because it is so important to the American economy. Many assessments have been published – calling attention to the potential supply gaps that could arise in the absence of market, utility and regulators’ responses. These studies highlight ranges of impacts on potential plant retirements under quite-different sets of assumptions. The more reasonable estimates indicate strongly that the impacts are manageable.

My colleagues at MJ Bradley Associates and I performed a review of many such studies last August,¹⁴ on behalf of the Clean Energy Group, and we did an update again a few weeks ago.¹⁵ Additionally, I have analyzed carefully many other reports written on this topic and prepared a “field guide” to their results.¹⁶ 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. 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 measures that may now become economical, or even transmission reconfigurations) in combination with the more moderate cases consistent with EPA regulations. As a result, in my opinion the suite of studies tend to overstate the gap in resources.

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.”

¹⁴ MJBA/Analysis Group 2010 Reliability Analysis.

¹⁵ MJBA/Analysis Group Summer 2011 Reliability Update.

¹⁶ 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>.

Even the results I report below, which select the more moderate cases, overstate these impacts for this reason.

Study:*	Estimated Capacity Retirements (Coal-Fired):	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."
Credit Suisse (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 and 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."
Note: Currently there is approximately 1,030 GW of generating capacity in the U.S., of which approximately 330 GW is coal-fired generation.		

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 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 upcoming regulatory requirement.
 - 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.
 - The many electric reliability (“resource adequacy”) assessments have called attention to the issues, and identified the regional markets where inefficient 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. Already, 42 GW (or 41,983 megawatts (MW)) of new plant capacity is under construction in various regions of the country for an in-service date of 2014 – the year when both the CATR and Utility Toxics Rules would be in effect. Another 27 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 much 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 6-2011)								
Reliability region	Generating Capacity (MW) Under Construction by Region						Total	Total by end of 2014:
	2011	2012	2013	2014	2015+			
TRE	365	1,228	-	-	304	1,897	1,593	
FRCC	308	6	1,295	-	26	1,635	1,609	
MRO	435	1,044	261	-	206	1,945	1,740	
NPCC	3,571	1,644	367	640	945	7,166	6,221	
RFC	3,608	1,419	142	159	6	5,334	5,328	
SERC	2,960	6,896	1,790	702	23	12,371	12,348	
SPP	1,080	582	7	-	-	1,669	1,669	
WECC	3,042	4,294	2,546	1,593	759	12,235	11,475	
Total	15,368	17,113	6,407	3,094	2,268	44,251	41,983	
Reliability region	Generating Capacity (MW) in Advanced Development Phases but Not Under Construction						Total	Total by end of 2014:
	2011	2012	2013	2014	2015+			
TRE	1	2,030	-	1,000	3,635	6,666	3,031	
FRCC	105	88	217	1,295	4,563	6,268	1,705	
MRO	86	295	50	-	1,226	1,656	430	
NPCC	364	865	1,174	829	2,214	5,446	3,232	
RFC	251	653	684	19	5,974	7,581	1,607	
SERC	153	862	654	1,392	12,585	15,646	3,061	
SPP	118	627	-	-	138	883	745	
WECC	1,342	1,567	4,960	5,675	17,031	30,574	13,544	
Total	2,420	6,986	7,738	10,210	47,366	74,720	27,354	
Source of data: SNL Financial								

- Other tools are available to ensure reliability as time gets closer to compliance deadlines in the EPA regulations:
 - State and federal regulators do not sit idly by in the face of big important challenges, such as the reliability and resource planning issues introduced by the EPA clean air regulations.

- State and federal regulations have a strong track record of taking the steps necessary to ensure that the companies they supervise are meeting their obligation to provide reliable electric service.
- At present, there is active coordination underway by many federal agencies (EPA, FERC, DOE) involved in policy making for policies affecting the power sector.
- State agencies with responsibility for energy, utility and environmental regulations are in discussions to learn about each other 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.
- 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.
- 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) are updating 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.
- Close-to and during the compliance period, there are several safeguards that prevent reliability problems from occurring:
 - EPA has the ability to extend the deadlines in the Utility Toxics for one year on a case-by-case basis for affected generating units where the owner has taken steps to comply in a timely fashion but still needs more time to assure reliable system operations.
 - Grid operators have the ability to deny requests for plant retirements 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 denial of Exelon's request to close the Eddystone plant in Pennsylvania; the consent decree affecting continued operation of the Salem Harbor power plant in Massachusetts while steps were being undertaken to address local reliability issues that would arise in the event the plant retired; and the FERC's denial of the closure of the

Potomac River Generation outside of Washington, DC, based in part on reliability concerns raised by the DOE.

- The DOE and the President may exercise emergency authority to assure that electric system reliability is not adversely impacted as companies take steps to comply with EPA clean air regulations. DOE has previously exercised this authority.

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

Finally, 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 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 CATR 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.

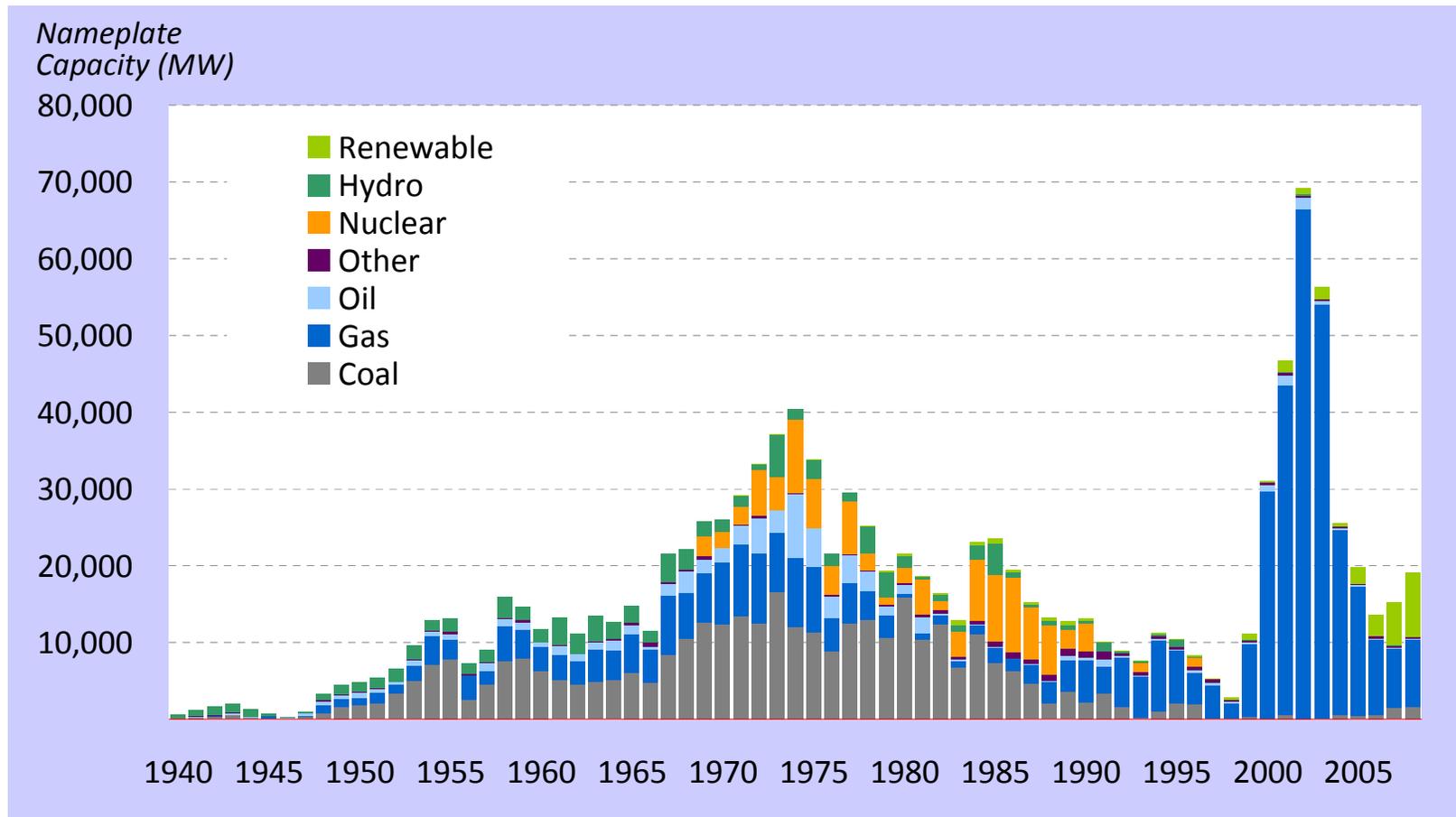
In my opinion, the PJM auction results also reinforce a key finding in the MJBA/Analysis Group 2010 Reliability Analysis and many studies since then: that the system has the tools to address the retirement of old, inefficient coal-fired units, preserve reliable service for customers.

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.

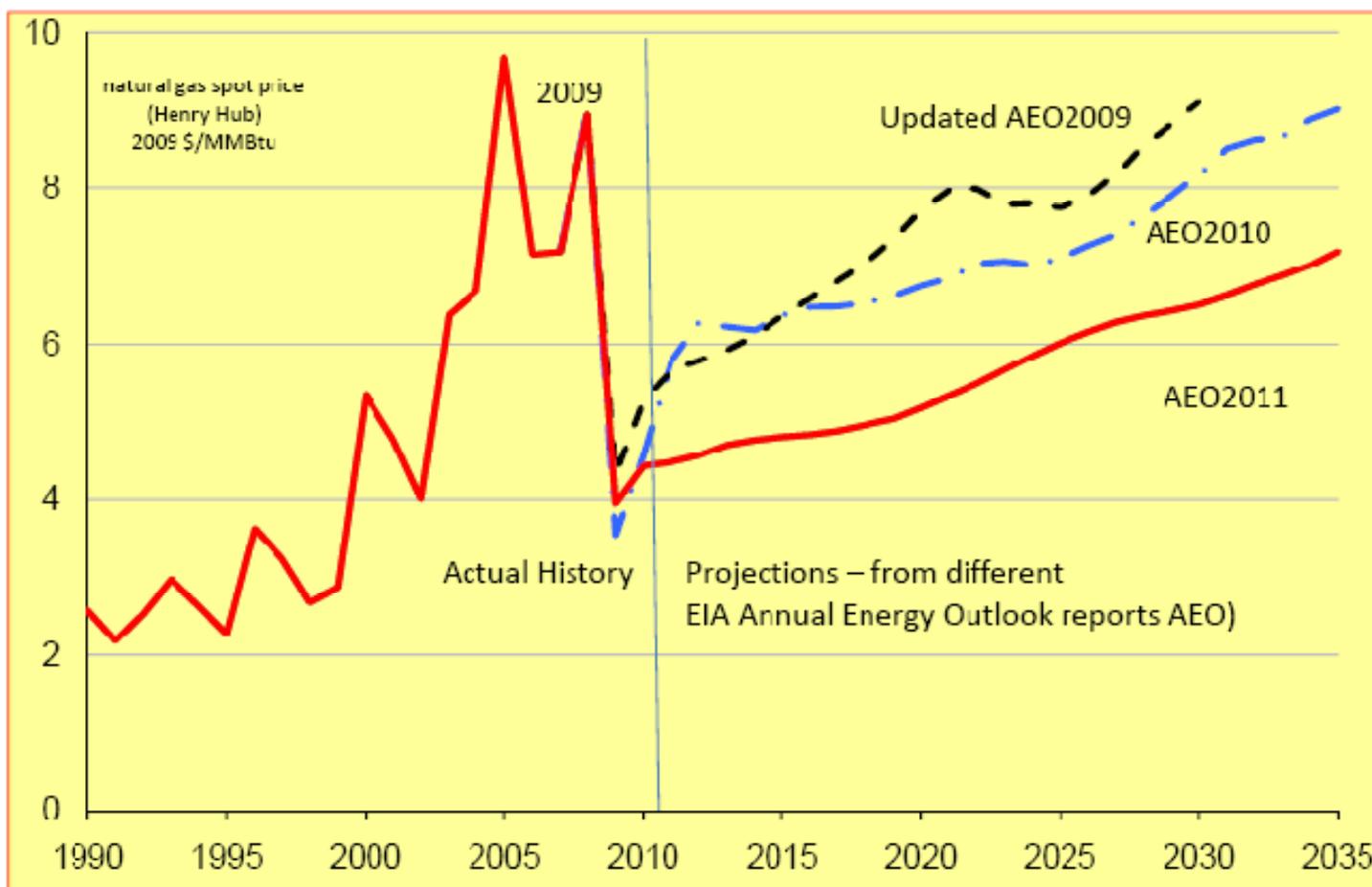
I urge the Senate to continue to take interest in this important topic, but to do so with an expectation that the industry will respond innovatively and effectively, and with confidence that Americans can get the benefits of both clean air and reliable electricity. This investment in cleaning up and 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.

Power Plant Capacity Added by Year It Entered Service



Source: Figure 3 from M. J. Bradley & Associates, LLC and Analysis Group., *Ensuring a Clean, Modern Electric Generating Fleet while Maintaining Electric System Reliability*, 2010, 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.

Natural Gas Prices: Actual (1990-2010) and Energy Information Administration 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

Estimates of Capacity Retirements Due to EPA Clean Air Rules

Study:*	Estimated Capacity Retirements (Coal Plants)	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."
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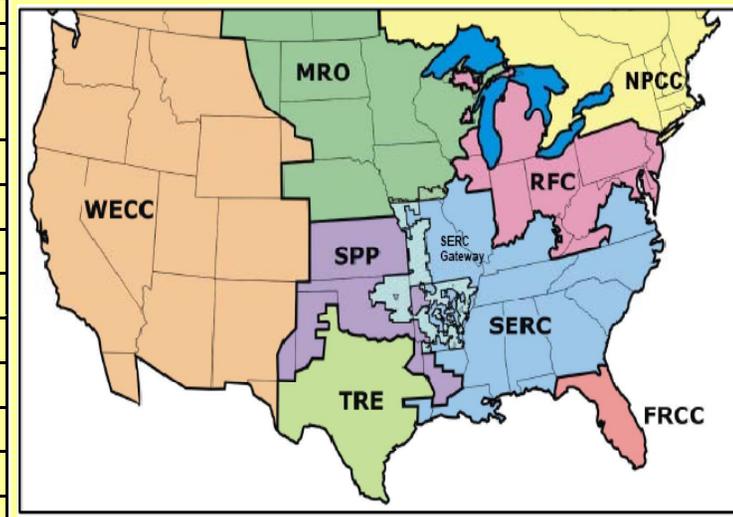
June 30, 2011

Current generating capacity in the U.S.:
 Approximately 1,030,000 MW (with ~330 MW of coal-fired capacity)

New Planned Generating Capacity Additions by Region: Capacity Under Construction and In Advanced Development (2011-2015+)

New Planned Generating Capacity Additions by Region (as of 6-2011)							
Reliability region	Generating Capacity (MW) Under Construction by Region						Total by end of 2014:
	2011	2012	2013	2014	2015+	Total	
TRE	365	1,228	-	-	304	1,897	1,593
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Total	2,420	6,986	7,738	10,210	47,366	74,720	27,354

Source of data: SNL Financial



Regional electrical reliability regions

Current generating capacity in the U.S.
 Approximately 1,030,000 MW