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EPA'S IMPACT ON JOBS AND ENERGY AFFORDABILITY: UNDERSTANDING THE REAL COSTS AND BENEFITS OF ENVIRONMENTAL REGULATIONS

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

SECOND SESSION

WEDNESDAY, JUNE 6, 2012

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EPA'S IMPACT ON JOBS AND ENERGY AFFORDABILITY: UNDERSTANDING THE REAL COSTS AND BENEFITS OF ENVIRONMENTAL REGULATIONS

WEDNESDAY, JUNE 6, 2012

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, DC.

The Subcommittee met, pursuant to call, at 2:15 p.m., in Room 2318 of the Rayburn House Office Building, Hon. Andy Harris [Chairman of the Subcommittee] presiding.

RALPH M. HALL, TEXAS
CHAIRMAN

EDDIE BERNICE JOHNSON, TEXAS
RANKING MEMBER

U.S. HOUSE OF REPRESENTATIVES
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Subcommittee on Energy & Environment

EPA's Impact on Jobs and Energy Affordability: Understanding the Real Costs and Benefits of Environmental Regulations

Wednesday, June 6, 2012
2:00 p.m. - 4:00 p.m.
2318 Rayburn House Office Building

Witnesses

The Honorable Cass Sunstein, Administrator, Office of Information and Regulatory Affairs, Office of Management and Budget (invited)

Dr. Michael Honeycutt, Chief Toxicologist, Texas Commission on Environmental Quality

Mr. Eugene Trisko, Attorney at Law, On behalf of the American Coalition for Clean Coal Electricity

Mr. Tom Wolf, Executive Director, Energy Council, Illinois Chamber of Commerce

Mr. David Hudgins, Director of Member and External Relations, Old Dominion Electric Cooperative

Mr. Richard Trzupek, Principal Consultant, Trinity Consultants

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY & ENVIRONMENT

HEARING CHARTER

EPA's Impact on Jobs and Energy Affordability: Understanding the Real Costs and Benefits of Environmental Regulations

Wednesday, June 6, 2012
2:00 p.m. - 4:00 p.m.
2318 Rayburn House Office Building

PURPOSE

On Wednesday, June 6, 2012, at 2:00 p.m. in Room 2318 of the Rayburn House Office Building, the Subcommittee on Energy and the Environment of the Committee on Science, Space, and Technology will hold a hearing titled, *EPA's Impact on Jobs and Energy Affordability: Understanding the Real Costs and Benefits of Environmental Regulations*. The purpose of this hearing is to examine the process used by the Office of Information and Regulatory Affairs (OIRA) and the Environmental Protection Agency (EPA) in evaluating the costs and benefits of federal environmental regulations, including the recently announced Carbon Pollution Standard for New Power Plants.[1]

WITNESS LIST

- **The Honorable Cass Sunstein**, Administrator, Office of Information and Regulatory Affairs, Office of Management and Budget (invited)
- **Dr. Michael Honeycutt**, Chief Toxicologist, Texas Commission on Environmental Quality
- **Mr. Eugene Trisko**, Attorney at Law, On behalf of the American Coalition for Clean Coal Electricity
- **Mr. Tom Wolf,** Executive Director, Energy Council, Illinois Chamber of Commerce
- **Mr. David Hudgins,** Director of Member and External Relations, Old Dominion Electric Cooperative
- **Mr. Richard Trzupek**, Principal Consultant, Trinity Consultants

Background

The Office of Information and Regulatory Affairs (OIRA), established in the 1980 Paperwork Reduction Act and located within the Office of Management and Budget (OMB), is responsible for reviewing draft regulations and ensuring agency compliance with requirements in several Executive Orders pertaining to the regulatory process.[2] It is OIRA's responsibility to oversee and coordinate the Administration's regulatory policies and ensure that agency reports, guidelines,

[1] 77 Federal Register 22392.
[2] http://www.whitehouse.gov/omb/inforeg_administrator.

rules, testimony, and proposed legislation are consistent with Administration policy.[3] In this capacity, OMB-OIRA commonly issues memoranda and guidance to agencies regarding the implementation of regulatory policies, actions, and goals. In accordance with these requirements, EPA and other agencies release Regulatory Impact Analyses (RIAs) that examine the costs and benefits of individual, major regulations.

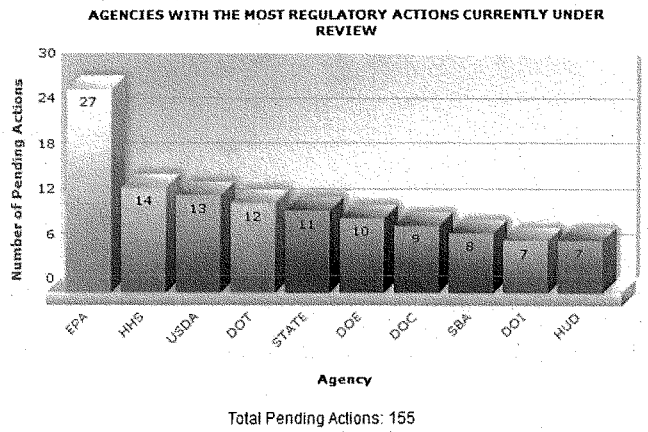
Overall Regulatory Burdens

President Obama's issuance of Executive Order (EO) 13563 on "Improving Regulation and Regulatory Review" takes a number of steps aimed at improving the cost-effectiveness of regulatory actions. Despite the principles affirmed in this EO, the number of major regulations and their price tag has grown substantially. A March 2012 analysis by the Heritage Foundation found significantly higher regulatory burdens compared to the historical pace, with 106 new major federal regulations with more than $46 billion in costs having been adopted during the Obama Administration.[4] In the same time period, federal regulatory agencies have seen their combined budgets grow 16 percent, and regulatory employment rise 13 percent.[5]

Role of EPA Clean Air Act Regulations

EPA regulations are playing a greater role in the overall federal regulatory enterprise as measured in rulemaking and overall costs and benefits. According to OIRA's Regulatory Review Dashboard, (see Figure 1) EPA has nearly twice as many regulatory actions currently being reviewed than any other part of the federal government.

Figure 1. OIRA's Regulatory Review Dashboard[6]



[3] The White House, Office of Management and Budget, "Office of Management and Budget: Open Government," http://www.whitehouse.gov/omb/open.

[4] James Gattuso and Diane Katz, "Red Tape Rising: Obama-Era Regulation at the Three-Year Mark," March 13, 2012, http://www.heritage.org/research/reports/2012/03/red-tape-rising-obama-era-regulation-at-the-three-year-mark.

[5] John Merline, "Regulation Business, Jobs Booming Under Obama," *Investor's Business Daily*, August 15, 2011.

[6] http://www.reginfo.gov/public/.

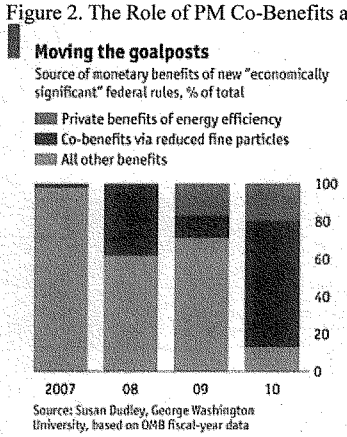
In its *Draft 2012 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities,*[7] OIRA notes the prominence of EPA Clean Air Act rules in the overall regulatory apparatus, disclosing that EPA rules represent 60 to 81 percent of the agency-estimated monetized benefits and 44 to 54 percent of the monetized costs of all federal regulations.

The report further emphasizes that 97 to 98 percent of EPA's claimed benefits come from air quality rules, and that "the large estimated benefits of EPA rules are mostly attributable to the reduction in public exposure to a single air pollutant: fine particulate matter."[8] While footnoting six major areas of uncertainty about EPA's assumptions about particulate matter (PM) and premature mortality and stating that "further scientific work is important in this domain" and "[m]ore research remains to be done on several key questions," OIRA continues to accept EPA's particulate matter-related benefits claims to justify the costs of air quality regulations on PM as well as other pollutants. The reliance on PM can also be seen in EPA's March 2011 report, *Benefits and Costs of the Clean Air Act from 1990 to 2020*, which focused almost exclusively on ambient PM reductions in claiming that the overall benefits of the Clean Air Act ($2 trillion) outweighed overall costs ($65 billion) by a factor of 30 to 1.[9] In the regulatory analysis accompanying the Agency's December 2011 Mercury and Air Toxics Standards for power plants,[10] PM co-benefits represented over 99 percent of the overall benefits, rather than the air toxics being regulated (see Figure 2).[11]

Recent environmental regulatory analysis has also increasingly relied on the use of private (as opposed to social) benefits, which allege private financial gain attributable to regulatory actions. For example, in the RIA accompanying the final New Source Performance Standards for the oil and natural gas sector in April of 2012,[12] the Agency claimed that requiring companies to capture methane from drilling operations would lead to "revenue from additional natural gas recovery" that "exceeds the costs" of compliance. Calling this practice "highly suspect," *The Economist* in February of this year described the increasing influence of private benefits and PM co-benefits for new federal rules:

[7] http://www.whitehouse.gov/sites/default/files/omb/oira/draft_2012_cost_benefit_report.pdf.
[8] Ibid.
[9] http://www.epa.gov/air/sect812/prospective2.html.
[10] 77 Federal Register 9304.
[11] Testimony of Anne Smith, October 4, 2011, http://science.house.gov/sites/republicans.science.house.gov/files/documents/hearings/100411_smith_0.pdf.
[12] www.epa.gov/airquality/oilandgas/pdfs/20120417finalrule.pdf.

Figure 2. The Role of PM Co-Benefits and Private Benefits[13]



In late March, EPA announced its proposed Carbon Pollution Standard for New Power Plants, despite concerns that the regulation could effectively prevent the construction of new coal-fired power plants.[14] While Executive Order 13563 requires that agencies "propose or adopt a regulation only upon a reasoned determination that its benefits justify its costs," EPA stated that the rule "will result in negligible CO2 emission changes, energy impacts, quantified benefits, costs, and economic impacts by 2020."[15]

Executive Order 13563

President Obama issued EO 13563, "Improving Regulation and Regulatory Review," on January 18, 2011.[16] EO 13563 outlined several imperatives for the federal government's regulatory system while reiterating the principles, structures, and definitions governing regulatory review established in Executive Orders issued in previous Administrations. The Obama Executive Order stipulates that the regulatory system must protect public health, welfare, safety, and the environment while promoting economic growth, innovation, and competitiveness. It requires the system to be "based on the best available science," allow for public participation, promote predictability, and reduce uncertainty. It must also identify and use the most innovative and least burdensome tools, take into account benefits and costs, and ensure regulations are accessible, consistent, and easy to understand. Furthermore, the system must measure and seek to improve the results of regulatory requirements.

EO 13563 reaffirms many of the requirements and principles established in the Clinton Administration's Executive Order 12866; specifically that the benefits of regulatory actions must

[13] *The Economist*, "The Rule of More: Rule-making is being made to look more beneficial under Barack Obama," February 18, 2012, http://www.economist.com/node/21547772/print.

[14] Robert Bryce, "Is There Still a Case for Coal?" Manhattan Institute Issues 2012, No. 13, May 2012, http://www.manhattan-institute.org/html/ir_13.htm.

[15] http://epa.gov/carbonpollutionstandard/pdfs/20120327proposalRIA.pdf.

[16] Executive Order 13563, "Improving Regulation and Regulatory Review," Issued by President Barack Obama, January 18, 2011, http://www.gpo.gov/fdsys/pkg/FR-2011-01-21/pdf/2011-1385.pdf.

justify costs; regulations must be tailored to impose the least burden on society and take into account the costs of cumulative regulations; selection of the regulatory approaches that maximize net benefits; specification of performance objectives; and the identification and assessment of available alternatives to direct regulation. However, President Obama's Order also permits agencies to "consider (and discuss qualitatively) values that are difficult or impossible to quantify, including equity, human dignity, fairness, and distributive impacts."

President Obama's Order also includes specific requirements for agencies regarding public participation, integration and innovation, flexible approaches, the use of science, and retrospective analyses of existing rules. The Order asks agencies to coordinate, simplify, and harmonize their regulatory efforts to avoid overlap or redundancies, and identify approaches that reduce burdens and maintain flexibility and freedom of choice for the public. Agencies are also urged to come up with a method to conduct retrospective analyses of existing regulations in order to identify any ineffective or excessively burdensome regulations and later streamline, modify, expand, or repeal those identified. Additionally, each agency must "ensure the objectivity of any scientific and technological information and processes used to support the agencies regulatory action."

Cumulative Effects of Regulation

In response to Executive Order 13563 and recommendations on strengthening regulatory review by the White House Jobs Council,[17] OIRA Administrator Cass Sunstein distributed an OMB Memorandum on March 20, 2012 with the subject "Cumulative Effects of Regulations."[18] The letter identified key recommendations from the executive order, and outlined a list of steps that agencies should consider in order to incorporate consideration of cumulative effects, reduce "redundant, overlapping, and inconsistent requirements" and "identify opportunities to harmonize and streamline multiple rules." Furthermore, the memorandum directed agencies, where appropriate and feasible, to consider "cumulative effects and opportunities for regulatory harmonization" and "carefully assess the appropriate content and timing of rules in light of those effects and opportunities" in the rule analysis process.

The steps outlined in the guidance stipulated ways for agencies to implement and incorporate recommendations, considerations, and principles outlined in the executive order. Issues addressed by the steps included public comment and early engagement of stakeholders in the rulemaking process; specific consideration of cumulative effects vis-à-vis small businesses and start-ups; identification of opportunities to increase net benefits while decreasing costs; consideration of the relationship between proposed and existing regulations; identification of opportunities to eliminate inconsistency and redundancy; coordination of timing, content, and requirements of multiple rulemakings for a particular sector or industry; and incorporating consideration of the interactive and cumulative effects of multiple regulations affecting specific sectors as part of agencies retrospective analysis of existing rules.

Previous Guidance to Agency

Executive Order 12866

[17] http://www.jobs-council.com/recommendations/summary-of-road-map-to-renewal-report/.

[18] http://www.whitehouse.gov/sites/default/files/omb/assets/inforeg/cumulative-effects-guidance.pdf.

In September of 1993, President Clinton issued Executive Order 12866, "Regulatory Planning and Review."[19] The order established a regulatory planning and review process whereby the OMB generally, and OIRA specifically, was assigned responsibility for review of the agency rulemaking process; furthermore, the Order designated OIRA as "the repository of expertise regarding regulatory issues, including methodologies and procedures that affect more than one agency..." Pursuant to this characterization, the Order proceeded to assign substantial responsibility to OIRA both with regards to the regulatory process in general and the implementation of the Order specifically.

The stated intention of the order was to "reform and make more efficient the regulatory process" and it established a regulatory philosophy and principles for agencies to incorporate or abide by in order to achieve this end. Per the identified principles, agencies would be required, among other things, to assess the costs and the benefits of intended regulations, and propose or adopt a regulation "only upon a reasoned determination that the benefits of an intended regulation justify its costs."[20] The order also established the organization of the regulatory planning and review process, and assigned OMB and OIRA responsibility for ensuring that agencies incorporated the principles in the rulemaking process.

OMB Circular A-4

Circular A-4, issued by the Office of Management and Budget to the heads of executive agencies and establishments on September 17, 2003, provides guidance to Federal agencies on the development of regulatory analysis and regulatory accounting statements as required by Executive Order 12866 and the Regulatory Right-to Know Act.[21] This circular served as a replacement for OMB's 1996 "Best Practices" document and the subsequent guidance issued in 2000. Circular A-4 defines "good regulatory analysis" and also helps standardize the manner in which the benefits and costs of Federal regulatory action are measured and reported. It also incorporated and elaborated on the regulatory philosophy and principles outlined in Clinton's order.

Per the circular, regulatory analyses should contain a statement of the need for the proposed action, which would include an identification of the problems to be addressed and specific authority to do so. An examination of alternative approaches based on several factors and variables must also be undertaken, followed by an evaluation of benefits and costs, both qualitative and quantitative, of the proposed action and identified alternatives. The circular provides instructions for agencies on how to perform a cost-benefit analysis, identifying key components and characteristics, such as establishment of a scope and baseline, evaluation of alternatives, and the transparency and reproducibility of results. Furthermore, the circular identifies opportunity cost as a key measure in estimating costs and benefits; OMB identifies "willingness-to-pay," or what individuals are willing to forgo to enjoy a particular benefit, as the most appropriate metric, although "willingness-to-accept," an individual's willingness to accept

[19] http://www.whitehouse.gov/sites/default/files/omb/inforeg/eo12866.pdf.

[20] This is a departure from a prior executive order, issued by President Reagan in 1981, which stipulated, "Regulatory action shall not be undertaken unless the potential benefits to society for the regulation outweigh the potential costs to society...the alternative involving the least net cost to society shall be chosen...". Executive Order 12291, "Federal Regulation" issued by President Ronald Reagan. February 17, 1981. Accessible at: http://www.archives.gov/federal-register/codification/executive-order/12291.html

[21] The White House, Office of Management and Budget, "Circular A-4," September 17, 2003, http://www.whitehouse.gov/omb/circulars_a004_a-4/.

compensation, is also included as a possible measure in some circumstances. The circular directs agencies to take into account ancillary benefits and countervailing risks in addition to simply examining direct benefits and costs.

OMB Final Information Quality Bulletin for Peer Review

The general authority granted to OMB allows the office to oversee the quality of agency information, analyses, and regulatory action. Thus, as part of a larger effort to improve the quality of scientific information upon which policy decisions are based, OMB issued its "Final Information Quality Bulletin for Peer Review" in December of 2004.[22] This bulletin, applicable to all departments and agencies, established "government-wide guidance aimed at enhancing the practice of peer review of government science documents" in order to increase the quality and credibility of scientific information generated by the federal government.

The guidance addressed several questions fundamental to the peer review process such as what information is subject to peer review, the selection of appropriate reviewers, opportunities for public participation in the process, and additionally defined a planning process that would allow for dialogue between the agency, the public, and the scientific community. It also established definitions and government wide standards concerning when peer review is required and what type of peer review should be considered in various circumstances.

EPA's *Guidelines for Preparing Economic Analyses*

In order to meet the requirements of Executive Order 12866 and OMB Circular A-4, the Environmental Protection Agency undertook internal efforts to develop a framework for economic analyses that would both "inform the policy making process and satisfy OMB's requirement for regulatory review." This process resulted in the agency's publication of *Guidelines for Preparing Economic Analyses*,[23] which established a scientific framework for performing economic analyses of environmental regulations and policies.

The document provides guidance for conducting cost-benefit and economic impact analyses, how to perform distributional analyses, and a review and explanation of discounting procedures to be used in evaluating environmental regulatory actions. The guideline also attempts to ensure that issues inherent in assessing benefits and costs, such as uncertainty, timing, and valuation, are treated in a consistent manner in economic analysis throughout the Agency and across all program offices.

[22] http://www.whitehouse.gov/sites/default/files/omb/memoranda/fy2005/m05-03.pdf.

[23] US Environmental Protection Agency, Office of the Administrator "Guidelines for Preparing Economic Analyses," December 2010. Accessible at: http://yosemite.epa.gov/ee/epa/eerm.nsf/vwAN/EE-0568-51.pdf/$file/EE-0568-51.pdf

Chairman HARRIS. The Subcommittee on Energy and Environment will come to order.

Good afternoon. I am going to first apologize for a late start but we just got off the Floor with our first series of votes today, and I want to thank you all for your patience.

Welcome to today's hearing entitled "EPA's Impact on Jobs and Energy Affordability: Understanding the Real Costs and Benefits of Environmental Regulations." In front of you are packets containing the written testimony, biographies, and truth-in-testimony disclosure for today's panel of witnesses.

I now recognize myself for five minutes for an opening statement.

I want to welcome everyone to this afternoon's hearing on EPA's Impact on Jobs and Energy Affordability and to thank our witnesses for lending this Subcommittee their time and expertise.

At the outset, I want to note that, unfortunately, due to a personal conflict, we should congratulate Cass Sunstein on the birth of a child. Administrator Sunstein from the White House Office of Information and Regulatory Affairs will not be testifying today. I certainly understand this explanation, although it was not communicated to the Subcommittee until late last week. I am concerned and somewhat disappointed in the lack of transparency and responsiveness demonstrated by the Office of Information and Regulatory Affairs when trying to organize this hearing.Staff reached out to identify a mutually agreeable hearing date over two months ago, and beginning on April 24, I sent formal invitations expressing flexibility regarding the Office's appearance that remain unanswered.

I would be greatly disappointed if Administrator Sunstein refused to testify at some point before this Subcommittee, especially in light of the fact that his predecessors have testified before the Science Committee and its Subcommittee nearly a dozen times. An unwillingness to discuss recent regulatory developments would be especially disconcerting, given that Mr. Sunstein is responsible for overseeing the Open Government Initiative for the President's self-proclaimed "most transparent Administration in history."

Further, his office is charged with enforcing the Executive Order requiring that the regulatory system be "based on the best available science" as well as OMB standards on information quality, peer review, and data access. These are all issues directly relevant to the Subcommittee's jurisdiction and work, and I expect the Administrator to communicate to the Subcommittee by the end of this week when it would be convenient for him to testify in the coming months.

While OIRA is not represented to discuss this process of integrating scientific and economics assessments into regulatory decision making, there are numerous Executive Orders and OMB and Agency guidelines for thorough regulatory analysis. Unfortunately, many of these guidelines have been willfully ignored in order to pursue an unprecedented regulatory agenda that is at odds with the President's rhetoric about an "all-of-the-above" energy policy.

Our witnesses today will describe a pattern of scientific and economic practices at EPA and OIRA that inflates health-based regulatory benefits; overlooks actual economic, energy affordability, and jobs impacts; and fails to reflect uncertainty in communicating

risks. All too often, major EPA regulations have been underpinned by secret science, hidden data, and black box models. As demonstrated in the hydraulic fracturing cases in Pavillion, Wyoming, Parker County, Texas, and Dimock, Pennsylvania, the Agency often appears more concerned with crucifying press releases and enforcement actions than meaningful peer review or scientific analysis.

Additionally, EPA has failed to account for the health impacts of the higher energy prices and joblessness that these regulations guarantee. More and more of these regulations are almost exclusively justified on the basis of incidental "co-benefits" from particulate matter reductions—raising the specter of double-counting—and private benefits on the assumption that all regulated entities are acting irrationally and against their economic self-interest and the—and that EPA knows what is best for their bottom line.

The absurdity of these estimates is demonstrated in OIRA's 2012 Draft Report to Congress, which indicates that, based on benefits estimates generated by EPA, the Agency's air quality regulations represent almost 80 percent of the benefits for all federal rules. Despite President Obama's Executive Order requiring that regulatory benefits justify costs, EPA recently announced its Carbon Pollution Standard for New Power Plants and claimed that the rule "will result in negligible CO_2 emission changes, energy impacts, quantified benefits, costs, and economic impacts." As a matter of principle, regulatory benefits should justify their costs, and EPA's pursuit of this coal-killing regulation, despite its own admission that the rule has negligible benefits is mind boggling. As several of our witnesses will testify, this statement strains credulity, and the proposal is a de facto ban on new, clean, coal-generated electricity in this country, as well as directly at odds with the President's "all-of-the-above" energy rhetoric.

I want to thank the witnesses for appearing before the Subcommittee today, and I look forward to a constructive discussion.

I yield back the balance of my time, and I recognize the Ranking Member, Mr. Miller, for five minutes for an opening statement.

[The prepared statement of Mr. Harris follows:]

PREPARED STATEMENT OF SUBCOMMITTEE CHAIRMAN ANDY HARRIS

I want to welcome everyone to this afternoon's hearing on EPA's Impact on Jobs and Energy Affordability, and thank our witnesses for lending this Subcommittee their time and expertise.

At the outset, I want to note that, unfortunately, due to a personal conflict, Administrator Cass Sunstein from the White House Office of Information and Regulatory Affairs, or OIRA, will not be testifying today. I certainly understand this explanation, although it was not communicated to the Subcommittee until late last week. I am concerned and somewhat disappointed in the lack of transparency and responsiveness demonstrated by OIRA when trying to organize this hearing. Staff reached out to identify a mutually agreeable hearing date over two months ago, and beginning on April 24 I sent formal invitations expressing flexibility regarding OIRA's appearance that remain unanswered.

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Our witnesses today will describe a pattern of scientific and economic practices at EPA and OIRA that inflates health-based regulatory benefits, overlooks actual economic, energy affordability, and jobs impacts, and fails to reflect uncertainty in communicating risks. All too often, major EPA regulations have been underpinned by secret science, hidden data, and black box models. As demonstrated in the hydraulic fracturing cases in Pavillion, Wyoming, Parker County, Texas, and Dimock, Pennsylvania, the Agency often appears more concerned with crucifying press releases and enforcement actions than meaningful peer review or scientific analysis.

Additionally, EPA has failed to account for the health impacts of the higher energy prices and joblessness that these regulations guarantee. More and more of these regulations are almost exclusively justified on the basis of incidental "co-benefits" from particulate matter reductions (raising the specter of double counting) and private benefits on the assumption that all regulated entities are acting irrationally and against their economic self-interest (and that EPA knows what is best for their bottom line).

The absurdity of these estimates is demonstrated in OIRA's 2012 Draft Report to Congress, which indicates that, based upon benefits estimates generated by EPA, the Agency's air quality regulations represent almost 80 percent of the benefits for all federal rules. Despite President Obama's Executive Order requiring that regulatory benefits justify costs, EPA recently announced its Carbon Pollution Standard for New Power Plants and claimed that the rule "will result in negligible CO_2 emission changes, energy impacts, quantified benefits, costs, and economic impacts." As a matter of principle, regulatory benefits should justify their costs, and EPA's pursuit of this coal-killing regulation, despite its own admission that the rule has negligible benefits, is mind boggling. As several of our witnesses will testify, this statement strains credulity, and the proposal is a de facto ban on new, cleaner coal-generated electricity in this country as well as directly at odds with the President's "all-of-the-above" energy rhetoric.

I want to thank the witnesses for appearing before the Subcommittee today and I look forward to a constructive discussion.

I yield back my time.

Mr. MILLER. Thank you, Chairman Harris.

I also want to begin by congratulating OIRA Administrator Cass Sunstein on the birth of a daughter last week. The human gestation period is somewhat predictable, and I suspect that Mr. Sunstein has known for some time that his wife would give birth about when she did. And that explains some of his reluctance to agree to a date to testify from among the options that the majority offered him. It is hard for me to imagine that he may not have mentioned that as the reason until last week, but it is hard for me to imagine he was keeping his wife's pregnancy secret. Pregnancy, particularly in the later stages, tends to be a fairly transparent event.

But today's hearing is one he probably would not mind missing. This Committee certainly should inquire into the cost-benefit analysis of environmental regulations. I have been concerned about economic cost-benefit analysis for a long time. Placing a dollar value on human life in deciding the economic benefit of environmental regulations raises serious questions, both practical and moral. Should we really value the lives of older Americans less than younger Americans, as at least one of our witnesses today apparently favors? And in a letter to Administrator Sunstein last fall,

Chairman Harris asked, "in spite of the fact that most mortality associated with particulate matter happens in the population over 65 years of age, EPA puts the same value on mortality for all ages. In your view, is this practice appropriate?"

The Bush Administration briefly considered a senior death discount to justify weakening environmental regulations by valuing the lives of Americans older than 70 at 37 percent less than the values of the lives of other Americans. Their analysis reduced the economic benefit of one air pollution regulation from $77 billion to $8 billion. The Bush Administration recognized that they were swimming in deep waters, however, and dropped the idea of a senior death discount in economic cost-benefit analysis. That seems like the right decision to me.

But we know that as a practical matter if we forbid anything that could result in someone's death, then all economic activity will grind to a halt. But putting a dollar value on lives and valuing the lives of some more than others raises profound moral questions. I admit that deep philosophical discussions make me feel like I am back in college. I am in a dorm room late at night; three or four of us have had a few beers. We are sure that we are considering issues that have gone largely unexamined by previous generations and that our insights are wise beyond our years, but it is certainly better to talk about these questions out loud and let the American people in on the discussion. They might not agree that old folks' lives should be discounted. In fact, they might decide that Congress is really just more interested in pleasing special interests than in protecting the health of our mothers and fathers. And any supposed philosophical justification or economic justification for what Congress is doing is phony.

If that was what this hearing was about or even a discussion of economic cost-benefit analysis that was a notch or two less abstract or philosophical, the majority would have invited EPA to provide a witness to explain how it would do cost-benefit analysis. So EPA, it does cost-benefit analysis of environmental regulations, not OIRA. Instead, this hearing is one more forum for big, specific industries to air their grievances about the EPA. We have heard again and again over the last year and a half that the EPA is filled with authoritarian zealots bent on destroying jobs, raising energy costs, and otherwise making us all eat granola, wear sandals, and ride bicycles. We have heard repeatedly that the EPA knows little of scientific methods and even less of economic analysis often from witnesses with few apparent credentials as scientists or economists.

Given the disjointed nature of the list of particular grievances with the EPA aired today, the minority decided not to call a witness to today's hearing. If this Committee holds a hearing in the future for a serious, focused discussion of cost-benefit analysis, the communities affected by environmental exposures, and the practical and moral judgments that are behind the value of statistical life, we will certainly invite a witness.

For today, I am submitting for the record letters and reports by groups and experts with the experience and knowledge to contribute to a thoughtful discussion of cost-benefit analysis.

I yield back. And Mr. Chairman, I believe that you have been provided already—or your staff has been provided already a list of the letters—the documents that we submit for the record.

[The prepared statement of Mr. Miller follows:]

PREPARED STATEMENT OF SUBCOMMITTEE RANKING MEMBER BRAD MILLER

Thank you, Chairman Harris.

I want to begin by congratulating OIRA Administrator Cass Sunstein on the birth of a daughter last week. The human gestation period is somewhat predictable, and I suspect that Mr. Sunstein has known for some time that his wife would give birth about when she did, and that explains some of his reluctance to agree to a date to testify from among the options that the majority offered.

But today's hearing is one he probably doesn't mind missing.

This Committee certainly should inquire into the cost-benefit analysis of environmental regulations. I've been concerned about economic cost-benefit analysis for a long time. Placing a dollar value on human life in deciding the economic benefit of environmental regulations raises serious questions, both practical and moral. Should we really value the lives of older Americans less than younger Americans, as at least one of our witnesses apparently favors? And in a letter to Administrator Sunstein last fall, Chairman Harris asked,"In spite of the fact that most mortality associated with [particulate matter] happens in the population over 65 years of age, EPA puts the same value on mortality for all ages. In you view, is this practice appropriate?"

The Bush Administration briefly considered a "senior death discount" to justify weakening environmental regulation. By valuing the lives of Americans older than 70 at 37 percent less than the lives of other Americans, their analysis reduced the economic benefit of one air pollution regulation from $77 billion to $8 billion.

The Bush Administration recognized that and dropped the idea of a "senior death discount" in economic cost-benefit analysis. That still seems like the right decision to me.

We know that as a practical matter, if we forbid anything that might result in someone's death, then all economic activity would grind to a halt. But putting a dollar value on lives, and valuing some lives more than others, raises profound moral questions.

I admit that deep philosophic discussions make me feel like I'm back in college, I'm in a dorm room late at night, three or four of us have had a few beers, and we're sure that we're considering issues that have gone largely unexamined by previous generations and that our insights are wise beyond our years.

But it's certainly better to talk about these questions out loud and let the American people in on the discussion. They might not agree that old folks' lives should be discounted. In fact, they might decide that Congress is really just more interested in pleasing special interests than in protecting the health of our mothers and fathers, and any supposed philosophical justification for what Congress is doing is phony.

That's what the title of this hearing suggested we would discuss today.

If that was what this hearing was about, or even a discussion of economic cost-benefit analysis that was a notch or two less abstract or philosophical, the majority would have invited the EPA to provide a witness to explain how they do cost-benefit analysis. Instead, this hearing is one more forum for specific big industries to air their grievances about the EPA. We've heard again and again that the EPA is filled with authoritarian zealots bent on destroying jobs, raising energy costs, and otherwise making us all eat granola, grow beards, and ride bicycles. We've heard repeatedly that the EPA really knows little of scientific methods and even less of economic analysis, often from witnesses with few apparent credentials as scientists or economists.

Given the disjointed nature of the list of grievances with the EPA aired today, the minority decided not to call a witness. If this Subcommittee holds a future hearing for a serious, focused discussion of cost-benefit analysis, the communities affected by environmental exposures, and the practical and moral questions that are behind the Value of Statistical Life, we will certainly invite a witness. For today, I am submitting for the record letters and reports by groups and experts with the experience and knowledge to contribute to a thoughtful discusssion of cost-benefit analysis.

I yield back.

Chairman HARRIS. Yes. The Chair appreciates the request, but I have to reserve the right to object to inclusion of the items in the record at this time as our staff simply has not had the time to adequately review the contents of the documents for relevance and appropriateness. As you know, we received—or may not know—we received most of the materials at 11:30 last night. And, you know, Congress, we like to think is a 24/7 body, but 11:30 last night is a little late. We received additional materials at 10 o'clock this morning. You know that we have been in session since then, and they total 18 documents and 140 pages. And, you know, we read fast, but we don't read that fast.

So it is quite possible that most, if not all, of these items will not present a problem but we simply need additional time for review.

The Chair would remind and encourage all Members wishing to submit extensive materials into the record to share those as far in advance as possible to allow for reasonable review times so that we can, you know, get them in the record under unanimous consent, but I am afraid that won't be possible at this time.

Mr. MILLER. And, Mr. Chairman, given that, first of all, I would like to have a chance to discuss these issues if you determine on any basis that these should not be part of the record. I do not recall any time that the minority has submitted documents for the record and had that request denied, but I would reserve the right to object to any documents that the majority wishes to enter into the record.

Chairman HARRIS. Sure. And if we send something over at 11:30 last night, I think you—it would be totally, totally appropriate for you to—especially 140 pages at 11:30 at night, it would be totally appropriate for that to be a fact.

Let me just—since you mentioned a letter that I had written to Mr. Sunstein, I look forward to discussing the issues about statistical lives, maybe with Administrator Sunstein, maybe with Ezekiel Emanuel also, because the whole purpose of the letter was that, in fact, Mr. Sunstein has said that we should use statistical life here and has repeatedly called for conducting regulatory analysis. I actually asked, is it appropriate in an EPA study? So I agree with you that that is something we should discuss in a very open forum.

Now, if there are Members who wish to submit additional opening statements, your statements will be added to the record at this point.

At this time, I would like to introduce three of our witnesses, and I will yield to Mrs. Biggert to introduce Mr. Wolf and Mr. Trzupek. The first witness is Dr. Michael Honeycutt, the Chief Toxicologist with the Texas Commission on Environmental Quality. Welcome back. He has been employed by the TCEQ since 1996 and has managed a division of 14 toxicologists since 2003. His responsibilities include overseeing health effects, reviews of air permit applications, overseeing the review of the results of ambient air monitoring projects, and overseeing the reviews of human health risk assessments for hazardous waste sites.

Our next witness is Mr. Eugene Trisko, Attorney-at-Law, who is testifying on behalf of the American Coalition for Clean Coal Electricity. For 10 years, Mr. Trisko served as an expert witness on water utility cost of capital before the Public Utility Commissions of Maryland, Virginia, and West Virginia. In 2000 and again in

2007, Mr. Trisko was appointed by the U.S. Department of State to represent U.S. industry and labor in bilateral negotiations with Canada on air pollution control.

Our fourth witness today will be Mr. David Hudgins, the Director of Member and External Relations at the Old Dominion Electric Cooperative. Old Dominion is a generation and transmission cooperative that supplies the electricity needs of 12-member electric distribution cooperatives that serve over 500,000 customers in Virginia, Delaware, and Maryland, and I might add, the 1st Congressional District of Maryland as well. In his position, Mr. Hudgins works with these member cooperatives and local, regional, and state governmental agencies to identify and attract businesses to locate in the predominantly rural areas served by these cooperatives.

I now yield to Mrs. Biggert to introduce our third witness, Mr. Tom Wolf; and our fifth and final witness, Mr. Richard Trzupek.

Mrs. BIGGERT. Thank you, Mr. Chairman. It is my pleasure to be here this afternoon to introduce both of these witnesses from my home State of Illinois.

Mr. Wolf is the Executive Director of the Illinois Chamber of Commerce's Energy Council, where he advocates for the development of across-the-board energy sources. Prior to joining the Chamber, Mr. Wolf spent more than 20 years as a Public Affairs Executive and holds a bachelor's degree from the University of Wisconsin in Madison.

Mr. Trzupek has worked in the environmental industry for three decades, starting as a stat tester and now acting as an Environmental Consultant to many businesses. He is the author of *Air Quality Permitting and Compliance Manual* and *Regulators Gone Wild*. I haven't read that one yet—but how the EPA is ruining America's industry—and holds a bachelor's degree from Loyola University in Chicago.

So I thank both of you for joining us and providing your insights into these troubling EPA regulations. I look forward to hearing your testimony.

Yield back, Mr. Chairman.

Chairman HARRIS. Thank you very much, Mrs. Biggert.

As our witnesses should know, spoken testimony is limited to five minutes, each after which the Members of the Committee will have five minutes each to ask questions.

I now recognize Dr. Michael Honeycutt to present his testimony.

STATEMENT OF DR. MICHAEL HONEYCUTT, CHIEF TOXICOLOGIST, TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Mr. HONEYCUTT. Good afternoon, Mr. Chairman and Members of the Committee. I am Dr. Michael Honeycutt, Director of the Toxicology Division at the TCEQ. I have submitted more detailed written comments on the science behind EPA's cost-benefit analysis, but I will touch on a couple of highlights right now.

The EPA's cost-benefit analysis is detailed in the Regulatory Impact Analysis for each significant rule. A number of Executive Orders address the requirement for and the goals of cost-benefit anal-

ysis. Under the Reagan Administration, the benefits for a proposed rule had to outweigh the cost for that rule. However, the Clinton Administration in this—the language was changed substantially such that the benefits must simply justify the cost. That position is maintained in the current administration, along with consideration for additional factors such as equity, fairness, promotion of economic growth, and job creation.

The vast majority of the benefits that EPA calculates come from the so-called "co-benefits" of reducing fine particulate matter, or PM, even on the rules that do not directly target PM. Those estimated benefits rely heavily on two key assumptions: number one, that PM causes mortality; and that, number two, that there is no safe level of exposure to PM. The most recent analysis of the costs and benefits of the Clean Air Act concludes that for every $1 society spends complying with these regulations, $30 in benefits is obtained. However, more objective assessments of the human health benefits from cleaner air do not necessarily support the conclusion that the benefits outweigh costs.

Keeping that in mind, I want to briefly talk about the ecological epidemiology studies that EPA is using as the primary basis for the PM benefits. These studies are exploratory studies designed to look for correlations. They are supposed to be followed up by more rigorous epidemiology and clinical studies to determine whether the correlations are real. These studies are not supposed to be used quantitatively, and they are certainly not rigorous enough to set environmental policy. The assumption is that breathing PM made individuals die sooner than they would have otherwise.

This type of study is notorious for unresolved issues. Were the individuals actually outside? Did they take their medications that day? Do they have other risk factors with a stronger influence on life expectancy like smoking, cholesterol levels or obesity? There are a whole host of common-sense questions that go unanswered in these studies. Simply put, these studies cannot tell us if PM caused these deaths or even if these people died prematurely, much less tell us what PM might have caused their death.

Since 2009, the EPA has assumed that there is a linear relationship between PM exposure and mortality. And you can see on the overhead here, data from a typical study showing that the relationship between mortality risk and PM levels is not obvious. That is not a straight line. I am sorry. In fact, one would be hard pressed to detect a linear association. Nevertheless, statisticians can run data through elegant models to try to find statistically significant correlations, but the output of those models is only as good as the input and, as any scientist will tell you, statistical correlation alone does not imply causation.

EPA also assumes that any exposure to PM, no matter how low, directly causes premature death. This method extrapolates risk far below the NAAQS, extending to background levels. This approach is not entirely accurate, nor is it conclusively supported by the data. In fact, ecological epidemiology studies are not designed to detect thresholds. Furthermore, this assumption does not take into account the fact that the body can handle small doses of PM, and indeed, this concept is the cornerstone of toxicology.

When the scientific data addressing the association between PM and premature death is examined in detail, it becomes obvious that these statistical associations may have very little biological significance. The increased chance of dying that is reportedly due to PM exposure is extremely small. This chance is communicated by what is known as relative risk, with a relative risk of 1.0 being not significant. Scientific as well as legal guidance indicates that relative risks below 2.0 should not be considered to support this relationship. The relative risks for PM and premature death reported to date are considerably lower than 2.0.

For the two studies EPA uses, one relative risk is 1.06 and the other is 1.16. Some of the studies show no relationship, and in fact, some studies suggest that PM can make you live longer.

These issues illustrate EPA's modus operandi. The concept of "weight of evidence" is misused to discount contradictory data. They use worst-case assumptions, fail to put risks into proper perspective, and fail to disclose how uncertain the data are. Our agency believes that regulations are an integral and necessary tool to protect public health and our natural resources. Likewise, our expectation is that those regulations be based on sound science and justifiable and that they realize true benefits.

Thank you for this opportunity.

[The prepared statement of Mr. Honeycutt follows:]

Testimony of Dr. Michael Honeycutt, TCEQ
One Page Summary of Main Points

Background/Purpose of RIAs
EPA uses the reduction of $PM_{2.5}$ in its Regulatory Impact Analyses (RIA) for rulemaking under the Clean Air Act to show that the benefits of the regulations justify the costs.

1. Under the Reagan administration, the benefits of proposed rules were required to outweigh the costs. However, recent executive orders under the Clinton and Obama administrations require the benefits of regulatory action to justify the costs.
2. EPA uses the reductions of $PM_{2.5}$ in its Regulatory Impact Analyses (RIA) for rulemaking under the Clean Air Act.
    a. Reductions of $PM_{2.5}$ are used even when regulations are not related to $PM_{2.5}$ exposure because these reductions are expected to occur coincidentally due to the use of control technologies required by the proposed rule.

Changes in $PM_{2.5}$ methodology
Changes in the methodology used to measure the benefits from reducing $PM_{2.5}$ are not based on sound science and have resulted in an increase in deaths attributed to $PM_{2.5}$, despite improved air quality, resulting in inflated benefits.

3. EPA recently changed the methodology used to measure the benefits from reducing $PM_{2.5}$. These changes include:
    a. A "no threshold model" inaccurately assumes incremental benefits in lower levels of $PM_{2.5}$, down to background levels.
    b. Risks are incorrectly attributed to very low levels of ambient $PM_{2.5}$.
    c. A causal relationship between $PM_{2.5}$ and mortality is assumed by only using data that supports the conclusion that $PM_{2.5}$ exposure causes premature mortality. EPA ignored well-conducted studies that contradict their findings. The studies EPA used to say a causal relationship exists **cannot** be used for this purpose.
    d. Inappropriate use of a Value of Statistical Life (VSL) creates an inaccurate projection of lives "saved."
4. EPA's changes to the $PM_{2.5}$ methodology resulted in an increase in deaths attributed to $PM_{2.5}$, despite improved air quality.
    a. This methodology together with the inappropriate use of VSL has resulted in inflated benefits of reducing $PM_{2.5}$ and creates the illusion of Clean Air Act benefits that vastly outweigh the costs of rule implementation.

Inflated benefit/cost ratio
EPA claims that the benefits of reducing $PM_{2.5}$ outweigh the costs by 30 to 1. However, alternative assessments of the human health benefits from cleaner air do not necessarily support the conclusion that benefits outweigh costs.

5. Using flawed methodology, EPA claims that the benefits outweigh the costs by 30 to 1.
    a. By correcting only the inaccurate use of VSL, it can be determined that the benefit:cost ratio is 5:1. Objective analysis indicates that the benefit:cost ratio is actually 0.3:1.
6. This trend amounts to censoring the information being communicated to the risk manager.
    a. The same statistical "lives" are counted in multiple rules, resulting in a double counting of benefits.
    b. Costs are unique to each rule.

Good morning, Mr. Chairman and members of the committee. I am Dr. Michael Honeycutt, director of the Toxicology Division at the Texas Commission on Environmental Quality. I have submitted more detailed written comments on the science behind the EPA's cost benefit analyses, but I'll touch on a couple of highlights now.

The EPA's cost benefit analysis is detailed in the Regulatory Impact Analysis (RIA) for each significant rule[1]. A number of Executive Orders address the requirement for and goals of cost benefit analysis. Under the Reagan administration[2] the benefits for a proposed rule had to outweigh the costs for that rule. However, with the Clinton administration[3] this language was changed substantially such that the benefits must simply justify the costs. That position is maintained in the current administration[4] along with consideration for additional factors such as equity, fairness, promotion of economic growth, and job creation.

The vast majority of the benefits that EPA calculates[5] come from the so-called "co-benefits" of reducing fine particulate matter[6], or PM, even on rules that do not directly target PM. Those estimated benefits rely heavily on two key assumptions: 1) that PM causes mortality and 2) that there is no safe level of exposure to PM. The most recent analysis[7] of the costs and benefits of the Clean Air Act concludes that for every $1 society spends complying with these regulations, $30 in benefits is obtained. However, more objective assessments of the human health benefits from cleaner air do not necessarily support the conclusion that benefits outweigh costs[8].

Keeping that in mind, I want to briefly talk about the ecological epidemiology studies that EPA is using as the primary basis for the PM benefits. These studies are exploratory studies designed to look for correlations. They are supposed to be followed up by more rigorous epidemiology and clinical studies to determine whether the correlations are real. These studies are not supposed to be used quantitatively and they certainly are not rigorous enough to set environmental policy. The assumption is that breathing PM made individuals die earlier than they would have otherwise. This type of study is notorious for unresolved issues: Were the individuals actually outside in the days prior to their death? Did they take their medications that day? Do they have other risk factors with stronger influence on life expectancy (like smoking, cholesterol, or weight)? There are a whole host of common sense questions that go unanswered in these studies. Simply put, these studies cannot tell us if PM caused these deaths or even if these people died prematurely, much less tell us what level of PM might have caused their death.

Since 2009, the EPA has assumed that there is linear relationship between PM exposure and mortality. You can see here (figure 1) data from a typical study showing that the relationship

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[1] OMB Circular A-4: A regulatory action is economically significant if it is anticipated (1) to "[h]ave an annual effect on the economy of $100 million or more" or (2) to "adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities."
[2] EO 12291, 1981
[3] EO 12866, 1993
[4] EO 13563, 2011
[5] EPA, March 2011. "The Benefits and Costs of the Clean Air Act from 1990 to 2020"
[6] $PM_{2.5}$
[7] EPA, March 2011. "The Benefits and Costs of the Clean Air Act from 1990 to 2020"
[8] Tony Cox. 2012. Reassessing the human health benefits from cleaner air. Risk Analysis. 32(5):816-29.

between mortality risk and PM levels is not obvious. In fact, one would be hard pressed to detect a linear association. Nevertheless, statisticians can run data through elegant models to try to find statistically significant correlations, but the output of those models is only as good as the input and, as any scientist will tell you, statistical correlation alone does not imply causation.

EPA also assumes that any exposure to PM, no matter how low, directly causes premature death. This method extrapolates risk far below the NAAQS, extending to background levels. This "no-threshold" approach is not entirely accurate, nor is it conclusively supported by the data[9,10,11,12,13,14,15,16,17]. In fact, ecological epidemiology studies are not designed to detect thresholds. Furthermore, this assumption doesn't take into account the fact that the body can handle small doses of PM. Indeed, this concept is the cornerstone of toxicology.

When the scientific data addressing the association between PM and premature death is examined in detail, it becomes obvious that these statistical associations may have very little biological significance. The increased chance of dying that is reportedly due to PM exposure is extremely small. This chance is communicated as relative risk, with a relative risk of 1.0 being non-significant. Scientific as well as legal guidance indicates that relative risks below 2.0 should not be considered to support a hypothesized relationship[18]. The relative risks for PM and premature death reported to date are considerably lower than 2.0. For the two studies most often cited by the EPA, the relative risks are 1.06 (Pope *et al.* 2002[19]) and 1.16 (Laden *et al.* 2006[20]). Many of these studies do <u>not</u> show a statistical relationship between PM and premature death[21].

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[9] McDonnell WF, N Nishino-Ishikawa, FF Petersen, LH Chen, DE Abbey. 2002. Relationships of mortality with the fine and coarse fractions of long-term ambient PM_{10} concentrations in nonsmokers. Journal of Exposure Analysis and Environmental Epidemiology. 10(5):427-36.

[10] Koop GM and LA Tole. 2004. An investigation of thresholds in air pollution-mortality effects. Environmental Modeling and Software. 21(12):1662-1673.

[11] Enstrom JE. 2005. Fine particle air pollution and total mortality among elderly Californians, 1973-2002. Inhalation Toxicology. 17(14):803-16.

[12] Lipfert FW, JD Baty, JP Miller, RE Wyzga. 2006. $PM_{2.5}$ constituents and related air quality variables as predictors of survival in a cohort of U.S. military veterans. Inhalation Toxicology. 18:643-657.

[13] Franklin M, A Zeka, J Schwartz. 2007. Association between $PM_{2.5}$ and all-cause and specific-cause mortality in 27 U.S. communities. Journal of Exposure Science and Environmental Epidemiology. 17(3):279-87. *see lag 0 data*

[14] Zeger SL, F Dominici, A McDermott, JM Samet. 2008. Mortality in the Medicare population and chronic exposure to fine particulate air pollution in urban centers (2000-2005). Environmental Health Perspectives. 116(12):1614-9. *see data for Western U.S.*

[15] Krewski D, M Jerrett, RT Burnett, R Ma, E Hughes, Y Shi, MC Turner, CA Pope 3rd, G Thurston, EE Calle, MJ Thun, B Beckerman, P DeLuca, N Finkelstein, K Ito, DK Moore, KB Newbold, T Ramsay, Z Ross, H Shin, B Tempalski. 2009. Extended follow-up and spatial analysis of the American Cancer Society study linking particulate air pollution and mortality. Research Report from the Health Effects Institute. 140:5-114. *see 1972-2000 data*

[16] Klemm RJ, EL Thomas, RE Wyzga. 2011. The impact of frequency and duration of air quality monitoring: Atlanta, GA, data modeling of air pollution and mortality. 61:1281-1291.

[17] Tony Cox. 2011. Hormesis for fine particulate matter ($PM_{2.5}$). Dose-Response. Pre-Press Article.

[18] Federal Judicial Center Reference Manual on Scientific Evidence Second Edition (2000) p384 & fn.140.

[19] Pope CA III, RT Burnett, MJ Thun, EE Calle, D Krewski, K Ito, and GD Thurston. 2002. Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution. Journal of the American Medical Association. 287:1132-1141.

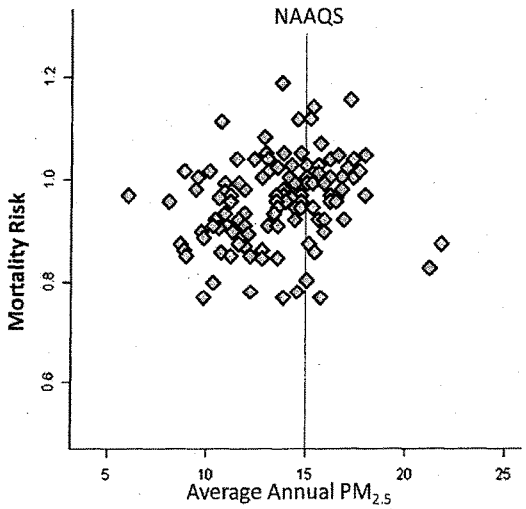
[20] Laden F, J Schwartz, FE Speizer and DW Dockery. 2006. Reduction in fine particulate air pollution and mortality. American Journal of Respiratory and Critical Care medicine. 173:667-672.

[21] See references 9-17 above.

Some studies even suggest PM makes you live longer[22,23]. EPA could have chosen a number of studies just as well conducted as the Pope and Laden studies and would have determined there is no health benefit from further regulating PM.

These issues illustrate EPA's *modus operandi*. The concept of "weight of evidence" is misused to discount contradictory data. They use worst-case, often unrealistic assumptions, fail to put risks into proper perspective, and fail to disclose how uncertain the data and therefore the conclusions are. They extrapolate their risk assumptions to generate numbers of lives "saved" which unnecessarily alarms the public, and backs policy makers into a corner so that questioning the basis for EPA actions creates the illusion that you don't care about public health. Indeed these regulations can have negative unintended consequences. Our agency believes regulations to be an integral and necessary tool to protect public health and our natural resources. Likewise, our expectation is that those regulations be based on sound science, be justifiable, and that they realize true benefits.

Thank you for the opportunity to give this testimony.



Eftim et al. *Epidemiology*. 2008 Mar;19(2):209-16.

Figure 1. Reported correlation between mortality risk and average annual $PM_{2.5}$ in Eftim *et al.* 2008. Adjusted mortality relative risk estimates for Medicare enrollees are plotted against average $PM_{2.5}$ for the 110 American Cancer Society Study counties.

[22] See Franklin *et al.* 2007 data for Birmingham, Cincinnati, Dallas, Houston, Las Vegas, Los Angeles, and Riverside.

[23] Tony Cox. 2011. Hormesis for fine particulate matter ($PM_{2.5}$). Dose-Response. Pre-Press Article.

TCEQ

EPA's Benefit Cost Analysis

Susana Hildebrand, P.E., Chief Engineer
Michael Honeycutt, Ph.D.
Stephanie Shirley, Ph.D.

Texas Commission on Environmental Quality

Mission Statement:
The Texas Commission on Environmental Quality strives to protect our state's human and natural resources consistent with sustainable economic development. Our goal is clean air, clean water, and the safe management of waste.

The TCEQ regularly weighs matters that affect the environment and economy. Our goal is sensible regulation that addresses real environmental risks, while being based on sound science and compliance with state and federal statutes. In every case where Texas disagrees with EPA's action, it is because EPA's action is not consistent with these principles.

Background

- March 2011 – EPA published "Benefits and Costs of the Clean Air Act from 1990 to 2020 (Second Prospective Study)"
  - Benefits ($2T) outweigh costs ($65B) by 30 to 1
    - TCEQ staff examined this analysis, focusing on:
      - The studies used
      - The assumptions made
      - The methods employed

Regulatory Impact Analyses

- President requires RIAs (Regulatory Impact Analyses) from all agencies proposing significant regulations

- RIA should help determine if the benefits of an action are likely and justify the costs or discover which of various possible alternatives would be the most cost-effective
  - (OMB circular A4, 09/2003)

- RIAs are NOT subject to peer or public review

Key legislation – Executive Orders

- EO12291 – Reagan, 1981
  - "Regulatory action shall not be undertaken unless the potential benefits to society for the regulation outweigh the potential costs to society…the alternative involving the least net cost to society shall be chosen"
- EO12866 – Clinton, 1993
  - Key change: benefits must justify the costs
- EO13563 – Obama, 2011
  - Benefits must justify the costs
  - New: equity, human dignity, fairness and distributive impacts are required to be considered
  - "Our regulatory system must protect public health, welfare, safety, and our environment while promoting economic growth, innovation, competitiveness, and job creation"

Use of $PM_{2.5}$ in RIAs

- EPA uses estimates of benefits from reducing $PM_{2.5}$ in its RIAs for rulemakings under the Clean Air Act
  - This is called "co-benefits" because a $PM_{2.5}$ reduction is expected from efforts to reduce other air pollutants
- Trend towards using $PM_{2.5}$ as primary source of benefits in most RIAs since 1997
  - Even when regulation is not intended to protect public health from exposures to ambient $PM_{2.5}$

Table 2. Summary of Degree of Reliance on $PM_{2.5}$-Related Co-Benefits in RIAs Since 1997 for Major Non-$PM_{2.5}$ Rulemakings under the CAA
(RIAs with no quantified benefits at all are not in this table. Where ranges of benefit and/or cost estimates are provided, percentages are based on upper bound of both the benefits and cost estimates. Estimates using the 7% discount rates are used in all cases.)

Year	RIAs for Rules NOT Based on Legal Authority to Regulate Ambient $PM_{2.5}$	$PM_{2.5}$ Co-Benefits Are >50% of Total	$PM_{2.5}$ Co-Benefits Are Only Benefits Quantified
1997	Ozone NAAQS (.12 1hr=>.08 8hr)	×	
1997	Pulp&Paper NESHAP		
1998	NOx SIP Call & Section 126 Petitions		
1999	Regional Haze Rule	×	
1999	Final Section 126 Petition Rule	×	
2004	Stationary Reciprocating Internal Combustion Engine	×	
2004	Industrial Boilers & Process Heaters NESHAP	×	×
2005	Clean Air Mercury Rule	×	
2005	Clean Air Visibility Rule/BART Guidelines	×	
2006	Stationary Compression Ignition Internal Combustion		
2007	Control of HAP from mobile sources	×	×
2008	Ozone NAAQS (.08 8hr=>.075 8hr)	×	
2008	Lead (Pb) NAAQS	×	
2009	New Marine Compress'n-Ign Engines >30 L per	×	
2010	Reciprocating Internal Combustion Engines NESHAP	×	×
2010	EPA/NHTSA Joint Light-Duty GHG & CAFES		
2010	SO2 NAAQS (1-hr, 75 ppb)	×	> 99.9%
2010	Existing Stationary Compression Ignition Engines	×	×
2011	Industrial, Comm, and Institutional Boilers NESHAP	×	×
2011	Indus'l, Comm'l, and Institutional Boilers & Process	×	×
2011	Comm'l & Indus'l Solid Waste Incin. Units NSPS &	×	×
2011	Control of GHG from Medium & Heavy-Duty		
2011	Ozone Reconsideration NAAQS	×	
2011	Utility Boiler MACT NESHAP (Final Rule's RIA)	×	≥99%
2011	Mercury Cell Chlor Alkali Plant Mercury Emissions	×	
2011	Sewage Sludge Incineration Units NSPS & Emission	×	×
2011	Ferroalloys Production NESHAP Amendments	×	×

2009 Change in Methodology

From Smith, 2012 testimony

Key Changes in $PM_{2.5}$ Methodology

- The Benefits and Costs of the Clean Air Act from 1990 to 2020 (March 2011)

  1. A no-threshold model for $PM_{2.5}$ that calculates incremental benefits down to the lowest modeled air quality levels

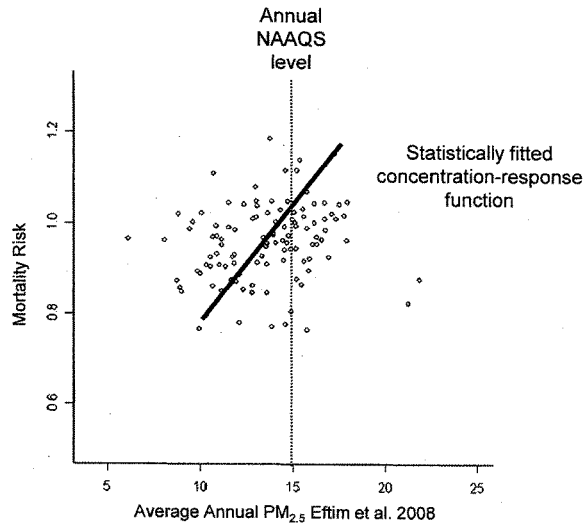
  2. Risks attributed to very low (background) levels of ambient $PM_{2.5}$

  3. Assumption of causal relationship between $PM_{2.5}$ and mortality

  4. A Value of Statistical Life (VSL)

1. No Threshold Model

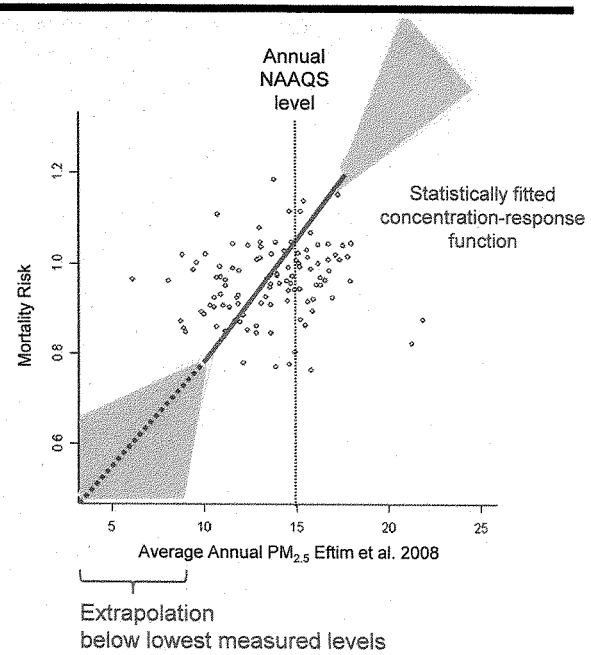
- A no-threshold model for $PM_{2.5}$ that calculates incremental benefits down to the lowest modeled air quality levels



Adapted from
Smith 2011

1. No Threshold Model

- A no-threshold model for $PM_{2.5}$ that calculates incremental benefits down to the lowest modeled air quality levels



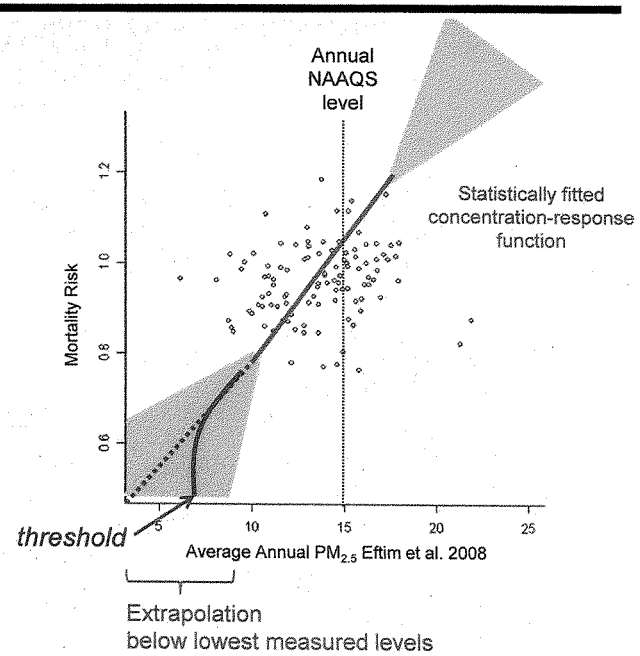
Adapted from
Smith 2011

1. No Threshold Model

- A no-threshold model for $PM_{2.5}$ that calculates incremental benefits down to the lowest modeled air quality levels

1. Question: what is the shape of the curve in the low-dose range?

2. Question: is there significant risk associated with ambient $PM_{2.5}$ levels?



Adapted from
Smith 2011

Clinical Exposure Studies Conducted by EPA

FOIA # HQ-FOI-02235-11

January 2010 – June 2011

41 Volunteers

Dose:35 – 750 ug/m^3

Results:

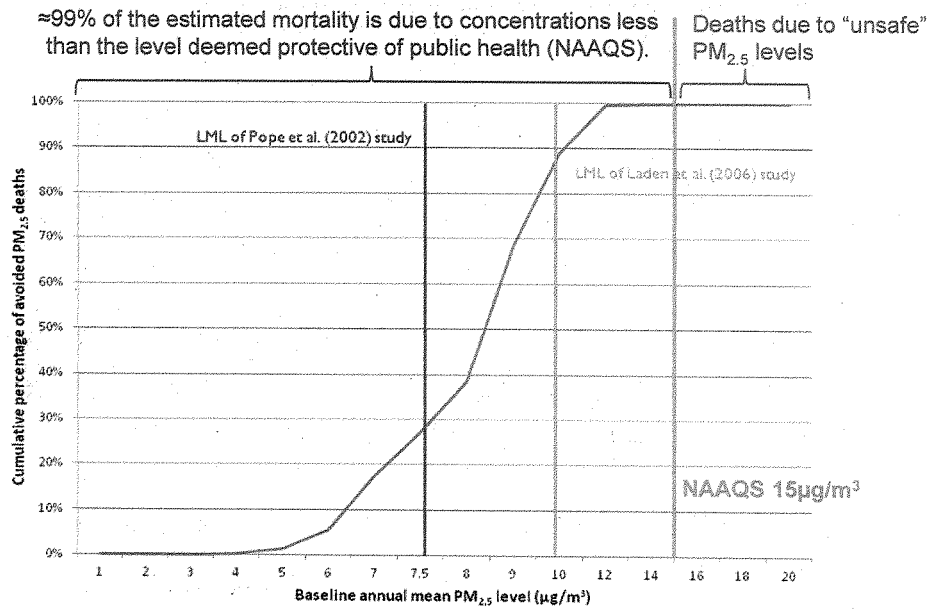
1 individual: elevated heart rate
1 individual: irregular heart beat*
39 individuals: no clinical effects

Exposure Date	Subject	Exposure Clinical	Exposure Return Normal	Dose ug/m3	Clinical Effects
1/5/2010	OMC019	11:02	13:02	205.27	No clinical effects requiring follow-up observed
1/6/2010	KCN112	9:34	11:34	153.58	No clinical effects requiring follow-up observed
2/9/2010	OMC021	10:52	12:52	442.49	No clinical effects requiring follow-up observed
3/9/2010	OMC023	10:45	11:08	750.83	No clinical effects requiring follow-up observed
3/23/2010	OMC024	10:49	12:49	147.42	No clinical effects requiring follow-up observed
4/13/2010	OMC025	10:43	12:43	431.06	No clinical effects requiring follow-up observed
4/20/2010	OMC026	11:19	13:19	336.56	No clinical effects requiring follow-up observed
4/27/2010	OMC027	11:00	13:00	257.18	No clinical effects requiring follow-up observed
4/28/2010	KCN111	9:13	11:13	154.36	No clinical effects requiring follow-up observed
5/4/2010	OMC028	10:54	12:54	328.78	No clinical effects requiring follow-up observed
5/5/2010	KCN113	9:26	11:26	578.95	No clinical effects requiring follow-up observed
5/11/2010	OMC022	10:51	12:51	247.77	No clinical effects requiring follow-up observed
6/8/2010	OMC030	10:48	12:48	257.12	No clinical effects requiring follow-up observed
6/15/2010	OMC031	11:28	13:28	468.96	No clinical effects requiring follow-up observed
6/29/2010	OMC033	11:04	13:04	321.36	No clinical effects requiring follow-up observed
7/13/2010	OMC034	10:49	12:49	177.02	No clinical effects requiring follow-up observed
7/15/2010	XCE224	11:10	13:10	157.19	No clinical effects requiring follow-up observed
8/10/2010	OMC035	11:00	13:00	411.98	No clinical effects requiring follow-up observed
8/12/2010	XCE225	10:59	12:59	157.63	No clinical effects requiring follow-up observed
8/25/2010	KCN114	9:55	11:55	232.91	No clinical effects requiring follow-up observed
9/9/2010	XCE226	10:55	12:55	87.36	No clinical effects requiring follow-up observed
9/23/2010	XCE228	11:05	13:05	174.61	No clinical effects requiring follow-up observed
10/6/2010	KCN115	9:31	11:31	131.50	No clinical effects requiring follow-up observed
10/7/2010	XCE227	11:21	12:10	111.68	Removed from chamber due to new onset of atrial fibrillation. Individual reverted to normal sinus rhythm approximately two hours later. Individual was admitted to the hospital overnight for observation and telemetry. Detailed in Ghio et al., 2011 Case Report, Environ Health Perspect doi:10.1289/ehp.1103877
11/18/2010	XCE229	11:14	13:14	59.09	No clinical effects requiring follow-up observed
12/2/2010	XCE231	10:55	12:55	35.60	No clinical effects requiring follow-up observed
1/6/2011	XCE233	11:05	13:05	43.65	No clinical effects requiring follow-up observed
1/24/2011	XCE232	10:47	12:47	150.63	No clinical effects requiring follow-up observed
1/31/2011	XCE234	11:03	13:03	90.95	No clinical effects requiring follow-up observed
2/3/2011	XCE236	11:12	13:12	57.91	No clinical effects requiring follow-up observed
2/10/2011	XCE235	11:12	11:35	66.26	Removed from chamber due to a short episode of an elevated heart rate during exposure. The individual denied any symptoms. This individual was provided with copies of the EKG and holter recording and referred to MD.
2/24/2011	XCE238	10:57	12:57	103.51	No clinical effects requiring follow-up observed
3/28/2011	XCE239	10:52	12:52	80.06	No clinical effects requiring follow-up observed
4/14/2011	XCE237	10:48	12:48	93.24	No clinical effects requiring follow-up observed
4/18/2011	XCE242	11:09	13:09	72.89	No clinical effects requiring follow-up observed
4/25/2011	XCE240	11:05	13:05	41.54	No clinical effects requiring follow-up observed
5/2/2011	XCE244	11:13	13:13	85.31	No clinical effects requiring follow-up observed
5/16/2011	XCE243	11:00	13:00	142.50	No clinical effects requiring follow-up observed
5/23/2011	XCE245	10:57	12:57	266.92	No clinical effects requiring follow-up observed
6/2/2011	XCE247	11:00	13:00	179.58	No clinical effects requiring follow-up observed
6/9/2011	XCE246	10:55	12:55	359.52	No clinical effects requiring follow-up observed

* Note : Clinical Effects is defined as requiring medical follow-up or referral to physician

** Case Report: Supraventricular Arrhythmia after Exposure to Concentrated Ambient Air Pollution Particles. Ghio et al. EHP. Feb. 2012. 120:275-277*

2. Risk Attributed to Ambient PM2.5



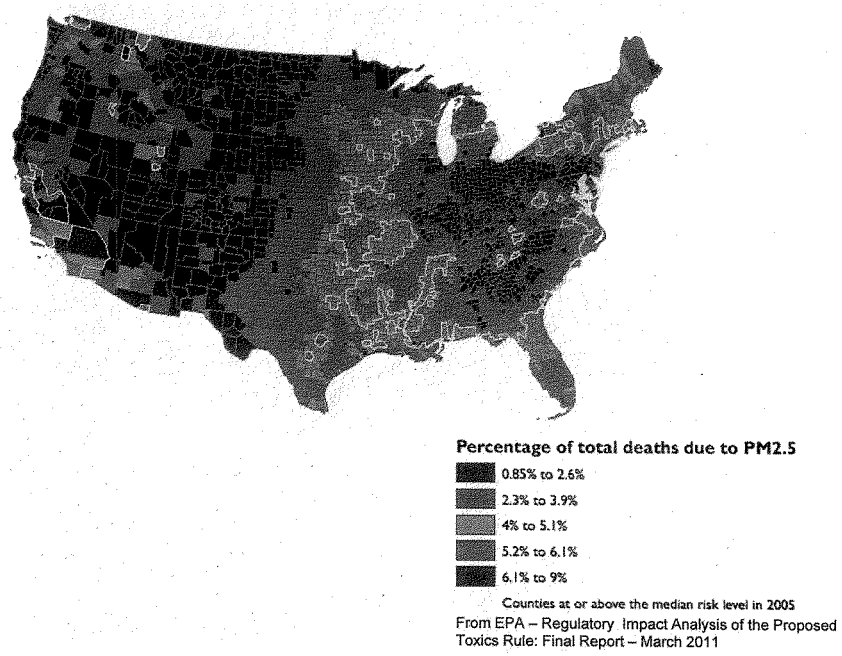
Of the total PM-related deaths avoided:

73% occur among population exposed to PM levels at or above the LML of the Pope et al. study.

11% occur among population exposed to PM levels at or above the LML of the Laden et al. study.

Extrapolation of Mortality Estimates

Figure C-2. Distribution of $PM_{2.5}$ Mortality Risk in 2005



From EPA – Regulatory Impact Analysis of the Proposed Toxics Rule: Final Report – March 2011

4. Value of Statistical Life
Definition

- A Value of Statistical Life (VSL) = value of risk reduction
  - A "statistical life" has traditionally referred to the aggregation of small risk reductions across many individuals until that aggregate reflects a total of one statistical life
  - The VSL has been a shorthand way of referring to the monetary value or tradeoff between income and mortality risk reduction, i.e. the willingness to pay for small risk reductions across large numbers of people
  - It has led to confusion because it has been interpreted as referring to the loss of identified lives

If risk was reduced
by 1 in 1,000,000
for 1 year
in a population of 200 million

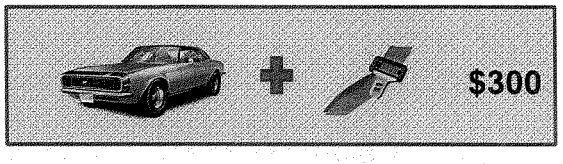
savings of 200 **statistical** lives = value of risk reduction

savings of 200 **actual** lives

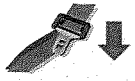
Deriving Value of Statistical Life

Willingness to Pay – Road Hazard Studies

- Example:
  - Cars with seatbelts cost $300 more than cars without seatbelts



  - Buying a car with that option reduces the probability of death by 1 in 100,000



Probability of death by **1 in 100,000**

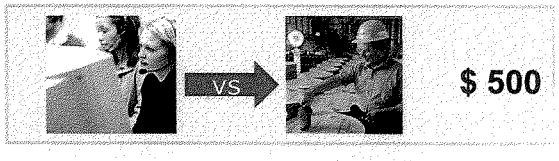
  - If people are willing to pay for this option, we can infer that the person is placing a valuation on his/her life of at least $300 x 100,000 = 30,000,000 ($30 million)

$300
x 100,000
= $30 million

Deriving Value of Statistical Life

Income vs. Risk – Occupational Studies

- Example:
  - A job carries a higher risk of injury, but pays $ 500 more per year



  - The more dangerous job carries an increased risk of injury by 1 in 10,000

Probability of injury by **1 in 10,000**

  - If people are willing to pay for this option, we can infer that the individuals are placing a valuation on their lives of at least $500 x 10,000 = 5,000,000 ($5 million)

$ 500
x 10,000
= $5 million

Interpreting VSL in the Media

"When these new [EGU MACT] standards are finalized, they **will assist in preventing** 11,000 heart attacks, **17,000 premature deaths**, 120,000 cases of childhood asthma symptoms and approximately 11,000 fewer cases of acute bronchitis among children each year. Hospital visits will be reduced and nearly 850,000 fewer days of work will be missed due to illness."

- Lisa Jackson, EPA Administrator, 2011

This was interpreted as:

"EPA's proposed mercury and air toxics standards ... **are projected to save as many as 17,000 American lives** ...

- John D. Walke, Natural Resources Defense Council, 2011

"These new standards mark a huge step forward in clean air protections and **will be responsible for saving thousands of lives** each year."

- Albert A. Rizzo, MD, National Volunteer Chair of the American Lung Association

"The new EPA mercury standards **will save countless lives** and improve the quality of life for millions."

- New York Mayor Michael Bloomberg

Appropriate Use of Value of Statistical Life

The Benefits and Costs of the Clean Air Act from 1990 to 2020

TABLE 5-8. LIFE YEARS GAINED AND LIFE EXPECTANCY GAIN ESTIMATES FROM THE POPULATION SIMULATION MODEL

AGE COHORT		LIFE-YEARS GAINED IN SPECIFIC YEARS (ANNUAL)		CUMULATIVE LIFE YEARS GAINED THROUGH TARGET YEAR		LIFE EXPECTANCY GAINS (YEARS)		
START AGE	END AGE	2020	2040	2020	2040	2010	2020	2040
30	39	17,000	18,000	260,000	620,000	0.65	0.87	0.91
40	49	60,000	71,000	910,000	2,300,000	0.63	0.84	0.88
50	59	150,000	180,000	2,000,000	5,400,000	0.59	0.79	0.84
60	69	330,000	380,000	3,500,000	11,000,000	0.53	0.71	0.76
70	79	470,000	840,000	5,000,000	20,000,000	0.44	0.59	0.64
80	89	470,000	1,200,000	6,000,000	23,000,000	0.32	0.43	0.48
90	99	320,000	800,000	3,600,000	14,000,000	0.19	0.25	0.27
100+		60,000	200,000	490,000	3,100,000	0	0	0
Total		1,900,000	3,800,000	22,000,000	80,000,000			

Note: Column entries to not add to totals due to rounding. Life expectancy results are incremental period conditional life expectancy gains at the start age of the cohort.

EPA VSL:$8,900,000

- Lives Saved vs. Life-Years Added
  - Deaths "prevented or avoided"
  - Gains in life expectancy

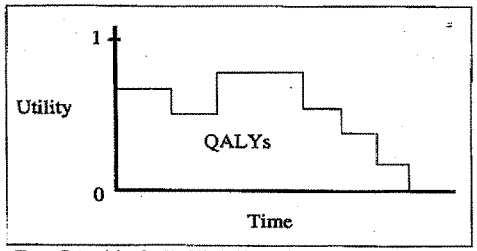


Figure: Determining Quality-Adjusted Survival—Length of life (time) is plotted against quality of life (utility). The area under the curve represents quality-adjusted survival measured in quality-adjusted life years (QALYs).

From Weeks 1995

- The median age of people who gain extra months of life from cleaner air is close to 80 years
- Adjustment of VSL for quality of life:
  - EPA VSL of $8,900,000 appropriate for healthy young adult (≈25)
  - 6:1 ratio for 25 vs. 80 year old

Clean Air Act - Benefits and Costs

reduced number of deaths in 2020 * value per statistical life saved
= 230,000 fewer deaths * $8,900,000 per life saved
≈ $2 trillion
Benefit/Cost = $2 trillion/$0.065 trillion* ≈ 30

life-years gained in 2020 * value per statistical life-year gained
=1,900,000 life-years gained * $150,000/life-year gained
≈ $0.3 trillion
Benefit/Cost = $0.3 trillion/$0.065 trillion* ≈ 5

Adjusted estimate of benefit:
$19 billion

Benefit/Cost = $0.019 trillion/$0.065 trillion* ≈ 0.3

Mercury & Air Toxics Standard

	Benefits from HAPs (billions)	"Co-Benefits" from non-HAPs (billions)
Mercury	$ 0.004-0.006	$ 1-2
Acid Gasses	$ 0	$ 32-87
Non-Hg Metals	$ 0	$ 1-2
Total	**≤$ 0.006**	**$ 33-90**

- MATS is estimated to prevent 0.00209 IQ point loss per child (starting immediately)
- Each child will gain 0.0956 school days over their lifetime
- 0.00209 IQ points x 244,468 children = 511 IQ points per year
- Assuming a net monetary loss per decrease in one IQ point of between ~$8,000 and ~$12,000 (in terms of foregone future earnings)
- Benefit = $4.2M to $6.2M

Table adapted from testimony by Anne E. Smith 2/2010 to Subcommittee on Energy and Power

Oil & Gas NSPS and NESHAPS

	Oil and Natural Gas NSPS (millions)	Oil and Natural Gas NESHAP Amendments (millions)
Benefits	NA	NA
Costs	- $15	$3.5
Non-monetized benefits	11,000 tons of HAP5 190,000 tons of VOC 1.0 million tons of methane Health effects of HAP exposure Health effects of $PM_{2.5}$ and ozone exposure Visibility impairment Vegetation effects Climate effects	670 tons of HAP 1,200 tons of VOC 420 tons of methane Health effects of HAP exposure Health effects of $PM_{2.5}$ and ozone exposure Visibility impairment Vegetation effects Climate effects

*"…**quantification of those benefits cannot be accomplished for this rule.** This is not to imply that there are no benefits of the rules; rather, it is a reflection of the difficulties in modeling the direct and indirect impacts of the reductions in emissions for this industrial sector with the data currently available."*
April 2012 RIA

PM Co-Benefits in RIAs

	$PM_{2.5}$ NAAQS	Utility Boiler MACT	Mercury Air Toxics Standard	Sewage Sludge Incineration Units	Ferroalloy NESHAP	Total Costs millions ($2006)
Estimated Statistical Deaths	15,000	11,900	2,650	25	14	
Cost	6,400	10,600	9,329	17	4	26,350

- Double counting benefits: same statistical lives counted in multiple rules
- Different costs: unique to each rule

Contact Information

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Health Effects of Poverty and Unemployment

- Poverty and unemployment have been recognized as risk factors for morbidity and mortality since the 1800's (Virchow, 1848)
  - As of March 2012, there are 4,850 publications on this topic

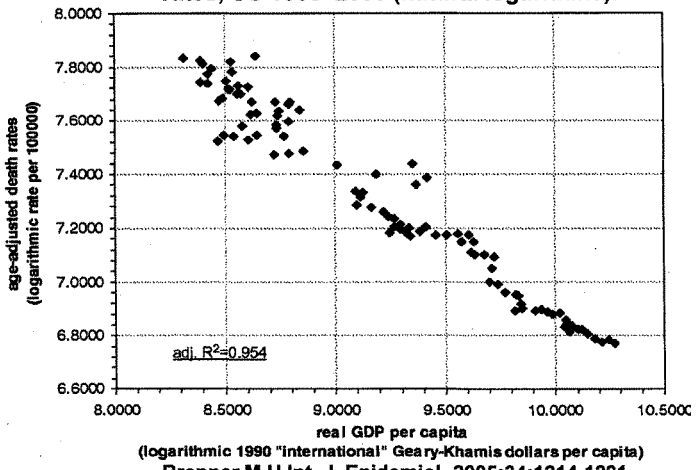
Unemployment and All-Cause Mortality

Meta-analyses stratified by gender and age [a]

Gender	Mean Age	HR (95% CI)
	Less than 40	1.73[b] (1.41, 2.11)
Women	40 to 49.9	1.34[b] (1.15, 1.56)
	50 to 65	0.94 (0.80, 1.11)
	Less than 40	1.95[b] (1.69, 2.26)
Men	40 to 49.9	1.86[b] (1.63, 2.12)
	50 to 65	1.17[c] (1.00, 1.36)

Roelfs et al. Soc Sci Med 2011; 72:840-54

Relation of real GDP per capita to age-adjusted death rates, US 1900–2000 (natural logarithms).

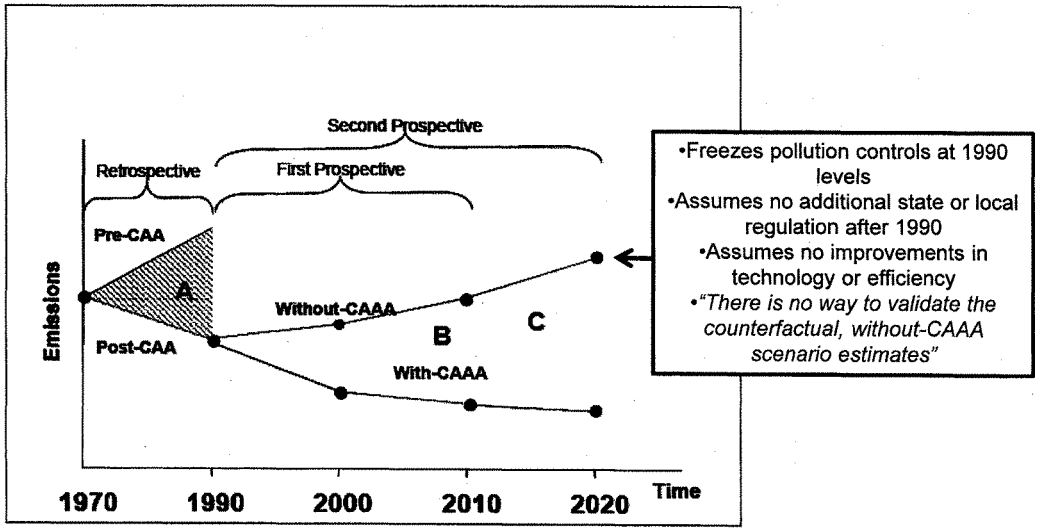


Brenner M H Int. J. Epidemiol. 2005;34:1214-1221

With CAAA vs. Without CAAA

The Benefits and Costs of the Clean Air Act from 1990 to 2020

FIGURE 1-1. CLEAN AIR ACT SECTION 812 SCENARIOS: CONCEPTUAL SCHEMATIC



Oil & Gas NESHAPS

Table 4-7 Climate Methane Benefits Using 'GWP' Approach

SCC Value for 2015 emission reductions ($/ton CO_2 in 2008 dollars)[1]	Total Benefits based on 100 year GWP adjustment[2] (millions 2008$)	
	Final NSPS	Final NESHAP Amendments
$6 (mean 5% discount rate)	$100	$0.05
$25 (mean 3% discount rate)	$440	$0.20
$40 (mean 2.5% discount rate)	$700	$0.32
$76 (95th percentile at 3% discount rate)	$1,300	$0.60
Methane Emission Reductions[3] (MMT CO_2-e)	17.6	0.008

April 18, 2012 Press Conference

"Today's rules would yield significant reductions in methane, a potent greenhouse gas. EPA's Regulatory Impact Analysis for the rule estimates the value of the climate co-benefits that would result from this reduction at $440 million annually by 2015."
-Gina McCarthy

Reported monetized benefit: $0

Note: benefits calculated at 3%, but costs at 7%

Costs of the Clean Air Act and Amendments

Year	RIAs for Rules Not Targeting Ambient PM 2.5	PM Co-Benefits are >50% of Total	PM Co-Benefits Are Only Benefits Quantified	Cost ($ Billion)*
1997	Ozone NAAQS (.12 1hr=>.08 8hr)	x		9.60
1997	Pulp&Paper NESHAP			6.48
1998	NOx SIP Call & Section 126 Petitions			1.66
1999	Regional Haze Rule	x		1.74
1999	Final Section 126 Petition Rule	x		1.15
2004	Stationary Reciprocating Internal Combustion Engin NESHAP	x		0.25
2004	Industrial Boilers & Process Heaters NESHAP	x	x	0.86
2005	Clean Air Mercury Rule	x		0.90
2005	Clean Air Visibility Rule/BART Guidelines	x		1.50
2006	Stationary Compression Ignition Internal Combustion Engine NSPS			0.06
2007	Control of HAP from mobile sources	x	x	0.36
2008	Ozone NAAQS (.08 8hr =>.075 8hr)	x		8.20[a]
2008	Lead (Pb) NAAQS	x		3.20
2009	New Marine Compress'n-Ign Engines >30 L per Cylinder	x		1.90
2010	Reciprocating Internal Combustion Engines NESHAP - Comp. Ignit.	x	x	0.37
2010	EPA/NHTSA Joint Light-Duty GHG & CAFES			15.60
2010	SO2 NAAQS (1-hr, 75 ppb)	x	>99.9%	1.50
2010	Existing Stationary Compression Ignition Engines NESHAP	x	x	0.25
2011	Industrial, Comm, and Institutional Boilers NESHAP	x	x	0.49
2011	Indus'l, Comm'l, and Institutional Boilers & Process Heaters NESHAP	x	x	2.90
2011	Comm'l & Indus'l Solid Waste Incin. Units NSPS & Emission G'lines	x	x	0.28
2011	Control of GHG from Medium & Heavy-Duty Vehicles			2.00[b]
2011	Ozone Reconsideration NAAQS	x		8.20[g]
2011	Utility Boiler MACT NESHAP (Final Rule's RIA)	x	≥99%	9.60
2011	Mercury Cell Chlor Alkali Plant Mercury Emissions NESHAP	x		0.00
2011	Sewage Sludge Incineration Units NSPS & Emission Guidelines	x	x	0.02
2011	Ferroalloys Production NESHAP Ammendments	x	x	0.004
		Total:		60.67

- Cross State Air Pollution Rule
  - EPA estimated cost:$800 million annually
  - Independent analysis: $120 billion by 2015
- Boiler MACT
  - EPA estimated cost:$2.6 billion annually
  - Independent analysis:$14.5 billion

+ MATS – 9.3 **Partial Total: 69.97**

* ($2006)

Business Impact

The Benefits and Costs of the Clean Air Act from 1990 to 2020

FIGURE 8-6. PERCENT CHANGE IN INDUSTRY OUTPUT IN 2020: LABOR FORCE-ADJUSTED CASE

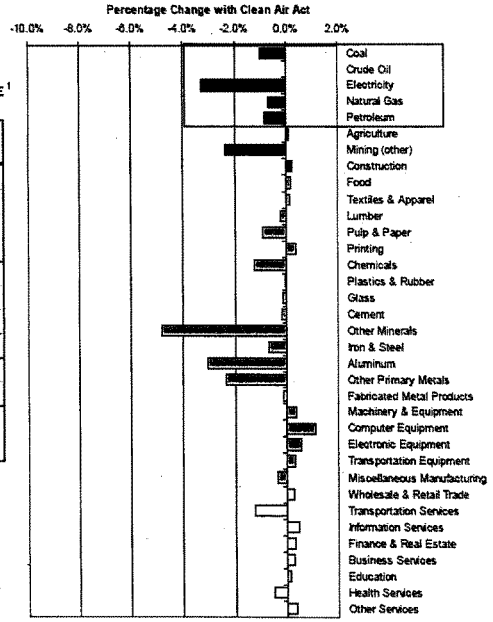


TABLE 8-8.

SUMMARY OF ANNUAL MACROECONOMIC IMPACTS: LABOR FORCE-ADJUSTED CASE[1]

VARIABLE	MODEL RUN	2010	2015	2020
GDP	With Clean Air Act ($ billion)	$15,027	$17,338	$20,202
	Without Clean Air Act ($ billion)	$15,059	$17,350	$20,197
	Change ($ billion)	-$32	-$12	$5
	% change	-0.21%	-0.07%	0.02%
Consumption	With Clean Air Act ($ billion)	$10,969	$12,699	$14,881
	Without Clean Air Act ($ billion)	$10,972	$12,696	$14,876
	Change ($ billion)	-$3	$3	$5
	% change	-0.03%	0.02%	0.03%
Hicksian EV (annual)	Change ($ billion)	$11	$22	$29
	% change	0.08%	0.13%	0.15%

Notes:

1. Results are expressed in year 2006 dollars.

Adjusted Benefits Estimate

Tony Cox, 2011:

($1.8 trillion initial estimate)

x (1/6 reduction factor for VSL if age or VSLY is considered)

x (0.5 probability that a true association exists)

x (0.5 probability that a true association is causal, given that one exists)

x (0.5 probability that ambient concentrations are above any thresholds or nadirs in the C-R function, given that a true causal C-R relation exists)

x (0.5 expected reduction factor in C-R coefficient by 2020 due to improved medication and prevention of disease-related mortalities)

= (1.8 trillion)*(1/6)*(0.5)*(0.5)*(0.5)*(0.5) = $19 billion

Chairman HARRIS. Thank you very much.

I now recognize Mr. Eugene Trisko for five minutes to present his testimony.

STATEMENT OF MR. EUGENE TRISKO, ATTORNEY AT LAW, ON BEHALF OF THE AMERICAN COALITION FOR CLEAN COAL ELECTRICITY

Mr. TRISKO. Thank you, Mr. Chairman, Ranking Member Miller.

I am Eugene Trisko. I am here on behalf of the American Coalition for Clean Coal Electricity. And I have conducted, for the better part of the last decade, an annual study as a consultant to ACCCE entitled, "Energy Cost Impacts on American Families." This study really started soon after the Kyoto Protocol when a question arose, what are American families spending on energy? Because there were a variety of estimates at that time when the Kyoto Protocol was being considered in the United States, a number of studies that suggested impacts on the order of $500 or $1,000 per household or more.

So we wanted to try to get a handle on a baseline—what are Americans spending now for energy? So having done this study pretty much on an annual basis since 2000, we have created, if you will, a baseline that has allowed us to track changes in energy costs. The report analyzes consumer energy costs since the year 2001 for all U.S. households and examines the pattern of energy expenditures among four income levels and for senior and minority families. It relies on historical energy consumption survey data and current energy price forecasts from the Department of Energy's Energy Information Administration. By way of a footnote, EIA is just now beginning to release the results of its 2009 survey of residential energy consumption and it has not yet gotten to the point where it is releasing consumption or expenditure data. When we get that information, we will update the study accordingly. But based upon the preliminary results from the 2009 survey, it appears that the consumption data, if anything, may be somewhat higher than they were in the previous study in 2005.

Slightly more than one half of U.S. households have average pretax annual incomes below $50,000. Mr. Chairman, this country is divided precisely in half at an annual household income pretax of $50,000. Our median family income today is $49,455. And that has not changed in principle in the 10 years in which I have been conducting this study, with no adjustment for inflation. In 2001, families with gross annual incomes below $50,000 spent an average of 12 percent of their average after-tax income of $21,800 on residential and transportation energy—gasoline. In 2012, these households are projected to spend 21 percent of their average after-tax income of $22,390 on energy.

Family incomes have not kept pace with the rising cost of energy. The U.S. Census Bureau reports that since 2000, real inflation-adjusted median household income has declined by six percent and is seven percent below the median household income peak of $53,000 that occurred in the year 1999. Higher gasoline prices account for nearly 4/5ths of the increased cost of energy for consumers since 2001. In nominal dollars, average U.S. household expenditures for

gasoline will grow by 136 percent from 2001 to 2012, based on EIA gasoline price projections for 2012.

Electricity has maintained relatively lower annual average price increases compared to residential natural gas and gasoline. Electricity prices have increased by 51 percent in nominal dollars since 1990, well below the 72 percent rate of inflation in the consumer price index. The nominal prices of residential natural gas and gasoline have nearly doubled and tripled, respectively, over this period.

Virtually all of the residential electricity price increases over the past two decades have occurred since 2000. These increases are due in part to additional capital, operating, and maintenance costs associated with meeting clean air and other environmental standards.

Lower-income families, including millions of fixed-income seniors, are more vulnerable to energy costs than higher-income families, because energy represents a larger portion of their household budgets. Energy is consuming 1/5th or more of the household incomes of lower- and middle-income families, reducing the amount of income that can be spent on food, housing, health care, and other necessities.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Trisko follows:]

Statement of Eugene M. Trisko
Before the Committee on Science, Space and Technology
Subcommittee on Energy and Environment
June 6, 2012

Good afternoon, Chairman Harris, Ranking Member Miller, and members of the Subcommittee,

I am here today to summarize the findings of a study of the impacts of rising energy costs on American families. I have conducted this study periodically since 2000 for the American Coalition for Clean Coal Electricity and its predecessor organizations. The latest version, "Energy Cost Impacts on American Families, 2001-2012," is attached to my testimony.

The report analyzes consumer energy cost increases since 2001 for all U.S. households and examines the pattern of energy expenditures among four income levels and for senior and minority families. It relies on historical energy consumption survey data and current energy price forecasts from the U.S. Department of Energy's Energy Information Administration (EIA). Energy costs are summarized in nominal dollars by household income category for U.S. households in 2001, 2005, and 2012, using data from EIA and the U.S. Bureau of the Census. Energy price projections for 2012 are based on the DOE/EIA Short-Term Energy Outlook released in January 2012. At that time, EIA projected an average gasoline price of $3.54 per gallon in 2012.

Energy expenditures as a percentage of nominal after-tax income are estimated after the effects of federal and state income taxes and federal social insurance payments. The 2012 projections in this report are based on U.S. Bureau of the Census household income data for 2010 (the most recent available) and projected energy prices for 2012.

Key findings of this report are:

- In 2010, the median household income of U.S. families was $49,445. Slightly more than one-half of U.S. households have average pre-tax annual incomes below $50,000. In 2001, families with gross annual incomes below $50,000 spent an average of 12% of their average after-tax income of $21,834 on residential and transportation energy. In 2012, these households are projected to spend 21% of their average after-tax income of $22,390 on energy.

- Family incomes have not kept pace with the rising costs of energy. Since 2007, the U.S. Census Bureau reports that real (inflation-adjusted) median household income has declined by 6% (from $52,823) and is 7% below the median household income peak ($53,252) that occurred in 1999.

- Poverty rates have increased to historic highs along with the declining long-term trend in family incomes. The number of people in poverty in 2010 was the largest number in the 52 years since the Census Bureau began to publish poverty statistics.

- Higher gasoline prices account for nearly four-fifths of the increased cost of energy for consumers since 2001. In nominal dollars, average U.S. household expenditures for gasoline will grow by 136% from 2001 to 2012, based on EIA gasoline price projections for 2012. In comparison, residential energy costs for heating, cooling, and other household energy services will increase on average by 43%, from $1,493 in 2001 to a projected $2,131 per household in 2012.

- Among consumer energy goods and services, electricity has maintained relatively lower annual average price increases compared to residential natural gas and gasoline. Electricity prices have increased by 51% in nominal dollars since 1990, well below the 72% rate of inflation in the Consumer Price Index. The nominal prices of residential natural gas and gasoline have nearly doubled and tripled, respectively, over this period.

- Virtually all of the residential electricity price increases over the past two decades have occurred since 2000. These increases are due in part to additional capital, operating and maintenance costs associated with meeting clean air and other environmental standards.

- Lower-income families are more vulnerable to energy costs than higher-income families because energy represents a larger portion of their household budgets. Energy is consuming one-fifth or more of the household incomes of lower- and middle-income families, reducing the amount of income that can be spent on food, housing, health care, and other necessities.

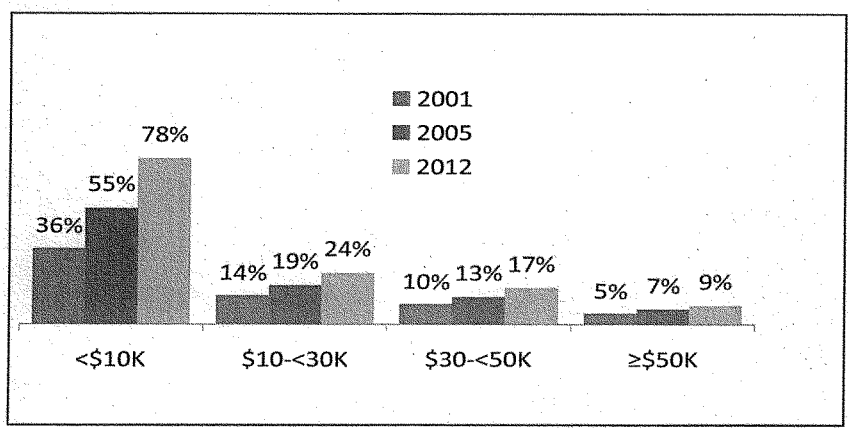
- Fixed-income seniors are a growing proportion of the U.S. population, and are among the most vulnerable to energy cost increases due to their relatively low average incomes. In 2010, the median gross income of 25.4 million households with a principal householder aged 65 or older was $31,408, 36% below the national median household income.

These summary findings are discussed in more detail in the principal report. I am happy to answer any questions that the Subcommittee may have.

Thank you.

ACCCE
AMERICAN COALITION FOR CLEAN COAL ELECTRICITY

Energy Cost Impacts on American Families, 2001-2012



Energy Costs as Percentage of Annual Household After-Tax Income

February 2012

www.americaspower.org

Summary of Findings

This report analyzes consumer energy cost increases since 2001 for all U.S. households and examines the pattern of energy expenditures among four income levels and for senior and minority families in 2012. It relies on historical energy consumption survey data and current energy price forecasts from the U.S. Department of Energy's Energy Information Administration (EIA).[1] Energy costs are summarized in nominal (then-current) dollars by household income category for U.S. households in 2001, 2005, and 2012, using data from EIA and the U.S. Bureau of the Census.[2] Energy price projections for 2012 are based on the DOE/EIA Short-Term Energy Outlook released in January 2012.

Energy expenditures as a percentage of nominal after-tax income are estimated after the effects of federal and state income taxes and federal social insurance payments. The 2012 projections in this report are based on U.S. Bureau of the Census household income data for 2010 (the most recent available) and projected energy prices for 2012.

Key findings of this report are:

- In 2010, the median household income of U.S. families was $49,445. Slightly more than one-half of U.S. households have average pre-tax annual incomes below $50,000. In 2001, families with gross annual incomes below $50,000 spent an average of 12% of their average after-tax income of $21,834 on residential and transportation energy. By 2005, energy costs rose to 16% of their average after-tax income of $22,682. In 2012, these households are projected to spend 21% of their average after-tax income of $22,390 on energy.

- Family incomes have not kept pace with the rising costs of energy. Since 2007, the U.S. Census Bureau reports that real (inflation-adjusted) median household income has declined by 6% (from $52,823) and is 7% below the median household income peak ($53,252) that occurred in 1999.

- Poverty rates have increased to historic highs along with the declining long-term trend in family incomes. The number of people in poverty in 2010 was the largest number in the 52 years since the Census Bureau began to publish poverty statistics. Poverty is more prevalent among some minority groups. Some 27% of Blacks and 26% of Hispanics lived in poverty in 2010, compared with 15% for the overall population.

- Higher gasoline prices account for nearly four-fifths of the increased cost of energy for consumers since 2001. In nominal dollars, average U.S. household expenditures for gasoline will grow by 136% from 2001 to 2012, based on EIA gasoline price projections for 2012. In comparison, residential energy costs for heating, cooling, and other household energy services will increase on average by 43%, from $1,493 in 2001 to a projected $2,131 per household in 2012.

- Electricity is the bargain among all consumer energy products. Among consumer energy goods and services, electricity has maintained relatively lower annual average price increases compared to residential natural gas and gasoline. Electricity prices have increased by 51% in nominal dollars since 1990, well below the 72% rate of inflation in the Consumer Price Index. The nominal prices of residential natural gas and gasoline have nearly doubled and tripled, respectively, over this period.

- Virtually all of the residential electricity price increases over the past two decades have occurred since 2000. These increases are due in part to additional capital, operating and maintenance costs associated with meeting clean air and other environmental standards.

- Lower-income families are more vulnerable to energy costs than higher-income families because energy represents a larger portion of their household budgets. Energy is consuming one-fifth or more of the household incomes of lower- and middle-income families, reducing the amount of income that can be spent on food, housing, health care, and other necessities.

- In 2010, 62% of Hispanic households and 68% of Black households had average annual incomes below $50,000, compared with 46% of white households and 39% of Asian households. Due to these income inequalities, the burdens of energy price increases are imposed disproportionately on Black and Hispanic households.

- Fixed-income seniors are a growing proportion of the U.S. population, and are among the most vulnerable to energy cost increases due to their relatively low average incomes. In 2010, the median gross income of 25.4 million households with a principal householder aged 65 or older was $31,408, 36% below the national median household income.

Energy Costs for U.S. Families, 2001–2012

Energy costs for residential utilities and gasoline continue to strain low- and middle-income family budgets. As Table 1 illustrates, the average American family with an after-tax income of $53,229 will spend an estimated $6,088 on energy in 2012, or 11% of the family budget. The 60 million households earning less than $50,000—representing 50.4% of U.S. households—will devote an estimated 21% of their after-tax incomes to energy, compared with 9% for households with annual incomes above $50,000. For the 28 million lower-income families with incomes between $10,000 and $30,000, energy expenditures will consume 24% of average after-tax incomes, compared with 14% in 2001.

The summary income and energy expenditure data in Table 1 are based on U.S. Bureau of the Census pre-tax household income data for 2010 (the most recent available) and energy prices for 2012 projected by DOE/EIA. The Congressional Budget Office has calculated effective total federal tax rates, including individual income taxes and payments for Social Security and other social welfare programs.[3] State income taxes are estimated from current state income tax rates.

Table 1. Estimated Household Energy Expenditures as a Percentage of Income, 2012

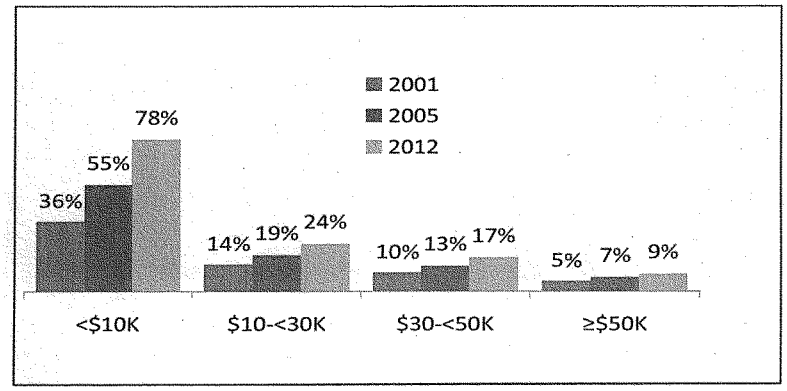
Pre-tax income	<$10K	$10-<$30K	$30-<$50K	<$50K	≥$50K	Average
Est. average after-tax income	$4,764	$18,106	$33,541	$22,390	$84,263	$53,229
Percentage of households	7.8%	23.6%	19.0%	50.4%	49.6%	100.0%
Residential energy	$1,596	$1,773	$2,044	$1,848	$2,554	$2,131
Transportation fuel	$2,106	$2,621	$3,705	$2,951	$4,953	$3,957
Total energy	$3,702	$4,394	$5,749	$4,799	$7,507	$6,088
Energy pct. of after-tax income	77.7%	24.3%	17.1%	21.4%	8.9%	11.4%

Source: Appendix Table 1.

Many lower-income families qualify for federal or state energy assistance. However, these programs are hard-pressed to keep up with the increase in household energy costs. In FY2011, funding for the federal Low Income Home Energy Assistance Program (LIHEAP) was cut from $5.1 billion to $4.7 billion.[4] Based on DOE/EIA's 2005 Residential Energy Consumption Survey (2009), the $4.7 billion funding level for LIHEAP would offset less than 2% of total U.S. residential energy bills.

The portion of household incomes devoted to energy has increased substantially since 2001 (see Chart 1). In 2001, 62 million families with gross annual incomes less than $50,000 (2001$) spent an average of 12% of their after-tax income on residential and transportation energy. In 2012, energy will account for an average of 21% of the after-tax income of the 60 million American families in this income category. Energy cost burdens are greatest on the poorest families, those earning less than $10,000. Their average energy bills increased from 36% of estimated after-tax income in 2001 to 78% in 2012. These estimates do not account for any governmental energy assistance that these families may receive, and thus do not reflect actual personal energy consumption expenditures.

Chart 1
Energy Costs as Percentage of Nominal After-Tax Income, 2001, 2005, and Projected 2012

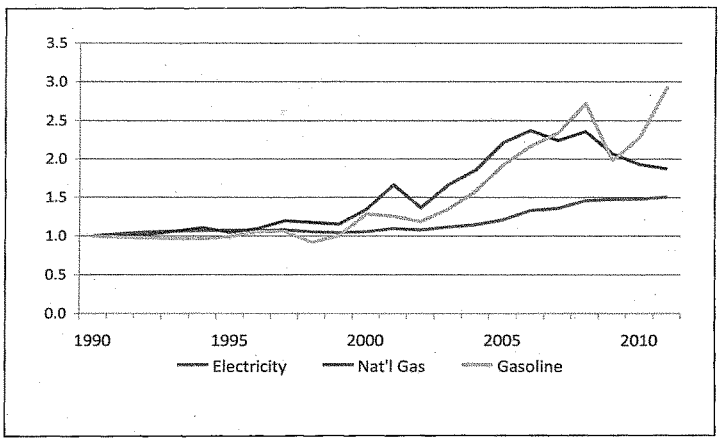


Source: Appendix Table 1.

Relative Energy Price Increases

Among key consumer energy products, electricity has increased at the lowest rate measured in nominal dollars over the past two decades. Chart 2 provides an index of consumer energy prices in nominal dollars since 1990. Prices for residential natural gas and gasoline have nearly doubled and tripled, respectively, while residential electricity prices increased by 51%, well below the 72% rate of inflation based on the Consumer Price Index between 1990 and 2011.[5]

Chart 2
Price Trends of Consumer Energy Products in Nominal Dollars, 1990-2012
(Index 1990 = 1.0)



Sources: U.S. DOE/EIA, Annual Energy Review 2010 and Short-Term Energy Outlook (January 2012).

Unlike other consumer energy products, electricity has maintained a relatively low rate of price increase below the overall rate of inflation. However, as Chart 2 indicates, virtually all of the residential electricity price increases over the past two decades have occurred since 2000. These increases are due in part to additional capital, operating and maintenance costs associated with meeting clean air and other environmental standards.[6]

Current and prospective EPA rules for the utility sector are expected to result in additional electricity price increases in many areas of the country. For example, U.S. EPA estimates the annual costs of compliance with one recent Clean Air Act regulation – the utility Mercury and Air Toxics Standards rule – at $9.6 billion ($2007) in 2016.[7] The projected annual cost of this rule is 45% greater than EPA's $6.6 billion ($2006) estimate of the costs of compliance with all utility Clean Air Act requirements in 2010.[8]

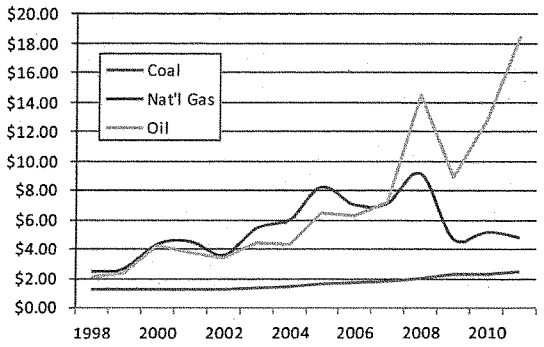
Electric Utility Fuel Cost Trends

The relatively modest long-term rate of price increase for residential electricity reflects, in part, the electric utility industry's historic reliance on low-cost coal for roughly one-half of its energy supplies. As shown in Chart 3, coal prices delivered to electric utilities over the past decade have remained low and stable relative to competing fuels such as

natural gas and petroleum.[9]

EIA forecasts that domestic coal will cost $2.40 per million British Thermal Units (MMBTU) delivered to power plants in 2012.[10] EIA projects the cost of natural gas delivered to utility plants in 2012 at $4.23/MMBTU.[11] In its most recent long-term projections, EIA forecasts that natural gas wellhead prices will remain below $5 per thousand cubic feet (mcf) in 2010$ through 2023, assuming continued success in the development of shale gas reserves.[12] EIA estimates that natural gas wellhead prices will reach $6.52 (in 2010$) per mcf (or $6.72/MMBTU) in 2035.[13] Minemouth coal prices are projected to increase from $1.76 per MMBTU in 2010 to $2.51 per MMBTU in 2035 (2010$).[14]

Chart 3
Electric Utility Fuel Costs, 1998-2012
(Nominal $ per Million BTU)



Sources: U.S. DOE/EIA, Electric Power Annual (2010) and Short-Term Energy Outlook (January 2012).

Consumer Energy Cost Estimates

The distribution of U.S. households by income categories provides the basis for estimating the effects of energy prices on consumer budgets in 2012. EIA's 2001 and 2005 Surveys of Residential Energy Consumption[15] are the principal sources for estimating energy expenditures for residential heating, cooling, electricity, and other household energy services. For this report, the EIA 2005 survey is updated with Census Bureau 2010 population data and EIA's January 2012 forecast of 2012 residential

energy prices.

EIA's 2001 Survey of Household Vehicles Energy Use[16] provides information for estimating transportation energy costs by household income category based on gallons of gasoline used per household. These transportation data are updated using Census Bureau 2010 population data and EIA's January 2012 national average retail gasoline price estimate for 2012 of $3.54 per gallon.

It is assumed that household gasoline usage in 2012 will be 6.3% below the levels of the 2001 survey, reflecting a decline in household vehicle-miles traveled. The Department of Transportation's 2009 National Highway Transportation Survey (NHTS) reports that average vehicle miles traveled per household declined from 21,187 miles in 2001 to 19,850 miles in 2009.[17] No adjustment is made for improved mileage performance because fleet average fuel efficiency has been flat at approximately 25 MPG since 1990.[18] The 2009 NHTS does not provide data on transportation expenses by income category, but its aggregate estimate of household gasoline expenditures for 2009 is consistent with the findings of this report.[19]

Residential and Transportation Energy Expenses

The principal residential energy expenses are for electricity and natural gas for heating, cooling, lighting, and appliances. Some homes also use propane fuel and other heating sources, such as home heating oil, kerosene, and wood.

Gasoline accounts for the largest single increase in consumer energy costs over the past decade. EIA's Short-Term Energy Outlook projects 2012 average retail gasoline costs at $3.54 per gallon, more than double the $1.47 per gallon price in 2001. In 2012, the average U.S. family will spend an estimated $3,957 on gasoline, compared with $1,680 in 2001 – an average increase of $2,277 per household.

The increase in gasoline prices follows a decade-long trend of increased market shares of pickup trucks and sport utility vehicles (SUVs), and an increase in the average number of vehicles owned per household.[20] Despite the success of the "Cash for Clunkers" program, many families continue to own low-efficiency vehicles with low trade-in values.

The impacts of residential and transportation energy costs on low- and middle-income families are summarized in Table 2 and in Appendix Table 1. Residential energy costs have increased on average by 43% since 2001, from $1,493 to $2,131 per household. Consumer costs for gasoline grew by 136% during this period, accounting for 79% of the overall $2,870 increase in total household energy costs since 2001.

Table 2. Estimated After-Tax Income and Energy Costs by Income Category, 2001, 2005, and Projected 2012
(In nominal dollars)

Pre-tax annual income:	<$10K	$10-<$30K	$30-<$50K	<$50K	≥$50K	Totals
Est. avg. after-tax income						
2001	$5,532	$17,520	$32,380	$21,834	$76,054	$47,396
2005	$5,249	$18,198	$33,716	$22,682	$81,066	$49,924
2012	$4,764	$18,106	$33,541	$22,390	$84,263	$53,229
Residential energy $						
2001	$1,039	$1,260	$1,456	$1,299	$1,836	$1,493
2005	$1,351	$1498	$1,733	$1,565	$2,173	$1,850
2012	$1,596	$1,773	$2,044	$1,848	$2,554	$2,131
Transport energy $						
2001	$934	$1,160	$1,638	$1,306	$2,195	$1,680
2005	$1,513	$1,878	$2,652	$2,119	$3,554	$2,790
2012	$2,106	$2,621	$3,705	$2,951	$4,953	$3,957
Total energy $						
2001	$1,973	$2,420	$3,094	$2,605	$4,031	$3,218
2005	$2,863	$3,375	$4,385	$3,684	$5,725	$4,640
2012	$3,702	$4,394	$5,749	$4,799	$7,507	$6,088

Source: Appendix Table 1.

Household Energy Cost Impacts

Energy costs are straining low- and middle-income family budgets. Heating, cooling, and transportation are necessities of life, and the rapid increase in consumer energy costs is impacting low- and middle-income family budget choices among energy and other necessary goods and services, such as health care, housing, and nutrition.

As energy costs have risen over the past decade, the real, inflation-adjusted incomes of American families have been declining. The U.S. Census Bureau reports in its latest assessment of income and poverty that:

> Real median household income was $49,445 in 2010, a 2.3 percent decline from 2009. Since 2007, median household income has declined 6.4 percent (from $52,823) and is 7.1 percent below the median household income peak ($53,252) that occurred in 1999.[21]

Poverty rates have increased along with the decline in real family incomes over the past decade, reaching historic highs in 2010:

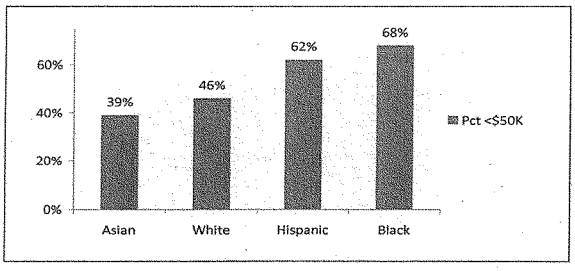
> The official poverty rate in 2010 was 15.1 percent—up from 14.3 percent in 2009. This was the third consecutive annual increase in the poverty rate. Since 2007, the poverty rate has increased by 2.6 percentage points, from 12.5 percent to 15.1 percent. ... In 2010, 46.2 million people were in poverty, up from 43.6 million in 2009—the fourth consecutive annual increase in the number of people in poverty. ...The number of people in poverty in 2010 is the largest number in the 52 years for which poverty estimates have been published.[22]

For low- and middle-income families, energy costs are now consuming a portion of after-tax household income comparable to that traditionally spent on major categories such as housing, food, and health care. The Bureau of Labor Statistics' 2010 Consumer Expenditure Survey reports that 121 million "consumer units" in the U.S. with an average pre-tax income of $62,481 in 2010 spent an average of $16,557 (27%) on housing, $6,129 (10%) for food, and $3,157 (5%) on healthcare.[23]

Energy Cost Impacts on Minorities

EIA's residential energy consumption surveys do not provide energy consumption expenditures by income group combined with minority status. However, as illustrated in Chart 4, the unequal distribution of household incomes is a principal factor leading to disproportionate energy cost impacts on many minority families. More than 60% of Black and Hispanic families had pre-tax household incomes below $50,000 in 2010, compared with 39% for Asian families and 46% for white households.

Chart 4
Percentage of Households with Pre-Tax Incomes below $50,000, 2010



Source: U.S. Bureau of the Census, Current Population Survey Annual Social and Economic Supplement (2011).

Real, inflation-adjusted per capita incomes have declined due to the recession, with larger impacts on Black and Hispanic families than on Asian or white households. The U.S. Census Bureau reports that these recent declines in the real income of American families are part of a long-term declining trend that has particularly impacted Black and Hispanic households:

> Since 2007, real median household income has declined for all race and Hispanic-origin groups. Non-Hispanic-White household income declined by 5.4 percent, Black household income by 10.1 percent, Asian household income by 7.5 percent, and Hispanic household income by 7.2 percent.
>
> Real median household income has not yet recovered to pre-2001 recession all-time highs. Household income in 2010 was 7.1 percent lower for all races combined (from $53,252 in 1999), 5.5 percent lower for non-Hispanic Whites (from $57,781 in 1999), 14.6 percent lower for Blacks (from $37,562 in 2000), 8.9 percent lower for Asians (from $70,595 in 2000), and 10.1 percent lower for Hispanics (from $41,994 in 2000). Black households experienced the largest household income percentage decline among the race and Hispanic origin groups.[24]

Poverty rates have increased in tandem with the declines in real incomes for Black and Hispanic households. The Census Bureau reports that:

> For Blacks, the poverty rate increased to 27.4 percent in 2010, up from 25.8 percent in 2009, while the number in poverty increased to 10.7 million from 9.9 million. For Asians, the 2010 poverty rate and the number in poverty … were not statistically different from 2009. However, the poverty rate increased for Hispanics to 26.6 percent in 2010 from 25.3 in 2009, and the number of Hispanics in poverty increased to 13.2 million from 12.4 million.[25]

Table 3 summarizes 2010 household incomes for Asian, Black, Hispanic, and white families in different gross annual income brackets. In 2010, the average incomes of Hispanic and Black families were 30% and 39% lower, respectively, than the average income of white households. Asian households, on the other hand, enjoyed average annual incomes of $84,828 in 2010 compared with the U.S. average income of $67,530. Based on these income inequality data, disproportionate numbers of Black and Hispanic families are more vulnerable to energy price increases than Asian or white families.

Table 3. Distribution of U.S. Households by Pre-tax Income, 2010

Pre-tax annual income **Percentage of households**	<$10K	$10-<$30K	$30-<$50K	<$50K	≥$50K	Totals
Asian	7%	17%	14%	38%	62%	100%
Black	16%	31%	21%	68%	32%	100%
Hispanic	10%	30%	22%	62%	38%	100%
White	6%	21%	19%	46%	54%	100%
U.S. average	8%	23%	19%	50%	50%	100%
Avg. pre-tax income						Average
Asian	$3,057	$19,841	$39,445	$23,923	$122,997	$84,828
Black	$4,968	$19,014	$38,862	$21,646	$93,539	$44,802
Hispanic	$4,964	$19,718	$38,764	$24,123	$95,848	$51,554
White	$5,005	$19,763	$39,315	$25,778	$113,991	$73,439
U.S. average	$4,906	$19,638	$39,183	$24,752	$111,018	$67,530

Source: U.S. Bureau of the Census, Current Population Reports – 2010 Annual Social and Economic Supplement (2011).

Impacts on Senior Citizens

More than 28% of U.S. households receive Social Security benefits. The average basic Social Security income of these 32.6 million households was $16,236 in 2010.[26] Some 61% of households receiving Social Security benefits also received other retirement income averaging $22,006.[27]

The U.S. Census Bureau reports that the median income of 25.4 million households with a principal householder aged 65 or older was $31,408 in 2010, 36% below the national household median income of $49,445.[28]

Lower-income senior households that depend mainly on fixed incomes are among those most vulnerable to energy price increases. Food, health care, and other necessities compete with energy costs for a share of the household budget. The $31,408 median income of senior U.S. households means that half of these households depend on incomes below this level.

Conclusion

On average, energy costs have nearly doubled as a fraction of annual family budgets since 2001. The unequal distribution of incomes in the United States imposes disproportionate energy cost burdens on minority and senior households. The average after-tax incomes of low- and middle-income U.S. families have not grown since 2001. Meanwhile, inflation has eroded 27% of the value of American families' incomes.[29]

The prices of petroleum-based fuels, particularly gasoline and home heating oil, have increased significantly in the past decade. The rapid escalation of consumer energy prices, along with stagnant income growth, magnifies the impact of energy costs on all American families.

Acknowledgment – This report was prepared for ACCCE by Eugene M. Trisko, who has conducted these analyses annually since 2000. Mr. Trisko is an attorney and energy economist who represents labor and industry clients. He previously served as at an attorney in the Bureau of Consumer Protection of the U.S. Federal Trade Commission and as an expert witness on utility cost of capital.

Notes

[1] Data on residential energy consumption patterns by income are derived from U.S. Department of Energy, Energy Information Administration, "Survey of Residential Energy Consumption," (2001 and 2005 surveys)," available at http://www.eia.doe.gov/emeu/recs/contents.html. Data for 2005 energy consumption by household income are updated to estimated 2012 values based on consumer residential energy cost projections for 2012 in EIA's "Short-Term Energy Outlook" (January 2012).

[2] Household income by gross income category are calculated from the 2010 distribution of household income in U.S. Bureau of the Census, Current Population Survey, "Annual Social and Economic Supplement" (2011).

[3] Congressional Budget Office (CBO), "Effective Federal Tax Rates Under Current Law, 2001 to 2014" (August 2004), and "Effective Federal Tax Rates 1979-2006" (April 2009). Effective federal tax rates for the income categories in this paper were interpolated from CBO's tax rates by income quintile based on the distribution of 2001, 2005 and 2010 household incomes. State income tax rates are estimated from tax rates summarized in Federation of Tax Administrators, http://www.taxadmin.org/fta/rate/ind_inc.html.

[4] See, http://www.neada.org/appropriations/index.html.

[5] U.S. Bureau of Labor Statistics, CPI Inflation Calculator, available at http://data.bls.gov/cgi-bin/cpicalc.pl

[6] See, U.S. EPA, "The Benefits and Costs of the Clean Air Act from 1990 to 2020" (2011) at Table 3-2 (electric utility direct annual compliance costs increased from an estimated $1.4 billion ($2006) in 2000 to $6.6 billion ($2006) in 2010.) Since 2000, the utility sector has complied with the federal acid rain program enacted in the 1990 Clean Air Act Amendments, EPA's 1998 Ozone Transport Rule reducing nitrogen oxide emissions in 19 eastern states, Phase I of EPA's 2005 Clean Air Interstate Rule requiring further reductions of sulfur dioxide and nitrogen oxide emissions in the eastern U.S., and a variety of other federal and state air and water quality standards.

[7] U.S. EPA, "Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards," (December 2011) at ES-14.

[8] U.S. EPA, "The Benefits and Costs of the Clean Air Act," *supra.*

[9] U.S. DOE/EIA, "Electric Power Annual 2010," (historical tables, 2011) and "Short-Term Energy Outlook," (January 2012).

[10] U.S. DOE/EIA, "Short-Term Energy Outlook" (January 2012), Table 2.

[11] *Id.*

[12] U.S. DOE/EIA, "Annual Energy Outlook 2012 Early Release," (January 2012) at 5. One thousand cubic feet of natural gas is equivalent to approximately 1.04 million BTUs.

[13] *Id.*
[14] *Id.*
[15] U.S. DOE/EIA, "Residential Energy Consumption Survey, 2005," (2009), viewable at http://www.eia.doe.gov/emeu/recs/contents.html.
[16] U.S. DOE/EIA, "Household Vehicles Energy Use: Latest Data & Trends" (November 2005), available at http://www.eia.doe/gov/emeu/rtecs/nhts_survey/2001/.
[17] U.S. Department of Transportation, 2009 National Household Travel Survey (2011), Table 6.
[18] U.S. Department of Transportation, "NHTS Brief" (April 2008), Exhibit 3
[19] U.S. DOT, NHTS, *supra*, at Table 34 (average household gasoline expenditures increased from $1,275 in 2001 to $3,308 in 2009.) The average price of gasoline in 2009 was $2.40/gallon, one-third less than the $3.54/gallon price that EIA projects for 2012. Adjusted by the change in average gasoline prices, the 2009 NHTS data imply average 2012 household gasoline expenditures of $4,366, compared with the $3,957 estimate in this report.
[20] U.S. Department of Transportation, 2001 National Household Travel Survey, "Summary of Travel Trends" (December 2004).
[21] U.S. Census Bureau, "Income, Poverty, and Health Insurance Coverage in the United States: 2010" (2011), at 5.
[22] *Id.*, at 14.
[23] See, Bureau of Labor Statistics, Economic News Release, September 27, 2011, available at: http://www.bls.gov/news.release/cesan.nr0.htm. See also, Economic Policy Institute, "Basic Family Budgets: Working Families' Incomes Often Fail to Meet Living Expenses Around the U.S.," Briefing Paper (2005), available at: http://www.epi.org/publication/bp165/
[24] U.S. Census Bureau, "Income, Poverty, and Health Insurance Coverage in the United States: 2010" (2011), at 8.
[25] *Id.*, at 17.
[26] U.S. Census Bureau, "American Community Survey – 2010 American Community Survey 1-Year Estimates," (2012).
[27] *Id.*
[28] U.S. Census Bureau, "Income, Poverty, and Health Insurance Coverage in the United States: 2010" (2011), Table 1.
[29] U.S. Bureau of Labor Statistics, CPI Inflation Calculator, available at http://data.bls.gov/cgi-bin/cpicalc.pl

APPENDIX TABLE 1 - 2001, 2005 AND PROJECTED 2012 HOUSEHOLD INCOME AND ENERGY EXPENSES

2001 HOUSEHOLD ENERGY EXPENSES BY INCOME CATEGORY - ALL U.S. HOUSEHOLDS

	<$10K	$10K-<$30K	$30K-</=$50K	>/=$50K	TOTALS	SUBTOTALS $10K-<$50K	<$50K	>/=$50K
Households (Mil.)	9.8	28.9	23.6	47.0	109.3	52.5	62.3	47.0
Pct of total households	9.0%	26.4%	21.6%	43.0%	100.0%	48.0%	57.0%	43.0%
Avg pre-tax income	$5,733	$19,707	$39,201	$107,649	$60,488	$28,470	$24,893	$107,649
Effec. fed tax rate %	2.0%	8.5%	13.4%	23.1%	17.3%	10.7%	9.3%	23.1%
Est. state tax rate%	1.5%	2.6%	4.0%	6.3%	4.4%	3.2%	3.0%	6.3%
Est. after-tax income	$5,532	$17,520	$32,380	$76,054	$47,396	$24,504	$21,834	$76,054
Residential energy $	$1,039	$1,260	$1,456	$1,836	$1,493	$1,348	$1,299	$1,836
Residential electric $	$628	$772	$922	$1,172	$938	$839	$806	$1,172
Other resid. energy $	$411	$488	$534	$664	$555	$509	$493	$664
Transport energy $	$934	$1,160	$1,638	$2,195	$1,680	$1,375	$1,306	$2,195
Total energy $	$1,973	$2,420	$3,094	$4,031	$3,218	$2,723	$2,605	$4,031
Energy % of after-tax inc.	35.7%	13.8%	9.6%	5.3%	6.8%	11.1%	11.9%	5.3%
Resid. % of after-tax inc.	18.8%	7.2%	4.5%	2.4%	3.2%	5.5%	6.0%	2.4%
Trans. % of after-tax inc.	16.9%	6.6%	5.1%	2.9%	3.5%	5.6%	6.0%	2.9%

2005 HOUSEHOLD ENERGY EXPENSES BY INCOME CATEGORY - ALL U.S. HOUSEHOLDS

	<$10K	$10K-<$30K	$30K-</=$50K	>/=$50K	TOTALS	$10K-<$50K	<$50K	>/=$50K
Households (Mil.)	9.4	28.1	23.4	53.5	114.4	51.5	60.9	53.5
Pct of total households	8.2%	24.6%	20.5%	46.8%	100.0%	45.0%	53.2%	46.8%
Avg pre-tax income	$5,400	$19,695	$39,388	$106,947	$63,344	$28,643	$25,055	$106,947
Effec. fed tax rate %	1.8%	5.0%	10.4%	17.9%	16.7%	7.5%	6.6%	17.9%
Est. state tax rate%	1.0%	2.6%	4.0%	6.3%	4.5%	3.2%	2.9%	6.3%
Est. after-tax income	$5,249	$18,198	$33,716	$81,066	$49,924	$25,581	$22,682	$81,066
Residential energy $	$1,351	$1,498	$1,733	$2,173	$1,850	$1,604	$1,565	$2,173
Residential electric $	$785	$914	$1,098	$1,361	$1,150	$998	$965	$1,361
Other resid. energy $	$566	$583	$635	$812	$699	$607	$600	$812
Transport energy $	$1,513	$1,878	$2,652	$3,554	$2,790	$2,230	$2,119	$3,554
Total energy $	$2,863	$3,375	$4,385	$5,728	$4,640	$3,834	$3,684	$5,728
Energy % of after-tax inc.	54.5%	18.5%	13.0%	7.1%	9.3%	15.0%	16.2%	7.1%
Resid. % of after-tax inc.	25.7%	8.2%	5.1%	2.7%	3.7%	6.3%	6.9%	2.7%
Trans. % of after-tax inc.	28.8%	10.3%	7.9%	4.4%	5.6%	8.7%	9.3%	4.4%

PROJECTED 2012 HOUSEHOLD ENERGY EXPENSES BY INCOME CATEGORY - ALL U.S. HOUSEHOLDS

	<$10K	$10K-<$30K	$30K-</=$50K	>/=$50K	TOTALS	$10K-<$50K	<$50K	>/=$50K
Households (Mil.)	9.2	28.0	22.6	58.9	118.7	50.6	59.8	58.9
Pct of total households	7.8%	23.6%	19.0%	49.6%	100.0%	42.6%	50.4%	49.6%
Avg pre-tax income	$4,906	$19,638	$39,183	$111,018	$67,530	$28,370	$24,751	$111,018
Effec. fed tax rate %	1.9%	5.2%	10.4%	17.8%	16.6%	7.5%	6.7%	17.8%
Est. state tax rate%	1.0%	2.6%	4.0%	6.3%	4.6%	3.2%	2.9%	6.3%
Est. after-tax income	$4,764	$18,106	$33,541	$84,263	$53,229	$25,320	$22,390	$84,263
Residential energy $	$1,596	$1,773	$2,044	$2,554	$2,131	$1,894	$1,848	$2,554
Residential electric $	$930	$1,083	$1,302	$1,613	$1,330	$1,181	$1,142	$1,613
Other resid. energy $	$666	$690	$743	$941	$800	$713	$706	$941
Transport energy $	$2,106	$2,621	$3,705	$4,953	$3,957	$3,105	$2,951	$4,953
Total energy $	$3,702	$4,394	$5,749	$7,507	$6,088	$4,999	$4,799	$7,507
Energy % of after-tax inc.	77.7%	24.3%	17.1%	8.9%	11.4%	19.7%	21.4%	8.9%
Resid. % of after-tax inc.	33.5%	9.8%	6.1%	3.0%	4.0%	7.5%	8.3%	3.0%
Trans. % of after-tax inc.	44.2%	14.5%	11.0%	5.9%	7.4%	12.3%	13.2%	5.9%

Sources: Population and income data from U.S. Bureau of the Census, Current Population Survey Supp. (2001, 2005, 2011 eds.) Residential energy costs are based on U.S. DOE Residential Energy Consumption Survey (2001, 2005 eds.) 2012 projections based on changes in 2005-2012 residential energy prices from U.S. DOE/EIA Annual Energy Review 2005 and Short-Term Energy Outlook (January 2012). Transportation energy expenditures are estimated from U.S. DOE/EIA, Household Vehicle Energy Use: Latest and Trends (Nov 2005) and DOE/EIA Short-Term Energy Outlook (January 2012). Gasoline use per household in 2012 is reduced by 6.3% from 2001 levels based on data in US DOT 2009 National Highway Transportation Survey. Average effective federal tax rates are estimated from Congressional Budget Office, Effective Federal Tax Rates Under Current Law, 2001-2014 (August 2004), and Effective Federal Tax Rates, 1979-2006 (April 2009). State tax rates estimated from www.taxadmin.org/fta/rate/ind_inc.html.

Summary of Statement of Eugene M. Trisko
Before the Subcommittee on Energy and Environment
June 6, 2012

This testimony summarizes the findings of a study entitled "Energy Cost Impacts on American Families, 2001-2012." I have conducted this study periodically since 2000 for the American Coalition for Clean Coal Electricity and its predecessor organizations.

The report analyzes consumer energy costs since 2001 for all U.S. households and examines the pattern of energy expenditures among four income levels and for senior and minority families. It relies on historical energy consumption survey data and current energy price forecasts from the DOE Energy Information Administration (EIA).

Slightly more than one-half of U.S. households have average pre-tax annual incomes below $50,000. In 2001, families with gross annual incomes below $50,000 spent an average of 12% of their average after-tax income of $21,834 on residential and transportation energy. In 2012, these households are projected to spend 21% of their average after-tax income of $22,390 on energy.

Family incomes have not kept pace with the rising costs of energy. The U.S. Census Bureau reports that since 2007, real (inflation-adjusted) median household income has declined by 6% (from $52,823) and is 7% below the median household income peak ($53,252) that occurred in 1999.

Higher gasoline prices account for nearly four-fifths of the increased cost of energy for consumers since 2001. In nominal dollars, average U.S. household expenditures for gasoline will grow by 136% from 2001 to 2012, based on EIA gasoline price projections for 2012.

Electricity has maintained relatively lower annual average price increases compared to residential natural gas and gasoline. Electricity prices have increased by 51% in nominal dollars since 1990, well below the 72% rate of inflation in the Consumer Price Index. The nominal prices of residential natural gas and gasoline have nearly doubled and tripled, respectively, over this period.

Virtually all of the residential electricity price increases over the past two decades have occurred since 2000. These increases are due in part to additional capital, operating and maintenance costs associated with meeting clean air and other environmental standards.

Lower-income families, including millions of fixed-income senior citizens, are more vulnerable to energy costs than higher-income families because energy represents a larger portion of their household budgets. In 2010, the median gross income of 25.4 million households with a principal householder aged 65 or older was $31,408, 36% below the national median household income. Energy is consuming one-fifth or more of the household incomes of lower- and middle-income families, reducing the amount of income that can be spent on food, housing, health care, and other necessities.

Chairman HARRIS. Thank you very much.

I now recognize Mr. Wolf to present his testimony.

STATEMENT OF MR. TOM WOLF,

EXECUTIVE DIRECTOR, ENERGY COUNCIL,

ILLINOIS CHAMBER OF COMMERCE

Mr. WOLF. Thank you, Mr. Chairman.

My name is Tom Wolf. I am the Executive Director of the Energy Council at the Illinois Chamber of Commerce. The Council is made up of companies that generate, transmit, transport energy or supply the energy marketplace. Thank you for the opportunity to give a little bigger-picture perspective on some of the regulations being proposed on future greenhouse gas emission sources.

When it comes to the energy regulatory oversight, businesses are looking for a few general themes. Some of them include predictability, what can and should they plan for; a sweet spot where interests—including environmental interests—are protected and commerce can flourish; benchmarks that are based on science and engineering, not wishful thinking; and diversity, allowing everyone a shot at success so we don't rely too much on one form of energy.

We believe the new rulemaking on greenhouse gas emissions for new sources proposed by the U.S. EPA falls short of these goals. Here are a couple of reasons why.

The proposed rulemaking sets a limit which most natural gas generators can accommodate with today's technology but that coal generation cannot. It seems a bit strange that this magic limit saves the planet and just so happens to allow natural gas but not coal generation. We understand there is a provision in the U.S. EPA regulations for coal companies to average the greenhouse gas emissions over 30 years, theoretically allowing them to build a new plant, retrofit it with sequestration technology when it becomes available—if and when it becomes available and move forward—that path for new coal could move forward. But that path seems to run through the installation of carbon capture and sequestration, a technology that is still under development and too expensive for use today. We hope that changes but it is unclear that it will.

Given that, what company will be able to get financing for a new plant that is built on the hope that a new technology will be available and affordable at some point in the future? We don't believe investors would or could take that risk. Let's take a moment to remember how much cleaner coal generation has become in the past three decades. The Prairie State generation plant in Marissa, Illinois, outside St. Louis on the Illinois side of the Mississippi River produces 50 percent less regulated emissions and 15 percent less greenhouse gas emissions using the best available control technology, a great step forward.

However, we believe if these proposed regulations take hold, the leap coal producers are asked to make in greenhouse gas emissions will be a roadblock to innovation, not an incentive. The leap being asked for could result in companies abandoning coal research and moving to other forms of energy, leaving us more vulnerable with fewer supply choices.

We believe if these regulations are enacted, the cleaner coal technologies will be invented somewhere else, or they won't be invented at all because other countries that rely on coal are making little to no effort to minimize greenhouse gas emissions. We are a leader in cleaner coal technologies today and could be going forward.

I hesitate to try and quantify the exact costs of the proposed rulemaking that I am going through. If I have learned one thing in my four years in this position, it is that the future is really hard to predict. Who could have predicted the natural gas—the new natural gas finds that we found in our country that could turn us into a natural gas exporter versus an importing one we thought we would be? Who could have predicted that crude oil from North Dakota, which was 7,500 barrels per day in 2006, is now over 500,000 barrels a day? Who could have predicted that wind turbines would be 30 percent more efficient than they were three years ago or solar equipment costs would plummet the way they have?

But unless there is a leap in coal generation technology that is unforeseen at this time, we believe the rules proposed by the U.S. EPA and new sources will effectively shut down the future of new coal generation and the jobs, economic development, and opportunity that would come with it.

In closing, I want to talk about the Prairie State. I took a tour of Prairie State, talked the lead environmental engineer there and asked him what he felt about working at that plant and how he felt about working on the environmental controls. And he said, I am a kid in a candy store. I reap potential environmental controls in this plant and I am so proud of working here. We need to make regulations that inspire him to roll up his sleeves and find the next innovation that makes coal even cleaner instead of rulemaking that I believe makes him want to throw up his hands and go, are you kidding me? We can't do it.

So we suggest taking a long, deep breath, take a hard look at these new regulations and change them to allow new coal plants to be built, incentivized in a way that creates a market for the technological advances that will make coal cleaner and cleaner and a viable option for United States and global electricity users.

Thank you for this opportunity, Mr. Chairman.

[The prepared statement of Mr. Wolf follows:]

ILLINOIS CHAMBER
OF COMMERCE

Testimony of Tom Wolf, Executive Director Energy Council
Illinois Chamber of Commerce

EPA's Impact on Jobs and Energy Affordability: Understanding the Real Costs and Benefits of Environmental Regulations

House Subcommittee on Energy and the Environment
June 6, 2012

My name is Tom Wolf and I'm the executive director of the Energy Council at the Illinois Chamber of Commerce. The council is made up of companies that generate, transmit and transport energy, or supply the energy marketplace. We have voices from worlds of crude oil, coal, wind, solar, nuclear, waste-to-energy, natural gas, utility and transmission and engineering interests. The Council's goal is to make Illinois a better place for energy of all kinds because that creates economic opportunities of all kinds.

What we're looking for in regulations

When it comes to energy regulatory oversight, businesses are looking for a few general themes:

- Predictability – what can and should they plan for?
- A sweet spot where interests – including environmental interests -- are protected *and* commerce can flourish
- Benchmarks that are based on science and engineering, not wishful thinking
- Diversity – allowing everyone a shot at success so we don't rely too much on one form of energy

Why we believe the proposed rulemaking falls short

We believe the new rulemaking on green house gas regulations for new energy sources proposed by the US EPA falls short of these goals. Here are some reasons why:

The proposed rulemaking sets a limit which most natural gas generators can accommodate with today's technology — but that coal generation cannot. It seems a bit strange that this magic limit saves the planet *and* just so happens to allow natural gas generation but not coal generation.

I know everyone, including the Chamber, is excited about the new natural gas finds across the country, but it was a few short years ago that we were talking about importing natural gas. Things change in way we cannot predict – so why preclude a solution that includes new coal generation?

We understand there is a provision in the EPA regulations for coal companies to average their GHG emissions over 30 years, theoretically allowing them to build a new plant and retrofit it with sequestration technology when (and if) it becomes available and economical.
The Administration claims that there is a 'path forward' for coal in this rule. However, the path seems to run through installation of carbon capture and storage - a technology that is still under development and too expensive for use today.

Given that, what company will be able to get financing for a new plant that is built on the hope that new technology will be available and affordable at some point in the future? We don't believe investors would or could take that risk.
From our perspective these regulations are advocating for natural gas generation and creating a regulatory wet blanket on future coal production -- in essence, picking winners and losers when we need nothing but winners.

Let's take a moment to comment on how much *cleaner* coal production has gotten in the past three or four decades. The Prairie State generation plant that's just about to become fully operational in southwestern Illinois produces 50% less regulated emissions and 15% less GHG emissions using best available control technology – a great step forward.

However, we believe if these proposed regulations come into place, the *leap* coal producers are asked to make in GHG emissions will be a roadblock to new innovation, not an incentive. The *leap* being asked for could result in companies abandoning coal research and moving to other forms of energy – leaving us more vulnerable with fewer supply choices.

We agree with the Administration when it talks about the importance of inventing new alternative energy technologies here in America. But we believe if these regulations are enacted, the cleaner coal technologies will be invented somewhere else, or they won't be invented at all

because other countries that rely on coal are making little to no efforts to minimize GHG emissions. We are a leader in cleaner coal technologies and could be going forward. But asking for this leap of faith could squash our ability to lead the world.

Finally, the Chamber has a concern that is imperative under the concept of predictability. Whatever regulations that come out of this process, they ***should not serve*** as a precursor to regulating GHG from *existing* plants or provide a legal trap door for regulating existing plants when they are modified with new pollution controls to comply with other regulations. The USEPA has clearly said that they would not treat modified sources as new and that they had no plans or timetable for proposing regulations for existing sources.

We ask that you stay true to that commitment as there will be voices pushing you to backtrack on that promise.

What does this mean for Illinois business and consumers?

I hesitate to try and quantify the exact costs and benefits if this proposed rulemaking is adopted as is. If I've learned one thing in my four years in this position is the future is really hard to predict. Who could have predicted the natural gas finds that might turn us into a natural gas exporting country instead of an importing one. Who could have predicted that crude oil production in North Dakota would jump from 7,500 barrels per day in 2006 to more than 700,000 barrels a day today. Who could have predicted that wind turbines would be up to 30% more efficient than four years ago, or that solar equipment costs would plummet.

However, unless there is a leap in coal generation technology that is unforeseen at this time, new coal generation will be precluded from being part of the solution when it comes to energy generation. Remember, coal provides almost half of the power in our state today. These rules effectively shut down the future of new coal generation and the jobs, economic development and opportunity that would come with it.

This does have economic ramifications as we believe we are better off with a diversified portfolio of generation options. Relying on fewer instead of more options puts us in danger of paying more for electricity, which affects the economy as a whole.

Conclusion

In closing the Chamber believes **all of the above should mean *all of the above*** – We believe diversity in our energy portfolio is an important. It seems these regulations push coal aside instead of forward. Therefore we're going to have to rely on everything *but* coal in our future baseload generation since it's hard to imagine anyone willing to invest in a power source that will be out of compliance before the first kilowatt is generated. We have 25% of the world's coal reserves. Isn't it worth trying a bit harder to make it part of the future energy mix?

Since the rest of the world is going to continue using coal, shouldn't rulemaking provide reasonable challenges that drive innovation that can be exported globally and make a dent in the CO2 emissions this proposal is trying to achieve?

We're afraid these new regulations will thwart, not push, innovation and discourage rather than encourage a diverse portfolio of generation recourses.

We hope the government would create an environment where all sources of power have the chance to become more efficient and cleaner. We believe coal should be an important part of that future and, if regulations allow the industry to continually improve its production methods, it can provide opportunities for continued advancements and economic opportunity at home and abroad.

We suggest taking a long, deep breath, and take a hard look at these new regulations and change them to allow new coal plants to be built, incentivized in a way that creates a market for the technological advances that will make coal cleaner and cleaner – and a viable option for a U.S. and global electricity users.

Thank you.

Chairman HARRIS. Thank you very much.

I now recognize Mr. David Hudgins for five minutes to present his testimony.

STATEMENT OF MR. DAVID HUDGINS,
DIRECTOR OF MEMBER AND EXTERNAL RELATIONS,
OLD DOMINION ELECTRIC COOPERATIVE

Mr. HUDGINS. Thank you, Mr. Chairman, Members of the Committee.

Good afternoon. My name is David Hudgins. I am the Director of Member and External Relations at Old Dominion Electric Cooperative. ODEC is a generation and transmission cooperative headquartered in Glen Allen, Virginia, which is outside of Richmond. We provide electric power to 11 member-distribution cooperatives in Virginia, Maryland, and Delaware. Among our portfolio of fossil fuel generation, we have a 50 percent ownership in an 850 megawatt coal-fired plant in Halifax County, Virginia, and two simple cycle combustion turbines in Virginia and 50 percent of another one in Maryland.

As an owner of existing fossil fuel generation, and more importantly, as we continue our interest and efforts to develop a coal-fired base facility, Cypress Creek Power Station, ODEC's decisions on future generation will be directly and negatively impacted by the adoption of the New Source Performance Standards for carbon dioxide, and I very much appreciate the opportunity to speak today on the EPA proposal or, as I learned over the weekend, the Employment Prevention Agency—i.e., this plant will employ 3,000 construction workers for four years, 225 permanent jobs at the end of the construction, and that is not including the ripple effect of hundreds of millions of dollars that are going to ripple through the economy. So it has a material impact on the entire region about the rules.

But today, I am here to state officially that ODEC has significant concerns related to the proposal. This rule, the NSPS, is at its core flawed. EPA fails to provide stated benefits for this rule. The proposed rule's standard is set without regard to fuel type, with only certain natural gas-fired units capable of meeting the proposed limit without control equipment. Given that there is currently no commercially available, demonstrated technology capable of removing the required CO_2, namely carbon capture and storage from large coal power plants, this standard mandates fuel choice in lieu of technologies. The NSPS was never intended to be used to "redefine" a source or dictate use of one fuel over another. NSPS must be technologically driven and not enacted to drive an overall national mitigation goal.

Additionally, the EPA, in their efforts to justify this standard, relied on two major assumptions. First, EPA believes that implementation of a currently unachievable CO_2 standard for coal will drive commercial development of the emerging carbon capture technology to ensure future compliance. Second, the proposed rule presumes supply of natural gas will be both affordable and readily available to fuel the significant increase of base load generation in the com-

ing decades. ODEC believes both of these assumptions are erroneous.

With regard to carbon capture technology, EPA states in the release of the proposed standard, "today's proposal does not interfere with construction of new coal-fired capacity." EPA is justifying the standard by providing a 30-year averaging and assuming that full-scale carbon capture technology would be commercially viable within 10 years given current and projected government testing and demonstration. This averaging requirement alone will preclude any new coal plants from being built. No company will take the risk to invest billions of dollars into a power plant in the hopes that carbon capture technology will be developed. Additionally, financial lending institutions will not lend money to construct a plant without a viable technology to demonstrate compliance. This is a $5 billion investment on behalf of the cooperatives to provide 1,500 megawatts.

There are some demonstration projects involving enhanced oil recovery; however, this Administration's Interagency Task Force on Carbon Capture noted, "only when the financial, economic, technological, legal, and institutional barriers are addressed will carbon capture be a viable mitigation option." Finding suitable storage areas, developing pipeline infrastructure, and developing large-scale capture technology, in addition to the legal and liability issues, are significant—if not insurmountable—hurdles to overcome.

ODEC has been and continues to be a member of the Southeast Regional Carbon Sequestration Partnership. We recognize the need for these partnerships to facilitate exploration and expansion of this Nation's technological capabilities. As a Virginia cooperative, coal has been an abundant, consistent, and economical source of fuel for development of base load electric generation for many decades. While all of us have seen recent prices of natural gas at all-time lows, EPA's assumption that prices will remain low is extremely short-sighted.

Historically, the U.S. Government has consistently failed to accurately predict future natural gas prices, and world market implications on natural gas pricing are disturbing. Electrical affordability from natural gas generation is significantly driven by the fuel price. EPA's proposed standard will effectively eliminate ODEC's choice for affordable base load electric power.

ODEC recognizes that solutions to this country's power needs in the future will take resources and innovation. However, this proposed mandate will not drive those solutions. Because of the significant impact it will have on the electric generation industry as a whole, and more importantly, on ODEC's ability to construct new base load generation that will be affordable for all of our members—owners, ODEC urges the Committee to fully and objectively examine the source material and this proposed rule. Also, we urge the Committee to encourage the EPA to withdraw this proposed rule.

This concludes my testimony and thank you again for the opportunity to speak on this fundamental issue of powering the United States economy into the future. Thank you.

[The prepared statement of Mr. Hudgins follows:]

Comments of

Old Dominion Electric Cooperative

New Source Performance Standards for CO2

Presented to

United States House of Representatives
the Subcommittee on Energy and Environment of
the House Committee on Science, Space, and
Technology

Presented by

C. David Hudgins

June 6, 2012

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ODEC TESTIMONY

Good morning. My name is David Hudgins. I am the Director of Member & External Relations at Old Dominion Electric Cooperative (ODEC). ODEC is a generation and transmission cooperative, headquartered in Glen Allen, Virginia providing electric power to its 11 member-distribution electric cooperatives in Virginia, Maryland, and Delaware. Among our portfolio of fossil fuel generation assets, ODEC has a fifty percent ownership interest in the 850 MW coal-fired Clover Power Station, which is located in Halifax County, Virginia. Additionally, ODEC owns and operates two simple cycle combustion turbine facilities (each 510 MW gas and oil-fired generation) in Virginia and owns fifty percent of another in Maryland.

As an owner of existing fossil fuel generation, and more importantly as we continue our interest and efforts to develop a coal-fired base load facility, Cypress Creek Power Station, ODEC's decisions on future generation will be directly and negatively impacted by the adoption of the New Source Performance Standards (NSPS) for carbon dioxide (CO2), and I very much appreciate the opportunity to speak today on the EPA's proposal.

I am here today to state that ODEC has significant concerns related to the proposal. The proposed NSPS is at its core flawed. EPA fails to provide a stated

benefit for this rule. The proposed rule's standard is set without regard to fuel type, with only certain natural gas-fired units capable of meeting the proposed limit without control equipment. Given that there is currently no commercially available, demonstrated technology capable of removing the required CO_2, namely carbon capture & storage (CCS), from large coal-fired power plants, this standard mandates fuel choice in lieu of technologies. The NSPS was never intended to be used to "redefine" a source or dictate use of one fuel over another. NSPS must be technologically driven and not enacted to drive an overall national mitigation goal.

Additionally, the EPA, in their efforts to justify this standard, relied on two major assumptions. First, EPA believes that implementation of a currently unachievable CO_2 standard for coal will drive commercial development of the emerging CCS technology to ensure future compliance. Second, the proposed rule presumes supply of natural gas will be both affordable and readily available to fuel the significant increase of baseload generation in the coming decades. ODEC believes both of these assumptions are erroneous.

With regard to CCS technology, EPA states in the release of the proposed standard, "today's proposal does not interfere with construction of new coal-fired capacity". EPA is justifying the standard by providing a 30 year averaging period and assuming that full scale CCS technology would be commercially viable within 10 years given current and projected government testing and demonstration

projects and funding. This averaging requirement alone will preclude any new coal plants from being built. No company will take the risk to invest billions of dollars into a power plant in the hopes that CCS technology will be developed. Additionally, financial lending institutions will not lend money to construct a plant without a viable technology to demonstrate compliance.

There are some demonstration projects involving enhanced oil recovery (EOR); however, this administration's Interagency Task Force on Carbon Capture noted; "only when the financial, economic, technological, legal, and institutional barriers are addressed will CCS be a viable mitigation option." Finding suitable storage areas, developing pipeline infrastructure and developing large scale capture technology, in addition to the legal/liability issues, are significant, if not insurmountable, hurdles to overcome. ODEC has been and continues to be a member of the Southeast Regional Carbon Sequestration Partnership (SECARB). ODEC recognizes the need for these partnerships to facilitate exploration and expansion of this nation's technological capabilities.

As a Virginia cooperative, coal has been an abundant, consistent, and economical source of fuel for development of base load electric generation for many decades. While all of us have seen recent prices of natural gas at all-time lows, EPA's assumption that prices will remain low is extremely short-sighted. Historically, the U.S. Government has consistently failed to accurately predict

future natural gas prices, and world market implications on natural gas pricing are disturbing. Electricity affordability from natural gas generation is significantly driven by the fuel's price. EPA's proposed standard will effectively eliminate ODEC's choice for affordable baseload electric power.

ODEC recognizes that solutions to this country's power needs in the future will take resources and innovation. However, this proposed mandate will not drive those solutions. Because of the significant impact this will have on the electric generation industry as a whole, and more importantly, on ODEC's ability to construct new base load generation that will be affordable for all of our member owners, ODEC urges the committee to fully and objectively examine the source material and this proposed rule. Also we urge the committee to encourage the EPA to withdraw this proposed rule.

This concludes my testimony and thank you again for this opportunity to speak on this fundamental issue of powering the United States economy into the future.

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Chairman HARRIS. Thank you very much.

I now recognize our final witness, Mr. Richard Trzupek, for five minutes to present his testimony.

STATEMENT OF MR. RICHARD TRZUPEK,
PRINCIPAL CONSULTANT,
TRINITY CONSULTANTS

Mr. TRZUPEK. Thank you, Mr. Chairman and Ranking Member Miller, for the opportunity to testify here today.

I am Rich Trzupek, a chemist and environmental consultant currently employed as Principal Consultant with Trinity Consultants, Inc. I work in the trenches, as it were, for the small and midsized companies that do not have their own environmental staff.

You have my written testimony, so I would like to use this time to highlight a few points.

First, the perception in the regulative community that the EPA is overly aggressive and overly intrusive is real and in my opinion justified. When former Region 6 Administrator Dr. Al Armendariz—sorry about that—Armendariz made his famous crucifixion speech, it came as no surprise to those who work on the industrial side. From an industrial point of view, he honestly expressed—albeit in far-too-colorful language—the way that most high-ranking EPA officials view enforcement actions. My experience has been that, at the federal level, intimidation is often as important as compliance.

Second, many parts of the regulatory structure and the federal permit systems are needlessly cumbersome and complex. Some say they do what they can to provide help in streamlining—TCEQ is a great example—but there is little they can do about the parts of their programs which are subject to U.S. EPA oversight and approval. The complexity the regulatory structure creates more and more opportunities for noncompliance, which has nothing to do with exceeding emission limits, but rather strictly about paperwork and procedures.

The combination of aggressive enforcement, regulatory complexity, and a clunky federal permit system does lead to adverse economic consequences. I have seen many cases in my career where the decision not to build a facility in the United States or the decision not to expand an existing facility was heavily influenced by the regulatory environment. This is not to say that environmental regulations were the only factor in these decisions but they were important factors.

Third, I believe it is time for Congress to review the way the U.S. EPA is allowed to continually redefine its mission, particularly with respect to the Clean Air Act. Under the Clean Air Act, the U.S. EPA is allowed to continually redefine what constitutes clean air by issuing a new ambient air quality standards. By continually moving the goalposts farther and farther as the air has gotten remarkably cleaner and cleaner, the Agency thus justifies continuing with less and less actual environmental or human health returns. The United States now has some of the cleanest air in the world, and I would respectfully suggest that it is time we acknowledge that fact and that the Clean Air Act reflects that fact.

Fourth, the economic justifications that the U.S. EPA uses when promulgating new regulations are, in my opinion, seriously flawed. In my opinion, U.S. EPA both grossly overestimates the economic benefits of regulations and ignores many economic, societal, and health consequences on the other side of the ledger. In a way, I think it is unfortunate that we call the metric value a statistical life because it tends to imply maybe I can plop down $9 million and buy a person. What it really is is the net economic productivity of the average person, how much money he makes, how much he impacts the economy. When you say it is a value of a life it is going to be insulting no matter the number. I personally think I am worth more than $9 million over the course of my life. And there is no way that metric should be used or should be called what it is as though it was a real value of a life. It is a value of what a person does and earns in his life.

You will note that all of the above comments are not related to the U.S. EPA under this or any other administration. These comments would have applied four years ago, eight years ago, 12 years ago, et cetera. The only real difference over time is that we can apply the word "more" each and every year. Regulations get more complex, the EPA gets more aggressive, economic justifications are more unbelievable, et cetera.

There is one thing that is unique to the EPA under the current Administration and that is what I refer to as the regulatory tsunami aimed squarely at the use of coal and power industrial sectors. Through a combination of greenhouse gas limitations—which previous witnesses have talked about—new permitting requirements, new ambient air quality standards, and new hazardous air pollution rules, the Agency has made it virtually impossible to build the new, modern coal-fired generation in the United States that would replace our aging fleet.

The EPA has thus effectively decided that more and more of the base load power generation capacity the American depends on will be natural gas-fired. In the long term, I strongly suspect this will lead to substantial increases in the cost of electricity and in more wildly fluctuating power prices.

Thank you again for the opportunity to testify, and please feel free to call on me again in the future if I can be of assistance to the Committee.

[The prepared statement of Mr. Trzupek follows:]

Committee on Science, Space, & Technology
Energy & Environment Subcommittee
United States House of Representatives
"Cost and Benefits of Environmental Regulations"
Testimony of Richard Trzupek
Principal Consultant
Trinity Consultants, Inc.
Wednesday, June 6th, 2012
WRITTEN

Introduction

Thank you Chairman Harris, Ranking Member Miller and other members of the Subcommittee for the opportunity to testify on this important topic. I am Richard Trzupek, a chemist and environmental consultant, currently employed as a Principal Consultant with Trinity Consultants, Inc. I have been employed in the environmental industry for thirty years, initially as a stack tester (measuring air pollution emitted by industrial processes) and then as a consultant to industry. The vast majority of my clients are now, and always have been, small to mid-sized companies that do not have full-time environmental professionals on staff.

We have made enormous progress in cleaning up the environment in America since the passage of the Clean Air and Clean Water Acts over forty years ago. Everyone involved in that effort – from businesses to environmental groups to everyday Americans – should be proud of what we have accomplished together. Obviously, the Environmental Protection Agency has played a key role in that effort as well. However, as our air and water and soil continue to get cleaner year after year – as the EPA's data clearly shows – the Agency's mission has, in my view, increasingly morphed from protecting human health and the environment to finding ways to justify its existence.

I am not one of those who believes that the EPA should be eliminated. Instead, I believe that the EPA's mission should be redefined to reflect the fact that the environment in America in 2012 is nothing like what the environment was in 1970. As the law stands today, the EPA has the ability to continually redefine its mission in many areas and it does so regularly, no matter the administration is in charge at the time. By continually moving the goalposts further and further back, and offering increasingly dubious economic justifications for doing so, the Agency creates the illusion that ever more heavy-handed regulation are necessary and worth the cost.

Working "in the trenches" with the men and women who struggle to comply with this ever-growing, ever more complex body of environmental regulations, I have seen the price that we all pay – not for environmental protection, but rather for environmental puritanism. We pay a price in terms of jobs lost, in terms of reduced productivity and in terms of opportunities not realized.

Costs and Benefits – EPA Claims

The EPA routinely claims enormous monetary benefits when promulgating a new regulation. Typically, these benefits consist of two key components: "premature deaths avoided" and increased worker productivity due to less lost sick days. "Premature deaths avoided" is the largest component of the calculation, so I will focus on that.

In calculating the worth of premature deaths avoided, the EPA relies upon the "Value of a Statistical Life" (VSL). It currently uses a VSL of about $9 million, which is, to my knowledge, the highest VSL used by any government agency. The Agency applies this value to each premature death avoided claimed, whether the theoretical death avoided involves extending an octogenarian's life by two weeks or a newborn's by seventy five years. The EPA, to my knowledge, has never said how much the average theoretical life is theoretically extended by the issuance of a new regulation. They simply claim the full value of the "statistical life" for each "premature death avoided".

For example, the EPA recently claimed the recently promulgated Boiler MACT rule would result in $22 billion to $54 billion in economic benefits in 2014. This number is almost entirely driven by the premature deaths avoided metric, which the Agency claims is 2,500 to 6,500 premature deaths avoided per year.

Even more dubiously, EPA Director Lisa Jackson has claimed the Clean Air regulations are an investment that returns forty dollars in revenue for each dollar spent on regulating sources of air pollution. This figure comes from an EPA study in which the Agency made the following assertions:

The direct benefits of the Clean Air Act from 1970 to 1990 include reduced incidence of a number of adverse human health effects, improvements in visibility, and avoided damage to agricultural crops. Based on the assumptions employed, the estimated economic value of these benefits ranges from $5.6 to $49.4 trillion, in 1990 dollars, with a mean, or central tendency estimate, of $22.2 trillion.

And, further on in the same document:

The direct costs of implementing the Clean Air Act from 1970 to 1990, including annual compliance expenditures in the private sector and program implementation costs in the public sector, totaled $523 billion in 1990 dollars.

$22.2 trillion divided $523 billion is 42.4, which is where Director Jackson comes up with the 40 to 1 return on investment argument. Consider, however, that between 1970 and 1990, the aggregate total GDP of the United States was $63 trillion. According to EPA logic, the Clean Air Act alone was responsible for 35% of that economic activity ($22.2 trillion), and perhaps as much as 78% of it ($49.4 trillion)! It is a ludicrous claim.

In considering the cost side of the cost-benefit analysis, the Agency typically considers only the capital cost of control equipment, operating and maintenance costs associated with the equipment and the man-hour costs of compliance activities. The Agency does not consider other economic, societal and health costs associated with each regulation and with the body of regulatory activity as a whole. Examples of these costs include:

- Job loss
- Heath effects associated with job loss and reduced income
- Opportunity costs associated with facilities not built in the US because of the regulatory burden
- Costs passed on to the consumer and the effects that has on quality of life and health
- Facilities that move to other countries in whole or in part because the regulatory environment

Compliance Issues

The most common lament among my clients goes something as follows: "I want to comply. I'm trying to comply. I just can't figure out what I'm supposed to do." Indeed, helping them figure it out is the reason they hire someone like me. Compliance with air quality regulations is not simply a matter of ensuring that emissions from a particular facility do not exceed applicable EPA standards. That part of compliance is relatively easy to understand in most cases.

But, compliance also involves records and reports and notifications and inspections and tests and permits and other bureaucratic minutia. Compliance involves EPA inspectors and EPA permit writers and EPA attorneys. As complex as environmental regulations have gotten, a great many "violations" these days have nothing to do with pollution, but rather are about paperwork. Yet, in terms of enforcement, it does not matter if the violation involves pollution or paperwork. If a company fails to file some obscure notification, or if an over-zealous, inexperienced inspector doesn't like the way a particular record is being kept, the company is still subject to penalties of up to $25,000 per day until the error is corrected, as provided for in the Clean Air Act.

The Agency does not typically collect $25,000 per day per violation of the Clean Air Act. But it frequently wields that legal authority as a cudgel to force a company to accept a lesser – but still substantial – penalty demand. This is particularly the case when small or mid-sized businesses are involved. Few have the will or the resources to fight a penalty demand of a hundred thousand dollars for a paperwork violation, for example. It's not worth it to hire a lawyer to go to battle with the EPA, especially when the Agency holds the $25,000 per day, per violation threat over their heads.

Compliance with environmental regulations today is every bit as complex as compliance with tax code is for many Americans. It is an increasingly stressful burden on many businesses, in terms

of both the time spent on trying to stay in compliance with an ever-growing body of regulations and in terms of the way that overly-aggressive regulators can suppress the entrepreneurial spirit.

Let me give you an example of the latter phenomena. "Renewable Energy" is all the rage today and everyone is looking for new sources of renewable fuels. One source of renewable fuels is one of the oldest fuel sources on earth: human waste, in the form of sewage sludge. Dried sewage sludge is very similar to lignite (a form of coal) in terms of both fuel value and air pollutant characteristics. Since it's not a fossil fuel, the combustion of sewage sludge does not add any additional carbon to the eco-system. So, rather than landfill it, land-apply it, or incinerate it (the three most popular disposal options today), why not recover the energy contained in sewage sludge? In some cases the EPA agrees, having recently approved of the use of dried sewage sludge as a supplementary fuel in coal-fired boilers.

One of my clients, Uzelac Industries, manufactures some of the driers that are used to dry sewage sludge for use as a supplementary fuel. Uzelac is a small, entrepreneurial metal fabrication ship located just outside of Milwaukee in Greendale, Wisconsin. The owner, Michael Uzelac, had an inspiration: rather than burn natural gas (a fossil fuel) to dry the sludge, why not use some of the dried sludge itself to do the job?

Unfortunately, EPA decided that burning dried sludge to operate the drier would be "incineration" and thus subject to an entirely different – and much more intrusive – set of rules than a coal boiler using the sludge as supplemental fuel would be subject to. Why? Because, according to the Agency, if you burn the sludge at the same site where it was produced, it's a waste and then burning it is incineration. If you burn the sludge somewhere else, it's a fuel and then burning it is not incineration. When this decision was related to us, my flip response was "so, if I load the dried sludge on a truck and drive it around the block, does it become a fuel?"

These kinds of tortuous, illogical regulatory analyses are a hallmark of the EPA today. The Department of Energy, the current administration and the American people may want innovation and new technologies, but the EPA hates dealing with them and the current regulatory structure is terribly unsuited to doing so.

The Permit System

The permit system has two parts: the state (or other local, independent district) level and the federal level. In most cases, there are two types of permits that must be obtained: a construction permit, which is required before a new plant or process can be built, and an operating permit, which is required for continuing operation of the plant or process. Construction permit programs carry with them the most significant economic impacts, so I will focus on those programs here.

In general, the states are responsible for permitting smaller sources, while the states and the feds both get involved in permitting larger sources. At the state level, performance varies. Some states are very business friendly and work hard to push reasonable permits through quickly. Texas is an

excellent example of such a state. The TCEQ has an enviable reputation for working with industry, without compromising environmental protection. Other states are much more difficult to work with. Permits in some states take far too long to obtain and, when issued, are often littered with needlessly intrusive conditions that do nothing to protect the environment.

At the federal level, the permit program is much more complex. Major sources must go through the EPA's Prevention of Significant Deterioration (PSD) permit program. The PSD permitting process is fraught with peril and, as currently constituted, frequently results in the cancellation of projects that would otherwise modernize American infrastructure and further advance the remarkable environmental progress we have made.

The PSD program started with a good idea: as large sources of air pollution are replaced in the natural capital equipment life-cycle, let's make sure that the project includes state of the art controls. It makes sense to require a facility to install a $10 million control device as part of a $500 million capital project to build a brand new plant that's going to be around for forty years. It doesn't make sense to require a facility that's on its last legs to make the same investment. Thus, as fleets turned over, the air in the natural scheme of things, emissions would continue to drop.

That's what PSD was supposed to be. Perversely, it's had exactly the opposite effect in some big industries. Take our coal fleet, for example. Director Jackson is on-record chiding utility operators for running inefficient boilers that are forty years old or more. The implication being that nobody tried to replace those old inefficient boilers with newer, more efficient boilers. That is simply not true.

The Sierra Club has a portion of its website dedicated to its "Beyond Coal" program. In it, the organization proudly records the tens of thousands of megawatts of new, more efficient coal-fired boiler construction projects it has helped to kill. Those are the boilers that should have replaced the older boilers in the fleet and they would have, had organizations like the Sierra Club not prevented them from being built. And, the PSD program is the weapon that organization\s like the Sierra Club and NRDC use to kill projects they don't like. They flood agencies with public comments that, under PSD, the agencies are bound to read and respond to. They file appeals, both in the judicial system and with the Environmental Appeals Board. In the latter case, just filing an appeal – whether it has merit or not – automatically stays the permit.

PSD is thus used to throw obstacle after obstacle in the way of new projects. The goal is to so frustrate a developer that he or she will eventually abandon the project. Since capital has a shelf-life, opposition groups like the Sierra Club are often remarkably successful utilizing this strategy. Ultimately, the combination of PSD and well-healed, aggressive opposition groups are the reason that we haven't built a new oil refinery in the United States since 1975, and that we instead rely on an aging refineries instead. It's also the reason that we have so many old coal-boilers chugging along. This kind of activity doesn't do the environment any good and it's hardly sound

economic policy. We need to find a way to go back and make PSD do what it was intended to do.

Recent Regulatory Developments

In the course of the last four years, the EPA has effectively banned the construction of any new, modern coal fired power plants in the United States. This has been accomplished not by the passage of a single regulation, but by the passage of multiple regulations that clearly target coal-fired power in what I have come to think of as a regulatory tsunami. Some of the key regulations promulgated include:

- *A New, Short Term Ambient Air Standard for Nitrogen Dioxide* This standard was put in place in addition to the existing annual Nitrogen Dioxide standard. The short term standard is so stringent that it is virtually impossible for a new coal fired power plant not to violate it. And, since new power plants are required to perform computer dispersion modeling to show that emissions won't exceed ambient air quality standards anywhere, under any conceivable weather conditions, this standard effectively prevents the construction of new, modern, efficient coal-fired generation to replace our aging fleet of coal boilers.

- *A New, Short Term Standard for Sulfur Dioxide* Again, the standard is so low that it is virtually impossible for new coal-fired generation not to violate it, even with state of the art controls.

- *Greenhouse Gas Permitting* Large new sources of greenhouse gases must go through the EPA's major source, PSD construction permit program. As part of PSD permitting, sources must show that the controls used to reduce target air pollutants meet the definition of Best Available Control Technology (BACT). The EPA has made it clear, through guidance documents, that a coal-fired power plant will not pass the "BACT test" unless it uses Carbon Capture and Sequestration (CSS) to control greenhouse gas emissions. Since CSS technology is neither feasible nor affordable in large scale, this program also prevents the construction of new, modern, efficient coal-fired generation to replace our aging fleet.

- *Greenhouse Gas New Source Performance Standards* The EPA recently published a New Source Performance Standard (NSPS) for Greenhouse Gas emissions from Electric Generating Units (EGU). No coal-fired power plant can meet that standard without the use of CSS, which – as noted above – is neither technically feasible nor affordable in large scale. Combined cycle, natural gas-fired power plants are capable of meeting the standard.

- *Utility MACT & Boiler MACT* Maximum Achievable Control Technology (MACT) standards are supposed to be about minimizing emissions of Hazardous Air Pollutants (or "HAPs", as opposed to the more common Criteria Air Pollutants). What the EPA has done in establishing MACT standards for large EGUs (Utility MACT) and industrial boilers (Boiler MACT) goes far beyond this goal. The standards themselves are incredibly stringent and that alone will hasten the retirement of many coal-fired assets in the United States. As troubling are provisions in the rules that will involve the EPA much more closely than ever in operation of the EGU's and boilers that remain. There are requirements to conduct periodic tune-ups and energy efficiency audits within the rules. Now, there is nothing wrong with tuning up boilers and conducing energy efficiency audits. Indeed, most companies do so on their own, because there is a monetary incentive to minimize energy use. But, involving the EPA in the process is foolish, overly intrusive and will be counter-productive in many cases. Inexperienced, over-zealous EPA officials at the federal and state levels often make foolish and counter-productive decisions about the pollution control systems that are within their purview today. A rule that gives them the opportunity to interfere at the operational level – as these rules clearly do – is a recipe for disaster.

It should also be noted that EPA officials are using threat of enforcement action to force smaller coal-fired boilers, such as municipal boilers or those operated by co-ops, to shut down or convert their boilers to fire another fuel (typically natural gas or biomass). Given the relatively small size of these units and the entities that operate them, and given EPA's spectacular, multi-million dollar successes in going after larger utility boilers, few – if any – operators of these smaller boilers would dare to fight the Agency.

All of these regulatory actions, and many more, mean that the coal fleet in the United States will continue to shrink and no new coal-fired plants will be built to replace retired units. Construction of new natural gas fired generation is the only possible way to replace that base-load capacity without endangering the reliability of the grid. (Nuclear plants, even if permitted, cannot be built quickly enough; wind power is nowhere near reliable enough to provide base-load capacity; and solar plants are also terribly unreliable and the size of even the largest solar plants are pitifully small compared to the size of the coal-fired plants that will be retired).

At the moment, natural gas is plentiful and relatively cheap. Thus, repowering will likely be relatively painless in the short term. However, natural gas prices are historically much more volatile than coal prices. The natural gas industry – which is doing a tremendous job in my opinion – will find and create new markets for their product. Prices will eventually rise again and this will have a much more significant effect on the cost of electricity than is currently the case.

We are thus in the midst of the monumental shift in the way that America generates its electric power. Dreams of supposedly "free" wind and solar power make for good talking points and heart-warming commercials, but there is little substance to found in those dreams from a science

and engineering point of view. According to Department of Energy Data, both solar plants and wind farms generate less than 20% of the power they are designed to produce. One cannot run an electric grid by relying on sources that we can't count on over 80% of the time.

As a practical matter, the only sources of power that are both abundant enough and reliable enough to provide the base-load generation that is critical to maintaining a healthy grid are coal, nuclear and natural gas. Through a series of regulatory initiatives, the EPA has effectively decided that natural gas will be the fuel of choice in the years to come. Not Congress. Not the free market. That decision has been made by the Agency alone. I cannot say whether Congresses past intended to grant the EPA the authority to make such a decision when the original Clean Air Act and the Clean Air Act Amendments of 1990 were passed, but it is clear that this EPA believes it has that authority. If the EPA is going to decide energy policy to this extent, I would hope – as a private citizen – that someone takes a closer look at their decision-making process.

Conclusion

In conclusion, as I have stated in my testimony, the EPA continues to have a greater and greater effect on industry, energy production and economic activity in general, with increasingly smaller environmental returns. It's been twenty two years since Congress has taken a fresh look at the Clean Air Act. It's time to do so again.

Thank you again for the opportunity to testify before the committee.

Chairman HARRIS. Thank you very much.

I thank the witnesses for being available for questioning today, reminding Members that Committee rules limit questioning to five minutes.

The Chair at this point will open the round of questioning and I recognize myself for five minutes.

Mr. Trzupek, let me just follow up on that regulatory tsunami. I am sure you are aware, as everyone in the public is, you know, we have this 2,700-page *Affordable Care Act* bill and a whole bunch of rules and regulations have to come from it. Are you aware that there are twice as many regulations from the EPA as there are from Health and Human Services before OIRA right now, despite the fact that HHS has to implement a 2,700-page health bill that involves 17 percent of the U.S. economy, twice as many? Would that surprise you?

Mr. TRZUPEK. That frightens me.

Chairman HARRIS. It wouldn't surprise. I didn't think it would.

With regards to this statistical life, that is kind of related to the quality adjusted life, which is, if I recall, Ezekiel Emanuel, the advisor to the President, is the one that introduced that concept in regards to how to ration medical care as we go to look to decrease the costs of Medicare in the future. Am I correct? I mean it is the same concept that in fact older lives somehow don't get the same amount of resources as younger lives?

Mr. TRZUPEK. Yeah, that is correct.

Chairman HARRIS. Right, that was Ezekiel Emanuel's—the whole point of his pretty famous paper.

Now, Dr. Honeycutt, let me ask you some questions. I am going to ask you—can we show the slides here? Because I am going to show this—these are some of your slides here that you didn't present, but they are in the written testimony. Now, the first one suggests—because, you know, in science you like to think we kind of, you know, seek the truth. Apparently, the truth before pre-2009 appeared to be that maybe four percent of all deaths was due to PM_2, but the truth somehow changed post-2009 and all of a sudden four times as many deaths. One of those sciences is wrong, right? I mean we have to assume that no cataclysmic event occurred in 2009 except maybe the beginning of a new administration that would have quadrupled the number of deaths attributable to PM_2, is that—that is kind of correct?

Dr. HONEYCUTT. Yes.

Chairman HARRIS. Right? Okay. Now, let's go to the next slide, which I think is one that you showed. When I took my master's degree at the School of Public Health, the first thing they taught us in the statistics course is before you do any statistics you actually look at the data. Now, I look at this data and if you took that line that is vertical which really is nothing, that is just, you know, that .15, and you looked at that data and I asked someone to draw the best line—to imagine that a line describes this data or even a curve describes this data, one would look at it and go, well, you really can't because with those outliers there on the right you could say, well, I could draw a line going downward with those outliers on the left. Well, maybe it is straight across.

So the first validation of any statistical analysis is look at it and say should you subject this statistical analysis? I got to you tell you, I look at this, I say I am not sure I would. Let's go to the next slide.

And that is true, right? Is that—that is the way you are supposed to deal with statistics?

Dr. HONEYCUTT. You are absolutely correct.

Chairman HARRIS. This is the assumption of causality. Now, this is the most worrisome because what you are suggesting—and I wish, you know, Cass Sunstein were here and God bless him on the birth of a daughter. I have two daughters. You know, he is going to have his hands full and three other—three boys. He is going to have his hands full for a while. But the research was an association.

Dr. HONEYCUTT. Absolutely.

Chairman HARRIS. Which they teach you in epidemiology should never be attributed to causality until you do actual studies that prove causality, is that correct?

Dr. HONEYCUTT. Yes, sir.

Chairman HARRIS. Okay. Now, this is the assumption of causality, and even if you assume causality, this is where you say most of the studies—because that line above the number one assumes that there is no effect—most of those studies fall on that line and only one study if I look at it doesn't have an estimate—a range of estimate—of accuracy of estimate that actually doesn't touch the line one.

Dr. HONEYCUTT. Yes, sir. It is very——

Chairman HARRIS. So the assumption looking at that data would be there is actually no evidence that there is an increase in relative risk.

Dr. HONEYCUTT. There is very little.

Chairman HARRIS. In fact, the studies you showed indicate there is a 1.06. I imagine that study actually included 1 as part of the range.

Dr. HONEYCUTT. Actually, it didn't. It was very close to 1.

Chairman HARRIS. Well, you said there were two studies, 1.06 and 1.16, but I don't see two that don't touch the line of 1, maybe 1.16 that did it. That is what I thought.

Next slide.

This one is very interesting, because it assumes that if you want to live a longer life in Dallas and in Houston, you better start breathing some PM_2——

Dr. HONEYCUTT. Yes, sir.

Chairman HARRIS [continuing]. Is that right?

Dr. HONEYCUTT. Yes, sir.

Chairman HARRIS. Because using the same association and the same causality information to say that actually your risk is decreased in Dallas and Houston and Birmingham and I know Las Vegas crosses the 1. And actually, there are only very few cities where there is even a slight increase. You know, maybe in Phoenix and Milwaukee it might not be hazardous, but that could outweigh Dallas and Houston.

As far as you know, does the EPA—did they change the requirements for Dallas and Houston based on this scientific data?

Dr. HONEYCUTT. No, sir. We have the same requirements everyone else does.

Chairman HARRIS. You do? Even though the evidence is that in Texas it appears to be protective?

Dr. HONEYCUTT. Yes, sir.

Chairman HARRIS. Okay. That is kind of what I thought. Anyway, thank you very much. We will get a second round, be sure to get some more in. And I now recognize the Ranking Member, Mr. Miller, for five minutes.

Mr. MILLER. Thank you, Mr. Chairman.

That set of questions make it all the more remarkable that no one from EPA was invited to appear at this hearing because these analyses are done by EPA; they are not done by OIRA. It certainly would have been useful to have had someone here from EPA to ask some of those very particular questions that the Chairman was just asking.

The reason that I set out verbatim in my opening statement the Chairman's question to Cass Sunstein last fall is I did not want to summarize the position he was taking since it was, as they say in "Jeopardy," in the form of a question. But let me put this innocent—although it pretty clearly is implicit in the question—for purposes of this question, if your position is that EPA should value life not by life but by years, and that if an environmental exposure lessens life by a percentage and therefore it is more years for younger people, then if that is your analysis, then you are saying, yes, younger people's lives should count for more than older people's lives.

Given that assumption, Mr. Honeycutt, could you answer this question? In spite of the fact of that most mortality associated with particulate matter happens in the population over 65 years of age, EPA puts the same value on the mortality for all ages. In your view, is this practice appropriate?

Dr. HONEYCUTT. No, sir.

Mr. MILLER. That is not appropriate?

Dr. HONEYCUTT. No, sir.

Mr. MILLER. Okay. You do believe that younger lives should count for more than older lives? There should be a senior discount?

Dr. HONEYCUTT. Actually, the lives should be the same. It is the life years that needs to be different because actually the rules impact——

Mr. MILLER. Right.

Dr. HONEYCUTT [continuing]. People mainly 80 and over.

Mr. MILLER. So you were——

Dr. HONEYCUTT. So it adds months to their lives. So a 25-year-old, if he lives past 25 years old—if this were infant mortality, you would be correct. You would use a whole life. But we are talking adding lives to people who are over 80 or adding years—months to the lives of people who are over 80.

Mr. MILLER. Okay. So you are, again, the gist out of the analysis that you get there is that the life of a younger person should count for more than a life of an older person?

Dr. HONEYCUTT. Well, they should count equally because a 25-year-old—his value of a statistical life—it should be the same no

matter what. But an 80-year-old who dies four months sooner than they would have, they have only lost that four months.

Mr. MILLER. All right. Thank you, Dr. Honeycutt.

Dr. Honeycutt, there is a pretty clearly established legal concept that there can be many causes, but if they act in concert they are all—that each one is a cause. Do you dispute that in any way? I mean, if someone is obese and a smoker and is exposed to particulate matter or any other kind of environmental exposure and that combination had not existed they would have survived, then each one of those is a cause.

Dr. HONEYCUTT. Each one can contribute. The question is how much do they contribute? And I think the answer is those other factors contribute a lot more than PM does if PM does at all.

Mr. MILLER. Okay. I understand the whole idea of double counting is that the—that two different rules may accomplish the same purpose and if you count it the same for both, you are double counting. But it is certainly possible to have discrete benefits from two different rules, and it is possible to have a cumulative effect from two different rules. Your slides suggest that there has been double counting but there is absolutely no—you cite no authority for that at all. What is your authority for the EPA double counting the benefits of air pollution controls, for instance?

Dr. HONEYCUTT. Well, I mean it is taken directly from EPA analysis because when you reduce—if a rule reduces PM by a microgram per cubic meter and another one does, it is reducing the same microgram per cubic meter.

Mr. MILLER. Why is it not 2 micrograms per cubic meter?

Dr. HONEYCUTT. Because it looks at what——

Mr. MILLER. How do you know it is the same microgram?

Dr. HONEYCUTT. Because you are measuring—if you are measuring at a monitor—see, these aren't looking at sources; they are looking at monitors in the environment, monitors at a city. So if it is reduced at a monitor somewhere, it doesn't really matter where it came from. It is reduced at the monitor. That is the different between an ambient standard and a point force standard.

Mr. MILLER. Right. But you have offered no authority. Is there any authority—is there any published paper that shows that they are actually double counting rather than there being discrete benefit or cumulative benefit?

Dr. HONEYCUTT. I am not sure about a published paper on that, but you can actually just look at EPA's data and pull that information out. It is there. I would be happy to show you that.

Dr. MILLER. Okay. Well, even better would be to have an EPA witness come and have that person ask those questions.

My time has almost expired and I will yield back the last 15 seconds.

Chairman HARRIS. Thank you. I think you are actually 15 in the red, but we will give you—remember, we are going to have another five minutes. And gosh, I kind of wish that the minority had invited the EPA. I would love to hear their explanation.

Mrs. Biggert is recognized, the gentlelady from Illinois, for five minutes.

Mrs. BIGGERT. And thank you, Mr. Chairman.

Mr. Wolf, you recently testified at a public hearing in Chicago on EPA's proposed carbon pollution standard. Do you think that based upon recent EPA behavior, the Agency is likely to incorporate and respond to your concerns in the final standards?

Mr. WOLF. I hate to predict the future of what government agencies do. I certainly hope that they will take a look at this. The industry—you know, I represent a lot of different voices in the industry in Illinois—wind, solar, coal, nuclear, crude oil, utilities—it is not like they are against every regulation in the book. They would like regulations that they believe allow a sweet spot for that environmental protection and a successful business model. And I am hoping the U.S. EPA looks at this specific one and has a path for coal that really is a path for coal and not a roadblock.

Mrs. BIGGERT. Okay. Then, do you think that the recent EPA regulatory activity is consistent with the all-of-the-above energy policy?

Mr. WOLF. I think this proposal is not consistent with that. I think this proposal does preclude coal—new coal generation from happening. The coal producers and actually some of the other producers of energy I have talked to about these regulations, people aren't even in the coal business, some of the wind people I talk to look at this and say, yeah, they are not going to be able to build with this. It is just too much of a leap. Where they say incentivization for maybe permitting incentivizations, a renewed permit is X percent cleaner for greenhouse gas gives that incentive as an idea to get better and better and cleaner and cleaner over time. If you just say here is this big bar you have to reach and they can't reach it, they aren't even going to try to get there.

Mrs. BIGGERT. I know that in Illinois there was sequestration that was talked about for a long time in southern Illinois which has not happened, but it seems like there has been some breakthrough on the greenhouse gases for coal. I thought that they really had—in some of the plants had been able to remove that from there.

Mr. WOLF. Well, on the sequestration side there is actually a pilot project going on in Decatur right now——

Mrs. BIGGERT. Yeah.

Mr. WOLF [continuing]. Where they are sequestering a million metric tons over three years and we are hopeful that pilot project will prove successful both technologically and environmentally and economically. But again we are not sure.

Mrs. BIGGERT. So it is moving forward?

Mr. WOLF. It is moving forward but there are a lot of "ifs" in that scenario and to say—to put out regulation that says every if is going to work out; therefore, let's do it this way is grasping. And then, you know, there is—I think the coal industry has shown over the past three decades that it can get better. And that is in their hands and saying we are done. This is it. This is the best we can do. Consistently, they are showing they can get cleaner and cleaner in their energy and production and we should give them that chance to continue that.

Mrs. BIGGERT. Okay. Then, Mr. Trzupek, what are the cumulative effects of these various EPA rules on the bottom line for small businesses?

Mr. TRZUPEK. For small businesses they have a very marked effect on the bottom line. In the small entrepreneurial businesses that I deal with, the person who is trying to manage the EPA program is usually the driving force in that business; he is the entrepreneur. And the more time he has to spend doing things that really don't have environmental benefit, they are just about paperwork and procedures, the less time he is being productive, the less time he has to devote to growing his business.

Mrs. BIGGERT. And do you think that the EPA's carbon pollution standard that will effectively ban coal generation will impact the manufacturers and small businesses?

Mr. TRZUPEK. I think in the long term because coal has been for years the great stabilizer in energy prices and natural gas, as I think Mr. Hudgins pointed out, historically fluctuates a lot and if you don't have certainty on energy prices, that is definitely going to affect my clientele.

Mrs. BIGGERT. Okay.

And Mr. Trisko, what impact will the recently proposed and finalized rules on the power sector have on coalmining and coalminers?

Mr. TRISKO. The—thank you, Mr. Wolf.

Mrs. BIGGERT. Mr. Trisko, yeah.

Mr. TRISKO. Yes. Thank you. The most recent economic impact analysis of the impact of the EPA Mercury and Air Toxics Standards Rule sponsored by ACCCE is prepared by National Economic Research Associates. I could briefly summarize those job results because your hearing is focused in part on the impact of these rules on jobs. Now, this is not broken down for coalmining jobs. Coalmining jobs obviously are kind of first in line. They are the first to be lost in this process followed by losses in the utility sector, the railroad sector, and so forth. There are, of course, some offsetting job gains in construction—construction of pollution controls and the like.

The NERA study of the MATS rule—and this is prepared, dated March 21, 2012, so it was prepared after the final rule was promulgated and it is focused only on the MATS rule and compares that rule relative to two baselines; first, a CAIR baseline, the Clean Air Interstate Rule, which is in effect today pending the court's stay of CSAPR; and then second, a baseline of the CSAPR rule assuming that that is implemented at some point. And in sum, the estimate of the net job impacts for the two rules are a net loss of 215,000 permanent full-time equivalent jobs for the MATS rule plus CSAPR relative to a CAIR baseline. So it is a net loss, 215,000 permanent jobs.

Mrs. BIGGERT. Okay.

Mr. TRISKO. When you compare the MATS rule relative to the CSAPR transport rule, the estimate is for a net loss of 180,000 permanent full-time jobs. ACCCE would like permission to submit this study for the record following the conclusion of this hearing because all of the assumptions underlying the findings I have just summarized are contained therein.

Mrs. BIGGERT. Mr. Chairman, I would ask that the study be submitted for the record.

Chairman HARRIS. Without objection, so ordered.

[The information may be found in Appendix 2.]

Chairman HARRIS. Thank you. The gentlelady yields back her time.

We have enough time for a second round of questioning if—and I will begin a second round of five minutes of questions.

If we can show one of the—show the slides. You can put them up—and this slide right here. I finally found that other box that didn't intersect with zero because it is so close to the line of 1 you can't see it. The two studies with the lines are the Laden study from 2006, the Pope study from 2002 which actually forms the basis of $1.8 trillion of the $2 trillion benefit claimed by EPA, the economic benefit. Now, my reading of that slide shows that both those overlap the relative risk of 1. Is that true?

Dr. HONEYCUTT. Well, sir, there——

Chairman HARRIS. Or are they just really, really darn close?

Dr. HONEYCUTT. They are very close.

Chairman HARRIS. Okay. And just to put it into perspective, is it true that smoking increases—the relative risk of smoking is about 2.8 times?

Dr. HONEYCUTT. Yes, sir.

Chairman HARRIS. So you are looking at maybe two, three percent increase versus a 280 percent increase—180 percent increase——

Dr. HONEYCUTT. Yes, sir.

Chairman HARRIS [continuing]. In those? Okay. And that is 1.8 trillion of the 2 trillion. That is how really you get to 30 to 1——

Dr. HONEYCUTT. Sure.

Chairman HARRIS. Do you know if meta-analysis has been conducted on those to actually increase the power of it to see if when you put all of those studies together they intersect—they overlap 1?

Dr. HONEYCUTT. Yes, sir. A meta-analysis has been done. The problem is one of those studies has over a million people in it.

Chairman HARRIS. I got you. So it weighs—you are right. It overweighs in the meta-analysis. I understand that.

Look, I am sorry that the EPA isn't here to testify, but to be honest with you, we have been waiting since September. We were promised by—personally, Gina McCarthy promised me to send that data that justifies that from those two studies and the data. And Mr. Holden appeared and Mr. Smith asked him—he promised he would send it. We have been waiting for, you know, seven or eight months. I understand the EPA is busy writing regulations and doing other things but they should have some time to respond to Congress when we ask those kind of questions.

Now, Mr. Hudgins, Cypress Creek Power Station, that base facility you are talking about that would be—would help provide electricity into my district for Choptank Electric. You know, you stated that your decisions on the base load facility it will be "directly and negatively impacted by the new carbon pollution standard for power plants despite the Agency's claim that there is zero cost associated with the rule." We are going to have Lisa Jackson—if she appears—testifying in this room at the end of the month and she has claimed that this rule won't kill coal due to flexibilities included and the ability to incorporate carbon capture and sequestra-

tion in 10 years. My assumption from your testimony is that you are not—you don't really agree that that is necessarily true. Obviously, you probably would have gone ahead and built the facility.

Mr. HUDGINS. Mr. Chairman, at the end of the day, this whole process of billions of dollars is driven by the financial institutions that we deal with, Wall Street. And one thing that bankers do not want is uncertainty.

Chairman HARRIS. Right. I should say it is actually the financiers who really don't trust that that is a stable, financially sound decision to——

Mr. HUDGINS. Take a $5 billion risk——

Chairman HARRIS. Right, on the fact that, for instance, carbon—and we know because we have had testimony in front of this Committee that carbon capture and sequestration, the demonstration projects actually aren't—haven't been done. They are just not scalable. They are really not financially feasible and yet we still hear that that is true.

The prediction of energy costs—because I guess Lisa Jackson bases that on a—you know, a $250 million BTU cost of natural gas but the EIA estimate—and, you know, you have to trust the EIA at some point—are you aware of what their estimate was for this year's cost of natural gas two years ago?

Mr. HUDGINS. I am not.

Chairman HARRIS. It is 4.50. It is actually 2.50. The government is only off by a factor of 80 percent in that estimate. Do you have any reason to believe that the government will be able to predict or that Ms. Jackson is able to predict the cost of natural gas? And is that, in fact, part of the basis for the decision to say that, you know, coal really might be—the price stability of coal might be the most dependable way to go if these rules weren't in place?

Mr. HUDGINS. Mr. Chairman, sometimes we go to use common sense and every time you have a——

Chairman HARRIS. This is Washington, DC. I beg to differ.

Mr. HUDGINS. I understand, but at the end of the day, it is about monopoly and if we are forced as a utility into the gas market as to be the sole supplier of gas—I mean of electricity from gas, then what is going to happen to a price in any monopoly? And we can point to our history when the monopoly occurs, prices rise.

Chairman HARRIS. Sure.

Mr. HUDGINS. And what we were fearful of three, four years ago, gas was at almost $14 MCF.

Chairman HARRIS. You are absolutely right, and we have a long history of the stability of coal prices.

Mr. Trisko, can you add to that?

Mr. TRISKO. Yes, Dr. Harris. Given your penchant for statistical analysis, I think you would be interested to find that the EIA's analysis of the NYMEX future natural gas contract that appears on the short-term energy outlook Web page for DOE contains a tab called probability analysis. And if you click that tab on probability, you will find the 95 percent confidence intervals for the NYMEX December 2013 natural gas contract. It gives the reference case projection and then the 95 percent confidence intervals around that projection. Now, that is a contract price that is 18 months hence and EIA's 95 percent confidence interval is between a range of

slightly less than $2 per million BTU and slightly less than $8 per million BTU.

Chairman HARRIS. Only a four-fold range.

Mr. TRISKO. Yeah.

Chairman HARRIS. Easy to predict I guess. Listen, thank you very much and I defer—I recognize the Ranking Member, Mr. Miller, for a second round of questions.

Mr. MILLER. Thank you, Mr. Chairman. Among the 17 documents that I earlier asked to be included in the record and do not yet have a ruling on, almost all of them are letters from groups that have an opinion, have a point of view on this topic. I have never known an organization that has a point of view on a topic that is before a Congressional Committee being denied the right to have their views included in the record.

Some clippings, articles, and various publications, and only a couple of at all detailed technical kinds of documents, one of which is Summary of Expert Opinions on the Existence of a Threshold and the Concentration Response Function for PM-related Mortality, technical support document. This is published by the EPA, was compiled by the EPA. It includes several participants, some of which I have heard of like the American Heart Association, some of which I have not heard of but the list of authors of their papers is long, and their credentials appear impressive and in every case they have an equally long and equally impressive list of peer reviewers. It is pretty stunning to me to think that the majority staff does not know about this, did not know about this document well before last night in preparing for this hearing because this seems to be a pretty basic document.

Dr. Honeycutt, are you familiar with this document?

Dr. HONEYCUTT. I am familiar with most of the statements in it.

Mr. MILLER. Well, are you familiar with the list of scientists who participated in one way or another either as authors or as—well, some list authors and peer reviews; some list experts, but those—this list of scientists who participated in preparation of this document?

Dr. HONEYCUTT. Yes, sir.

Mr. MILLER. You are familiar with that list? Okay. Well, you have criticized the EPA, including in your testimony today, as being secretive, not telling you what their analysis is. This seems pretty open.

Dr. HONEYCUTT. Well, actually, the data underlying their analysis is not available.

Mr. MILLER. Was that data provided to this list of—it looks like probably a couple hundred scientists?

Dr. HONEYCUTT. No, it wasn't. That data is held by a couple of universities and only the university professors have access to the data.

Mr. MILLER. I am sorry. The data is not provided to peer reviewers?

Dr. HONEYCUTT. That is correct. Only the analysis of the data is.

Mr. MILLER. The people who—the scientists who agree to be peer reviewers are not seeing the data upon which they are——

Dr. HONEYCUTT. You are absolutely correct.

Mr. MILLER. I am not correct. I am not saying it. I am asking you.

Dr. HONEYCUTT. Your statement is correct.

Mr. MILLER. Okay. But that is what you are saying. All right. And so you disagree with the statement by the EPA that studies demonstrated an association between premature mortality and fine particulate pollution at the lowest levels measured in the relevant studies levels that are significantly below the NAAQS for fine particles. These studies have not observed a level at which premature mortality effects do not occur. You say that is not supported by data or by scientific analysis?

Dr. HONEYCUTT. Oh, no, sir. That is absolutely true. But there are other studies that don't show that association and there are other studies that show that PM is—if you can interpret it this way—healthful. And I think that is the problem. EPA doesn't present that data. They only present the positive data. They don't present the negative data.

Mr. MILLER. Okay. One of the advantages of having peer reviewers is presumably that they know the literature of the field. Do you believe this—what appears to me in my lay opinion to be an impressive set of experts—do you think they do not know the data in this area or the analysis, the literature in this area?

Dr. HONEYCUTT. Well, actually a number of those people, that is their data, so I would expect them to advocate the use of their own data over another researcher's data. But——

Mr. MILLER. But the other studies that you refer to——

Dr. HONEYCUTT. Um-hum.

Mr. MILLER [continuing]. And I—you are saying that what they are referring to is just some studies and then there are contradictory studies. So when they say that the studies demonstrate an association between premature mortality and fine particulate—fine particle pollution at the lowest levels measured in the relevant studies that what they are saying is our studies, but there are other studies that contradict that?

Dr. HONEYCUTT. That is true.

Mr. MILLER. And that these couple hundred scientists did not know about those studies or did they know about those studies?

Dr. HONEYCUTT. They may have. I am not sure what they did or didn't know, but those studies are older studies. Those studies—the exposures occurred during the '80s and '90s. A lot of the newer data shows different effects or doesn't show the effect.

Mr. MILLER. Okay. My time is expired.

Chairman HARRIS. Thank you very much.

And seeing no other Members here, I want to thank the witnesses for their valuable testimony, the Members for their questions. The Members of the Committee may have additional questions for you and we will ask you to respond to those in writing if we do. The record will remain open for two weeks for additional comments from Members.

Again, I want to thank you very much for your patience in a late start to the hearing because of our voting schedule. The witnesses are excused. Thank you all for coming.

The hearing is now adjourned.

[Whereupon, at 3:27 p.m., the Subcommittee was adjourned.]

Answers to Post-Hearing Questions

ANSWERS TO POST-HEARING QUESTIONS

U.S. House of Representatives
Committee on Science, Space, and Technology
Subcommittee on Energy and Environment

Questions for the Record – Responses by Dr. Michael Honeycutt
July 6, 2012

Hearing Title: EPA's Impact on Jobs and Energy Affordability: Understanding the Real Costs and Benefits of Environmental Regulations

1. **According to OIRA's Draft Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities, the benefits from EPA air quality regulations that affect particulate matter represent almost 80 percent of all benefits from all regulations across the entire federal government. Do you find that claim to be credible?**

I do not find this claim to be credible. This conclusion is based on the monetization of mortality risks attributed to $PM_{2.5}$ (fine particulate matter). The true (if any) relationship between $PM_{2.5}$ and premature mortality is obscured by:

(1) the choice of studies that support the proposed relationship between $PM_{2.5}$ and mortality (and exclusion of contradictory data). EPA relied on two studies that showed a statistically-significant association between $PM_{2.5}$ and premature mortality. If they had used any of the several equally well- or better-conducted studies that did not show a statistically significant association between $PM_{2.5}$ and premature mortality[1], then the monetized benefits would have been $0.

[1] Krewski *et al.*2000. Reanalysis of the Harvard Six Cities Study and the American Cancer Society Study of Particulate Air Pollution and Mortality, Part II: Sensitivity Analysis. Health Effects Institute. P129-293. See models that include SO2
McDonnell *et al.* 2002. Relationships of Mortality with the Fine and Coarse Fractions of Long-Term Ambient PM10 Concentrations in Nonsmokers. Journal of Exposure Analysis and Environmental Epidemiology. 10(5):427-36.
Koop and Tole. 2004. An Investigation of Thresholds in Air Pollution-Mortality Effects. Environmental Modeling and Software. 21(12):1662-1673.
Chen *et al.* 2005.The association between fatal coronary heart disease and ambient particulate air pollution: Are females at greater risk? Environmental Health Perspectives. 113(12):1723-1729. See data for males
Enstrom. 2005. Fine Particle Air Pollution and Total Mortality Among Elderly Californians, 1973-2002. Inhalation Toxicology. 17(14):803-16.
Lipfert *et al.* 2006. $PM_{2.5}$ Constituents and Related Air Quality Variables as Predictors of Survival in a Cohort of U.S. Military Veterans. Inhalation Toxicology. 18:643-657.
Franklin *et al.*. 2007. Association Between $PM_{2.5}$ and All-Cause and Specific-Cause Mortality in 27 U.S. Communities. Journal of Exposure Science and Environmental Epidemiology. 17(3):279-87. see lag 0 data.
Zeger *et al.*2008. Mortality in the Medicare Population and Chronic Exposure to Fine Particulate Air Pollution in Urban Centers (2000-2005). Environmental Health Perspectives. 116(12):1614-9. see data for Western U.S.
Krewski *et al.*2009. Extended Follow-Up and Spatial Analysis of the American Cancer Society Study Linking Particulate Air Pollution and Mortality. Research Report from the Health Effects Institute. 140:5-114. see 1972-2000 data.
Klemm *et al.*2011. The Impact of Frequency and Duration of Air Quality Monitoring: Atlanta, GA, Data Modeling of Air Pollution and Mortality. 61:1281-1291.
Tony Cox. 2011. Hormesis for Fine Particulate Matter ($PM_{2.5}$). Dose-Response. Pre-Press Article.

(2) the assumption of a no-threshold model which attributes risk to background levels of $PM_{2.5}$. This practice inflates the benefits because it calculates risk from $PM_{2.5}$ levels that are naturally-occurring and too small to be controlled by regulations.

(3) the application of a Weibull distribution to possible concentration-response functions leading to the exclusion of data that does not support the assumption of a cause-and-effect relationship between $PM_{2.5}$ and premature mortality. Again, this artificially inflates the benefits because it predicts premature mortality (and therefore monetized benefits) in parts of the country where the actual data shows premature mortality due to $PM_{2.5}$ exposure doesn't occur.

Based on the uncertainties regarding the limitations of observational epidemiology studies as well as the methodological issues noted above, the benefits estimated by EPA for rulemakings under the Clean Air Act are overstated.

2. The Subcommittee received a letter from the American Lung Association that stated that, in the case of the recently-finalized Mercury and Air Toxic Standards, "For every dollar spent to reduce air toxics pollution, Americans receive $3-9 in health benefits." Do you agree with this characterization?

Not at all. This statement by the American Lung Association is taken from the Regulatory Impact Analysis for the Mercury and Air Toxic Standards (MATS) rule, which relies almost exclusively upon $PM_{2.5}$ co-benefits (see response to question 1 above). The EPA's economic analysis misrepresented the actual benefits of the rule. Benefits should be based on direct health benefits associated with reductions of the HAPs rather than including co-benefits associated with emission reductions of non-HAP pollutants. More than 90% of the represented health benefits are based on particulate matter reductions and not the HAPs that are the focus of the rule. Particulate matter is not a HAP and is regulated under other EPA air quality programs. If EPA confined its analysis only to the specific HAPs that pose a hazard to public health, any health benefits would be insubstantial compared to cost of the regulation.

EPA was not able to quantify health benefits for reductions of actual HAPS regulated by the MATS rule except for mercury. EPA's quantified health benefits of $4 to $6 million reflecting mercury reductions are questionable, because that amount is based on the assumed economic value of a total of 511 intelligence quotient (IQ) points. EPA multiplied the average loss of 0.00209 IQ points per prenatally exposed child by 244,268 children assumed to be exposed to mercury via their mothers' consumption of freshwater fish[2]. This is akin to requiring 10 vehicles to reduce their speed by five mph per vehicle and then saying the resulting total decrease in speed is 50 mph. An IQ reduction of 0.00209 points cannot be measured. Also, EPA assumed no lag time in the response of methyl mercury levels in fish due to MATS, and if a lag was (correctly) assumed monetized benefits would be significantly lower.

[2] Please refer to additional testimony given 10/4/2011 before the Subcommittee on Energy and Environment - "Quality Science for Quality Air": http://science.house.gov/sites/republicans.science.house.gov/files/documents /hearings/100411_Honeycutt.pdf

3. What did you mean when you said that there is legal guidance for establishing causal relations and that relative risks less than 2.0 should not be considered? How does this affect EPA's association between particulate matter and mortality?

There is scientific as well as legal precedence indicating that relative risks below 2.0 should not be considered to support a hypothesized relationship (Federal Judicial Center Reference Manual on Scientific Evidence Second Edition (2000) and NCI/IARC/WHO[3],[4]). This is because relative risks less than 2.0 can often be explained by confounding variables, i.e. factors that were not considered, but that are responsible for the observed effect. For example, cholesterol levels were not measured in the Pope *et al.* 2002 study but might explain the observed cardiovascular disease mortality rates. The relative risks for $PM_{2.5}$ and premature death reported to date are considerably lower than 2.0. For the two studies most often cited by the EPA, the relative risks are 1.06 (Pope *et al.* 2002[5]) and 1.16 (Laden *et al.* 2006[6]), and therefore may actually be due to confounding variables. In fact, a recent report indicates that confounding likely plays a significant role in the statistical findings of positive $PM_{2.5}$-mortality associations.[7]

4. Aren't all of the assumptions within EPA's regulatory analysis and decision making designed to be health-protective? Isn't that a good thing?

In recent years, the EPA has approached policy decisions with an overabundance of caution, leading to excessively conservative regulations not fully supported by the best available science. The application of this precautionary principle, without regard to the extent of population exposure or risk, conflicts with best practices of science-based risk assessment. In defense of this approach, some have argued that EPA always overestimates risks in order to provide adequate protection. While this may or may not be sound regulatory policy, systematic over-estimation of benefits renders the cost-benefit process useless. Worst-case estimation of risks (and the benefits of avoiding those risks) without any indication that they represent very unlikely or even impossible scenarios, is highly misleading to the public and to elected representatives evaluating proposed policies and regulations.

Contrary to what its advocates claim, this principle does not provide a prudent guide to developing public health measures. Harvard law professor Cass Sunstein, who currently serves as administrator of the Office of Information and Regulatory Affairs has said, *"The precautionary principle, for all its rhetorical appeal, is deeply incoherent. It is of course true that we should take*

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[3] http://benchmarks.cancer.gov/2002/07/epidemiology-in-a-nutshell/ "Relative risks or odds ratios less than 2.00 are viewed with caution."

[4] WHO/IARC Breslow and Day (1980). *Statistical methods in cancer research. Vol. 1. The analysis of case control studies.* IARC Sci. Publ. No. 32, Lyon, p. 36. "Relative risks of less than 2.0 may readily reflect some unperceived bias or confounding factor, those over 5.0 are unlikely to do so."

[5] Pope CA III, RT Burnett, MJ Thun, EE Calle, D Krewski, K Ito, and GD Thurston. 2002. Lung Cancer, Cardiopulmonary Mortality, and Long-term Exposure to Fine Particulate Air Pollution. Journal of the American Medical Association. 287:1132-1141.

[6] Laden F, J Schwartz, FE Speizer and DW Dockery. 2006. Reduction in Fine Particulate Air Pollution and Mortality. American Journal of Respiratory and Critical Care medicine. 173:667-672.

[7] Greven *et al.* 2011. An Approach to the Estimation of Chronic Air Pollution Effects Using Spatio-Temporal Information. Journal of the American Statistical Association. 106(494):396-406.

precautions against some speculative dangers. But there are always risks on both sides of a decision; inaction can bring danger, but so can action. Precautions, in other words, themselves create risks—and hence the principle bans what it simultaneously requires."[8]

The result of utilizing the precautionary principle is highly uncertain estimation of the benefits of Clean Air Act rules. This is because regulating pollutants without proof they are indeed harmful at relevant doses negates the accurate quantification of what harm has been prevented. Further, especially in times of resource scarcity, focusing attention and regulation on unnecessary risks can result in inadequate attention or resources to address real health effect risks or problems.

5. Why shouldn't EPA claim regulatory benefits association with incidental particulate matter reductions from non-PM rules?

In 2011, President Barack Obama issued Executive Order 13563, which states that agencies should strive to reduce regulatory requirements that are *"redundant, inconsistent, or overlapping."*

Including $PM_{2.5}$ co-benefits in multiple non-PM $_{2.5}$ rules is *redundant*. Section 109 of the Clean Air Act requires that each NAAQS be set at a level that protects public health with "an adequate margin of safety" (i.e. no additional public health improvements would be gained by tightening the standard any further). If those concentrations are safe, then it is not appropriate to calculate co-benefits for $PM_{2.5}$ below this level to justify non-$PM_{2.5}$ regulations. More broadly, co-benefits from any pollutant that is regulated as a criteria pollutant with a NAAQS that conforms to the requirements of CAA should not be included in the Regulatory Impact Analysis (RIA) of any other pollutant. Including $PM_{2.5}$ co-benefits in other RIAs not only results in double-counting of benefits, but also prevents identification of ways to reduce regulatory burdens while still meeting air quality objectives.

Baseline calculations for proposed rules are *inconsistent* with best practices. EPA has argued that it does not double-count the $PM_{2.5}$ benefits because it includes all existing regulations in the baseline of emissions for each of its RIAs for another rule; however, this is not the case for the following reasons: (1) multiple RIAs are prepared simultaneously; this creates a constant potential for double-counting; (2) review of recent RIAs released by EPA indicates that all applicable CAA-related rules are not, in fact, included in the baseline calculations for these standards (e.g. see RIAs for ozone, SO_2, and NO_2 NAAQS); and (3) the baseline calculations are based on monitored levels of $PM_{2.5}$, and it is impossible to distinguish the effect of each rule on ambient levels of $PM_{2.5}$. Furthermore, each rule seeks to lower the same observed levels of ambient $PM_{2.5}$, resulting in double counting of estimated benefits across multiple rules.

The consequences of these *overlapping* rules include lack of transparency and miscommunication with the public and policy makers. $PM_{2.5}$ co-benefits are reported as part of the total benefits in the executive summary of an RIA and also in public announcements about the proposed rule. This

[8] Cass R. Sunstein, "Throwing Precaution to the Wind: Why the 'Safe' Choice Can Be Dangerous," Boston Globe, July 13, 2008. For a more extensive critique, see Cass R. Sunstein, The Laws of Fear: Beyond the Precautionary Principle (Cambridge: Cambridge University Press, 2005).

creates confusion for audiences who often fail to realize that these total benefits are mostly due to reductions in $PM_{2.5}$. Furthermore, $PM_{2.5}$-related benefits would be more effectively and appropriately obtained through revision to the $PM_{2.5}$ NAAQS than through non-$PM_{2.5}$ rules. Moreover, reliance on $PM_{2.5}$ co-benefits undercuts the practical value of RIAs and allows EPA to avoid improvements to its methods for characterizing and quantifying health and welfare benefits for other pollutants.

6. The Texas Commission on Environmental Quality is the 2nd largest environmental agency in the world. From your experience at TCEQ, are there ways that EPA could improve its cost-benefit analysis and stakeholder outreach process?

Generally speaking, risk assessments that serve to inform cost benefit analysis should include the following steps:

- Consider all available appropriate and relevant studies, not just studies that present positive results.
- Report comprehensive weight-of-evidence based analyses, including positive and negative data.
- Perform extensive sensitivity analyses to determine how confounding affects the analysis.
- Select health endpoints based on toxicological grounds rather than on post-hoc statistical grounds.
- Focus on studies with exposure data collected for individuals instead of groups (i.e. the studies by Pope *et al.*[9] and Laden *et al.*[10] do not determine personal exposure to PM – it was assumed to be equal for all individuals within a metropolitan area).
- Use Cox proportional hazards models as the exposure-response models.
- Do not use splines in statistical models, especially smoothing splines, as they have the effect of making the data fit the model instead of choosing an appropriate model to fit the data.
- Consider including thresholds and nonlinear relationships in the exposure-response models.
- Estimate risks using best estimates of individual exposure rather than extreme characterizations of population exposures.
- Estimate risks for the general population in addition to the "most sensitive" subpopulation.
- Clearly state the assumptions made and their qualitative and quantitative consequences.

Further, the EPA should demonstrate a peer-review process that reflects transparency and commitment to representing all data, not just data that supports its policy goals. The non-profit organization, Toxicological Excellence for Risk Assessment (TERA) provides a superb

[9] Pope CA III, RT Burnett, MJ Thun, EE Calle, D Krewski, K Ito, and GD Thurston. 2002. Lung Cancer, Cardiopulmonary Mortality, and Long-term Exposure to Fine Particulate Air Pollution. Journal of the American Medical Association. 287:1132-1141.

[10] Laden F, J Schwartz, FE Speizer and DW Dockery. 2006. Reduction in Fine Particulate Air Pollution and Mortality. American Journal of Respiratory and Critical Care medicine. 173:667-672.

description of peer review: *A peer review is an in-depth assessment of the assumptions, calculations, alternate interpretations, methodology, and conclusions of the document under review...peer reviewers and consultants should be selected for both independence and scientific/technical expertise...[and]include a range of perspectives on each panel, including diverse professional affiliations (e.g., academic, consulting, environmental, government, and industry). The evaluation of real or perceived bias or conflict of interest is an important consideration and for both peer review and consultation panels and every effort is made to avoid conflicts of interest and biases that would prevent a panel member from giving an independent opinion on the subject...an objective evaluation by independent experts with a variety of different viewpoints and perspectives is critical to the credibility of any peer consultation or peer review.*[11]

TCEQ agrees with this description and strives to implement these principles. In fact, when the TCEQ revises its Guidelines for Risk Assessment, a peer review is conducted by a disinterested third party. No person on the peer review panel works for or receives funds from TCEQ. It is a conflict of interest for such individuals to participate in the peer review process, although stakeholders are welcomed to participate in the public comment process. Following the public comment period, each and every comment is addressed and changes are made to the document (when justified) as a result of this process. When TCEQ disagrees with a comment, justification is provided in the response to comment document, which is made publically available along with the modified Guidelines document. The EPA should utilize an equally transparent process, free as possible of conflict of interest.

To this end, the following recommendations for improvement are suggested:

- EPA risk assessments should include all of the steps listed above with results clearly communicated in resulting policy assessments, regulatory impact analyses, and final rulemakings. Emphasis should be placed on the limitations of the available scientific literature in order to provide policy makers with accurate information. This is particularly important to avoid the appearance that proposed rules are based on policy objectives, and merely "backed up" by applicable scientific evidence.
- Members of the Science Advisory Board and Clean Air Science Advisory Committee should not include the authors of studies utilized in that specific assessment, nor should they be current recipients of EPA funding, as this represents a significant conflict of interest (see figures 1 and 2). If such individuals are to be consulted, equal weight should be given to scientists representing local and state governments as well as industry experts.
- Prior to developing a rule, EPA should solicit stakeholder input during the development phase. TCEQ has found that engagement of affected regulated entities can help avoid the need for drastic changes from proposal to final adoption of a rule.
- When soliciting public comment, EPA should respond to each comment in a substantial manner and revise technical and policy documents accordingly. A response to comments document which lists each comment (acknowledging that there may be multiple comments with very similar objectives that can reasonably be combined for this purpose) along with the agency responses should be provided with every rule.
- Place the risks associated with ambient air pollution into the context of other risks people face. This is a crucial function of public health officials, who have an obligation to present scientific data in an unbiased manner and avoid inaccurate or inflammatory language.

[11] http://www.tera.org/Peer/Description.html

7. You stated near the end of your testimony that these regulations could have negative unintended consequences. Could you explain what you mean by that?

When regulations are routinely based on extrapolated, highly uncertain risk analysis, stakeholders must distinguish between real risk and these often alarmist conclusions. The result is that other necessary tasks are postponed. Indeed, University of Texas law professor Frank Cross observes, *"The truly fatal flaw of the precautionary principle, ignored by almost all the commentators, is the unsupported presumption that an action aimed at public health protection cannot possibly have negative effects on public health."*[12]

In the experience of TCEQ, time and resources spent analyzing and responding to unnecessary regulations based of perceived (rather than real) risks detracts from other, far more urgent needs of our citizens. Activities such as the development of safe screening levels are often delayed while staff respond to policy issues that have significant consequences for the State.

The solution for an adverse health effect associated with an environmental risk factor can itself become a risk factor for other health effects[13]. Public health officials must be aware of such potential consequences when advising citizens. Take, for example the following quote from EPA Administrator Lisa Jackson: *"We are actually at the point in many areas of this country where on a hot summer day, the best advice you can give is don't go outside. Don't breathe the air. It may kill you."*[14] Not only is this hyperbole unscientific, inaccurate, and inflammatory, but this type of statement gives the public the impression that staying indoors and avoiding physical activity is preferable. In fact, indoor air quality is clearly worse than outdoor air quality (Burke *et al.* 2001 and references therein[15]) and this type of advice can lead to unintended negative consequences. For example, suggesting that citizens avoid outdoor exercise in order to prevent exacerbation of asthma symptoms can result in unintended negative consequences such as contributing to obesity.

The Policy Assessment (PA)[16] document serves to "bridge the gap" between relevant scientific information and assessments and the judgments required of the EPA administrator in determining whether and how to revise the NAAQS. In reviewing the PA that supports the newly proposed PM NAAQS, the following comment from CASAC member Dr. Robert Phalen came to our attention: *"I am struck by the limitations placed on the Staff in framing the P.A., and concerned that readers may believe that several potentially adverse secondary health consequences have been evaluated along with the direct health effects, when they have not. Thus, I recommend adding an explicit informative statement to the P.A., or the cover letter, such as: 'Due to statute, case-law, and policy decisions, it should be noted that this Policy Assessment addresses only the direct adverse health effects of PM mass fractions. Thus, secondary public health effects, such as (1) the potential health effects of compliance actions on jobs, and the availability of goods and services; (2) the potential health effects at locations that have positive (rather than negative) health associations with PM mass; and (3) the potential health effects of changes in PM mass on other air contaminants (e.g. UFP counts, and airborne acidity), are not considered. In short, the*

[12] Frank B. Cross, "Paradoxical Perils of the Precautionary Principle," Washington and Lee Law Review 53, no. 3 (1996): 860.
[13] Steve Packham, Phd, D.A.B.T. presentation titled: "Utah's Recess Guidance: Based on Air Quality." March 7, 2011.
[14] On HBO's "Real Time with Bill Maher," October 7, 2011.
[15] Burke et al. 2001. A population exposure model for particulate matter: case study results for PM2.5 in Philadelphia, PA. Journal of Exposure Analysis and Environmental Epidemiology 11:470-489.
[16] http://www.epa.gov/ttn/naaqs/standards/pm/data/20110419pmpafinal.pdf

range of potential unintended secondary adverse consequences have not been evaluated in this document. Thus the recommendations herein may, or may not, improve overall public health.'" It is disturbing that such salient and reasonable advice from a member of the CASAC panel has been disregarded by EPA in the Policy Assessment presented to the Administrator.

Looking at the issue in the most practical way, if an unnecessary regulation raises the cost of electricity such that a low-income elderly person feels they can't afford to use air conditioning during periods of intense heat they are more likely to suffer heat stroke.

8. I understand the EPA recently conducted some experiments where they exposed people to high levels of PM. What are the implications of these experiments?

A case study published in February 2012[17] describes exposure of a volunteer to Concentrated Air Particles (CAPs). This individual had a personal and family history of heart disease as well as numerous other medical issues. During the exposure, the volunteer experienced an irregular heart beat and was transported to the hospital. A Freedom of Information Act request initiated by Steve Milloy located data spanning 2010 and 2011 for 40 additional individuals exposed to CAPs[18]. Of these, 39 experienced no clinical effects and 1 experienced an elevated heart rate.

Significant concerns are raised by this information: (1) If the EPA believes $PM_{2.5}$ is lethal, is it ethical and/or legal to expose human volunteers to such high levels of $PM_{2.5}$? Indeed, Administrator Jackson testified to Congress[19] that, *"[Airborne] particulate matter causes premature death. It doesn't make you sick. It's directly causal to dying sooner than you should."* (2) The alternative interpretation is that these results invalidate the EPA's assertion that $PM_{2.5}$ causes premature mortality. In fact, EPA has not been able to articulate a mechanism whereby $PM_{2.5}$ causes mortality[20]. Moreover, Green and Armstrong conclude, *"it remains the case that no form of ambient PM—other than viruses, bacteria, and biochemical antigens—has been shown, experimentally or clinically, to cause disease or death at concentrations remotely close to U.S. ambient levels...hundreds of researchers, in the U.S. and elsewhere, have for years been experimenting with various forms of pollution-derived PM, and none has found clear evidence of significant disease or death at relevant airborne concentrations."*[21]

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[17] Ghio *et al.* 2012. Supraventricular Arrhythmia after Exposure to Concentrated Ambient Air Pollution Particles. Environmental Health Perspectives. 120:275-277.

[18] http://junkscience.com/2012/04/18/epa-human-experiments-debunk-notion-of-killer-air-pollution-agency-hides-exculpatory-results/

[19] September 22, 2011. House Energy and Commerce Committee Meeting on Air Regulations.

[20] U.S. EPA. Integrated Science Assessment for Particulate Matter (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F, 2009. From Chapter 5, Possible Pathways/Modes of Action : "Additional studies will be required to clarify the biological mechanisms underlying the health effects of PM."

[21] Laura Green and Sarah Armstrong, "Particulate matter in ambient air and mortality: toxicologic perspectives," Regulatory Toxicology and Pharmacology 38 (2003) 326-335.

FIGURES

Figure 1. Chartered Clean Air Science Advisory Committee (CASAC)

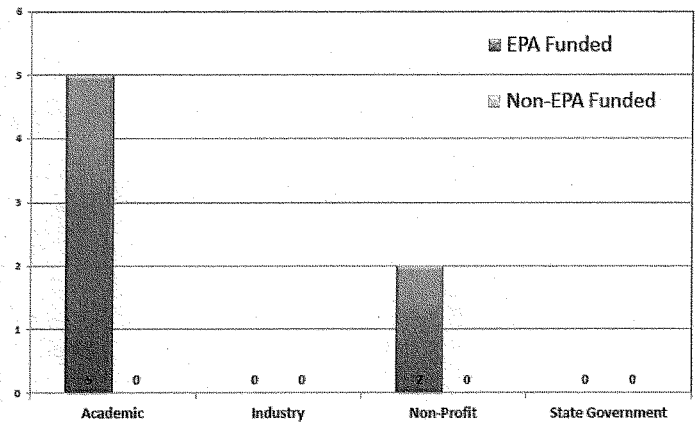
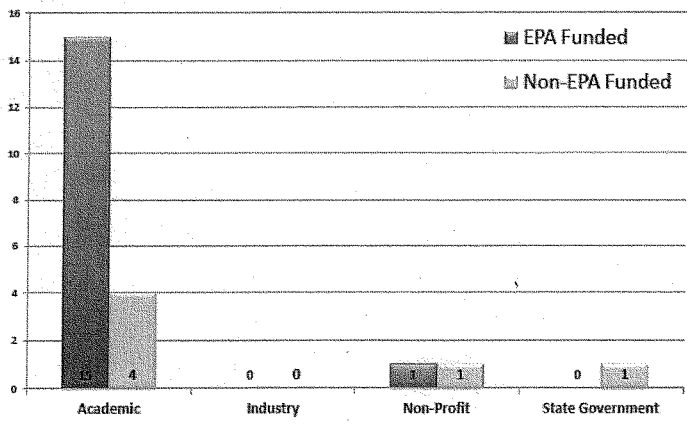


Figure 2. Particulate Matter Review Panel of the CASAC



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Honorable Andy Harris, MD
Chairman
Subcommittee on Energy & Environment
Committee on Science, Space, and Technology
2321 Rayburn House Office Building
Washington, DC 20515-6301

July 9, 2012

By e-mail transmission

Re: Responses to Committee Questions, Hearings on EPA's Impact on Jobs and Energy Affordability: Understanding the Real Costs and Benefits of Environmental Regulations, June 6, 2012

Dear Chairman Harris:

Thank you for your letter of June 25, 2012, concerning the above hearing. I greatly appreciated the opportunity to testify before the Subcommittee to present the findings of the study that I conducted on behalf of the American Coalition for Clean Coal Electricity (ACCCE), "Energy Cost Impacts on American Families, 2001-2012."

I previously supplied Subcommittee staff with a corrected version of my portion of the hearing transcript.

Attached are responses to the questions that you forwarded on June 25th in connection with my testimony and prefiled statement. These responses reflect my own views, and do not necessarily represent the views of ACCCE or its member organizations.

Thank you again for this opportunity, and please do not hesitate to contact me if you have further questions.

Sincerely,

Eugene M. Trisko

Digitally signed by Eugene M. Trisko
DN: CN = Eugene M. Trisko, C = US, OU = Attorney at Law
Reason: I am the author of this document
Date: 2012.07.08 20:53:29 -04'00'

Eugene M. Trisko

Attachment (Committee Questions and Responses)

Committee Questions and Responses

1. In your testimony, you state that "lower income families are more vulnerable to energy costs than high-income families because energy represents a larger portion of their household budgets." In the event electricity prices were to rise, can you elaborate on how this might disproportionately impact lower income families, the choices and tradeoffs that might have to be made, and the overall impact this could have on the health and welfare of lower income families in this country?

Response: The demand for electricity is relatively inelastic over the short-term, meaning that demand is not very sensitive to increased prices. Increased electricity prices due to compliance with environmental regulations or other policies would pose additional hardships on lower- and fixed-income families by creating additional financial pressure on their budgets for other necessities such as food, health care, child care, housing, etc. A detailed study, beyond the scope of my testimony, would be needed to assess how these tradeoffs are being managed by lower- and fixed-income families.

As documented in the study attached to my testimony, energy expenditures for the 50% of U.S. households with annual gross incomes less than $50,000 have nearly doubled over the past decade, from an estimated average of 12% of after-tax income in 2001 to an estimated average of 22% in 2012. These increased energy expenditures inevitably force difficult budget choices among other necessities. Meanwhile, real incomes have not increased to offset this additional cost burden on lower- and fixed-income families. As indicated in my testimony, the U.S. Census Bureau reports that since 2007 real (inflation-adjusted) median household income has declined by 6% (from $52,823) and is 7% below the median household income peak ($53,252) that occurred in 1999.

2. Your report found that residential price increases since 2000 have been associated with capital, operating and maintenance costs incurred due to environmental regulations. Given the current trend of environmental regulations in the last few years, will there be other even greater increases in electricity prices associated with meeting these new standards? How will

this affect the percentage of the average American's post-tax income spent on energy?

Response: The electricity price data included in my testimony show a clear trend toward higher electricity prices since 2000 – nearly a 50% increase in nominal dollar terms during a period in which inflation as measured by the CPI increased by 31% (2000 to 2011). A portion of this increase can be attributed to the costs of compliance with new environmental regulations such as Phase II of the Title IV acid rain program, the NOx SIP Call, the Clean Air Interstate Rule, and other environmental regulations.

There is evidence that even larger electricity price increases likely will result from new EPA regulations that have not yet been fully implemented, including the Mercury and Air Toxics Standards Rule (MATS) and the Cross-State Air Pollution Rule (CSAPR). In its Report to Congress on the Costs and Benefits of the Clean Air Act (2011), EPA indicates that the annual cost of compliance in 2010 with all existing utility clean air rules was $6.6 billion ($2006). In comparison, EPA's Final Regulatory Impact Analysis of the MATS rule projects the annual costs of compliance with this rule at $9.6 billion ($2007) in 2016. EPA estimates the annual costs of the CSAPR rule at an additional $0.8 billion ($2007) in 2014 (78 FR 48208, 48215, August 8, 2011, at Table III-4.) The two rules together thus will add $10.4 billion annually to the nation's electric bill.

The prospective impacts on electricity prices of the costs of compliance with the MATS and CSAPR rules – assuming that they were implemented in the absence of Congressional, judicial or administrative actions - will be system-specific, with the largest impacts anticipated in eastern states that rely upon coal for a substantial share of electric generation, and that will need to retrofit or upgrade substantial numbers of pollution control devices (e.g., West Virginia, Ohio, Kentucky, Indiana, Illinois, Missouri, etc.)

Determining how these increased costs will be passed along to consumers, and their impacts on consumer electric prices and costs, will depend in large measure upon how state regulatory authorities address cost recovery issues among residential, commercial and industrial customer classes. Informal reports from state public utility commission officials in coal-dependent states indicate that electric rate increases on the order of 15% to 30% may be needed to provide cost recovery for the investments in pollution controls required by the MATS rule. This is an issue that the Committee and

Subcommittee may wish to explore in future hearings, with invited PUC witnesses from states expected to bear large portions of the compliance burden.

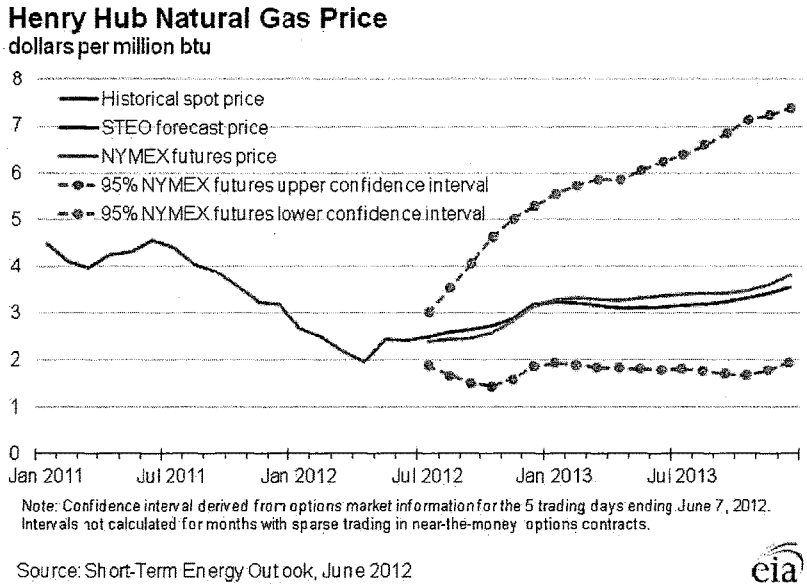
3. Your report states that while prices for residential electricity have only increased 51% since 1990, the price of residential natural gas has nearly doubled during this same time frame. What implications does this have for a potential future whereby natural gas generating units serve as this country's source of baseload electricity?

Response: Two recent EPA regulations – the final MATS rule with its unachievable emission limits for new coal-based generating plants (and in particular for mercury emissions), and the proposed NSPS rule for Greenhouse Gas Emissions – make it extremely difficult, if not impossible, to permit, finance and construct any new baseload coal capacity beyond a handful of plants already in the construction phase. The nation is being forced, in effect, to accept natural gas combined-cycle capacity as the predominant source of new baseload capacity for the indefinite future. This prospect is fundamentally inconsistent with the "all of the above" energy policy advocated by the President, and risks undue reliance on natural gas with its long-term history of price volatility.

As mentioned during the Q&A portion of my testimony, the Committee may wish to review the Department of Energy's price uncertainty analysis of future NYMEX natural gas contract prices. The most recent analysis from the EIA Short-Term Energy Outlook for June 2012 shows the 95% confidence intervals for the December 2013 natural gas contract.

EIA's price uncertainty chart, which appears below, indicates a range of prices in December 2013 from $1.95 per MMBTU to $7.39 per MMBTU.

Utility investments in new generating capacity involve plants with 50 to 60 year lifetimes. The nation with the world's largest coal reserves should develop energy policies that maximize – not constrain – future generation options in light of fuel price uncertainties such as these. No other nation has committed to undemonstrated CCS technology as a condition precedent for the construction of new coal generation capacity.



4. The EPA, in its regulatory analysis for the Carbon Pollution Standard, asserts that "the level of avoided negative health and environmental effects expected would imply net social benefits from this proposed rule." Given your testimony that higher energy costs decrease the amount of discretionary income family may spend on other necessities, including healthcare and food, would you agree with the Agency's assessment?

Response: No. The Carbon Pollution Standard would impose carbon capture and storage requirements – a technology that has not been commercially demonstrated in this country - on new coal plants. This effectively would render coal uneconomic as a choice for future new electric generation facilities, largely regardless of the future price of natural gas. Electricity consumers should be concerned that the future price of electricity will be increasingly linked to volatile natural gas prices. Low- and fixed-income households will become more vulnerable to energy price increases as a result. This is another issue that deserves consideration in a follow-up hearing with state PUC officials, as recommended above.

5. According to OIRA's Draft Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities, the benefits from EPA air quality regulations that affect particulate matter represent almost 80 percent of all benefits from all regulations across the entire federal government. Do you find that claim to be credible?

Response: OIRA's assessment appears to be consistent with the testimony that Dr. Honeycutt offered at hearing, and I defer to his expertise. More than 99% of the health benefits that EPA has claimed for the MATS rule are related to "co-benefits" from the reduction of PM2.5 and other pollutants already regulated by multiple provisions of the Clean Air Act. Health-related benefits from mercury reductions are *de minimis*, with a net present value of $500,000 to $6.0 million according to EPA's Final RIA for the MATS rule. The RIA also shows that MATS would reduce mercury deposition on average by 1 percent in the continental United States.

6. Do you think that recent EPA regulatory activity is consistent with an "all of the above" energy policy?

Response: See response to Question 3, above.

7. The recently-proposed Carbon Pollution Standard for Power Plants only applies to new sources, but some have indicated that the agreement that EPA signed with environmentalist groups will guarantee that they expand it to the existing facilities. How confident are you that EPA will only regulate new coal-fired power plants?

Response: As a result of court decisions, EPA has considerable flexibility in the manner in which it chooses to apply greenhouse gas regulations to various sectors of the economy. Many share the concern that EPA may next move to apply GHG standards to existing sources, particularly major sources undergoing modification, thereby arresting progress in maintenance and modernization of the existing coal fleet.

In recent years, a pattern of "regulation by consent decree" has evolved, effectively giving a large degree of control over EPA's regulatory agenda to the courts and to certain interest groups. A larger Congressional role both in oversight and in statutory direction is needed to ensure that generic legislation like the Clean Air Act is applied appropriately, and is updated to

reflect changing scientific, environmental, economic, and social considerations.

8. In the EPA's regulatory impact assessment for the NSPS for EGUs, the "EPA does not anticipate this rule will have any impacts on the price of electricity, employment or labor markets, or the US economy." Would you agree with that statement?

Response: For the reasons expressed here and above, I respectfully disagree with EPA's assertions about the potential macroeconomic impacts of the GHG NSPS rule. More detailed sensitivity analyses of the relative prices of coal and natural gas are needed to provide an adequate basis for judging the economic risks and potential costs of the rule, including adverse labor market impacts from undue reliance on natural gas as the principal form of new baseload generation.

Studies such as NERA's March 2012 assessment of the MATS rule prepared for ACCCE (previously supplied for the hearing record pursuant to unanimous consent) show that large net employment dislocations can result from regulations that EPA analyses suggest would create jobs. EPA needs to update and ro enhance its modeling capability for the prediction of employment dislocations, using readily-available models that account for state and regional electricity price increases and their impacts on employment, output and household income.

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July 23, 2012

The Honorable Andy Harris, M.D.
Chairman
Subcommittee on Energy & Environment
2321 Rayburn House Office Building
Washington, DC 20515-6301

Dear Chairman Harris:

Thank you for the opportunity to testify at the Energy & Environment subcommittee hearing entitled ***EPA's Impact on Jobs and Energy Affordability: Understanding the Real Costs and Benefits of Environmental Regulations*** on June 6, 2012. Here are the answers to your follow-up questions:

Q. What are the cumulative effects of these various EPA rules on the bottom lines of small businesses? Do you think EPA's carbon pollution standard, which will effectively ban coal generation, will impact manufacturers and small businesses?

A. The bottom line issue here is the availability and cost of electricity. For many small businesses and manufacturers, electricity is the second highest cost on their spreadsheets (after personnel). Therefore, the impact of the cumulative effect of the EPA rules will depend on how they end up affecting the cost and availability of electricity throughout the country. As you can imagine there are many differing opinions within the industry about how - and if - these rules will translate into cost increases and/or supply concerns. It is hard to predict because of the volatility of the market, the current increase in natural gas production, the current reliance on nuclear power and the rising (but still small) use of alternative energies.

If the EPA's rules come into effect and they do end up reducing our reliance on coal electricity generation (which we believe they will), they will have an effect on small businesses if other forms of electricity generation can't fill the gap (lack of supply) or if those other forms of generation end up being more expensive than coal (increased costs to consumers). Even though we are excited about the prospects of natural gas production in the United States, it is a bit premature to assume that production will continue at current levels and consumer prices will stay at historic lows.

We believe the coal industry needs a predictable regulatory environment from the Federal Government so it can determine which plants make sense to invest in and which ones don't – and provide incentive for coal companies to find better, cleaner ways to produce electricity from coal as they've been doing for the past forty years.

Q. In your testimony, you mention that it will be difficult for companies to obtain financing for new coal plants given the uncertain status of Carbon Capture and Sequestration (CCS) now and questionable prospects for its viability in the future. Aside from the difficulty in securing financing based on the hope that the new technology will be available and affordable at some point in the future, do you feel that this uncertainty

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will result in additional difficulties in obtaining the necessary construction and operating permits.

A. Not to quibble or parse, but I didn't say that CCS has questionable prospects, just unknown prospects. No one knows whether the process can overcome the technological, regulatory and legal hurdles and then cross the finish line by working successfully on a commercial scale. Given this uncertainty, the EPA's regulations are designed to make it next to impossible to get financing on a very risky bet that the coal industry can overcome the hurdles of CCS overnight. Making "bets" on our largest domestic resource, which provides such a huge chunk of our electricity, seems to us to be bad policy. We believe the Carbon Rules promulgated by the USEPA put new coal generation on the back burner, if not on a deathbed.

To answer the question in a simpler way, if you can't get the financing to build a plant, you certainly can't get a construction or operations permit. Even if you can find the financing, construction and operation permits might be difficult as you'd have to prove you can meet the stringent USEPA regulations on carbon; and right now no one can.

Q. In addition to the proposed Carbon Pollution Standard for New Power Plants, are there other EPA proposed or financial regulations that could negatively impact Energy Council members?

A. My members generate, transmit and transport all kinds of energy – wind, coal, solar, natural gas, crude oil, nuclear, waste-to-energy, biofuels and more. Every EPA rule affects them in some way, shape or form -- sometimes positively, sometimes negatively. But my members gave me the green light to testify on the Carbon Rules because it seemed like they were written to make life for one form of generation – coal -- very difficult. Many of my members believe that regulations should not be written to pick winners or losers, but to provide realistic road maps to enable companies to meet new environmental standards in a competitive marketplace. We are blessed with ever-increasing diverse choices when it comes to electricity generation. Why should we promulgate rules that will result in the demise of one of them and overdependence on the rest? Give them a chance to compete and advance more efficient, lower emission technologies. That kind of regulation creates a better planet in the long term and a better energy market for all Americans.

I hope these answers provide some insight and are deemed helpful to the ongoing process.

Sincerely,

Tom Wolf
Executive Director, Energy Council

July 06, 2012

Via E-mail

Chairman Andy Harris
Subcommittee on Energy & Environment
US House of Representatives
Committee on Science, Space, and Technology
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Attn: Taylor Jordan taylor.jordan@mail.house.gov

Re: Response to Questions for the Record – ODEC Testimony from June 6, 2012 Hearing

Dear Chairman Harris:

In response to your letter dated June 25. 2012, Old Dominion Electric Cooperative (ODEC) offers the following answers to the Questions for the Record posed in conjunction with my testimony given at the June 6 hearing entitled "*EPA's Impact on Jobs and Energy Affordability: Understanding the Real Cost and Benefits of Environmental Regulations*". We very much appreciate the time given to speak before the subcommittee and also the opportunity to address follow-up questions for which we will provide our cooperative's perspective on very critical issues facing our country and our company.

1. **Do you think that recent EPA regulatory activity is consistent with an "all of the above" energy policy?**

   No, the underlying assumption that natural gas and renewables will be the technology of choice speaks very strongly to this issue. While EPA has proposed what they feel is a reasonable solution to allow coal to continue to be used, the practicality of the situation will be that companies will not be willing or able to take the risk on the viability of carbon capture and storage (CCS) technology. New coal plants will not be built and the existing fleet will be slowly phased out. There are few options available for base load power, and the loss of a significant and abundant energy resource like coal runs counter to this country's needs to ensure a diverse energy mix. Maintaining use of all our resources will provide competition among base load fuels in the market place resulting in true price stability and move us in the direction of energy independence.

   While we would all like to find more and better ways to generate electricity without any environmental impact, the fact of the matter is new technology, while moving forward,

has not, and will not realistically be able to progress at an accelerated rate to make up potential large shortfalls in our generation capabilities. EPA's justification that these mandates will encourage alternative technology and spur development of commercially viable CCS is extremely shortsighted. What has been and will be successful for this country are technologies developed, vetted, and brought to market by pioneers, researchers and visionaries working in collaboration with the government and the private sector. This formula has successfully worked for decades and not government mandates and oppressive regulations. ODEC believes that we must continue to move forward to better the environment, but based upon sound science, efficient technology, and in a manner that is economically responsible and environmentally balanced. Always keeping in the fore front these decisions directly affect all of our electric bills and the United States competitive position in the world. We must never lose sight that affordable and abundant electricity is the fundamental foundation for every sector of our economy, without exception.

1. **In the EPA's analysis for the proposed Carbon Pollution Standard for Power Plants, the agency assumes that "generation technologies other than coal (including natural gas and renewable sources) are likely to be the technology of choice for new generating capacity." In your opinion, is this assessment correct?**

   No, this is a very large assumption based upon a small window of current data. While none of us possess a crystal ball to know what will happen in the future, the EPA should not be engaging in this type of supposition regarding the future of the energy market. While there is available information from a variety of reliable sources regarding the quantities of natural gas that are significantly higher than once estimated, there are still the questions of development of more and better extraction technology, and additional storage and infrastructure, as well as potential environmental impacts on water, which must be addressed to take full advantage of these resources. From a national perspective, the assumption that there will be adequate natural gas supply throughout the country is erroneous. This proposed rule fails to consider or account for lack of fuel availability in many geographic areas, and this failure is a fatal flaw.

   While natural gas prices are at record lows currently, no one should forget that between 1999 and 2005, US natural gas prices quadrupled and there were significant spikes as recent as 2008. Furthermore, natural gas companies are pursuing developing liquid natural gas (LNG) facilities to transport natural gas from the US to other parts of the world. EPA has not considered the economic impact of LNG export on the US market and how it would affect this rule.

   Additionally, renewable technology has made progress; however, many of these sources are still heavily subsidized, intermittent and not truly economically viable. Moreover, different areas of the country have very different potential to take advantage of renewable technology. To assume technologies other than coal can and will be the choice in many regions of the country is extremely troubling.

EPA has stated that the proposed Rule is based upon a "common sense approach". However, ODEC considers this proposal to be contrary to common sense and, in fact, the intent of the requirements of the Clean Air Act (CAA). Common sense would normally dictate that we as a country should be able to utilize a diverse mix of resources in the most efficient manner that is technically feasible at the time. While ODEC agrees that there should be forward thinking regarding technology, no one, including EPA, should be making forward assumptions that can and will have significant unintended consequences. In Section 1 of Executive Order 13563, addressing the general principles of regulation, it states "It [our regulatory system] must promote predictability and reduce uncertainty." Further Section 4, in discussing flexible approaches, the order states that agencies "consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public." The regulation of technology in the proposed rule has not embodied these principles. Electricity affordability from natural gas generation is significantly driven by the fuel's price. The proposed standard will effectively eliminate competition in the market place and ODEC's choice for affordable electric power. The electric industry will become a price taker of gas monopolies.

2. **According to OIRA's Draft Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities, the benefits from EPA air quality regulations that affect particulate matter represent almost 80 percent of all benefits from all regulations across the <u>entire</u> federal government. Do you find that claim to be credible?**

   Based upon a review of the Draft Report dated March 2012, that percentage on its face appears to be correct. ODEC has not done a specific calculation. However, ODEC, as well as other utilities, has continued to comment that the assumptions and methodologies used to calculate the overall health benefits from the EPA regulations have a high degree of uncertainty and in many cases, the benefits are significantly biased high. The underlying assumptions used to calculate the benefits of these rules are not necessarily indicative of the real benefits. In many cases, both past and present, the benefits calculated, which are primarily health-related, are based upon a direct assumption that a certain amount of emissions will equate to a certain increase in atmospheric concentration which relates to a specific number of health impacts (morbidity, hospitalizations, treatment, lost work time, etc.). All of the assumptions made the air quality & statistical models used, the specific research data chosen - all have inherent inaccuracies. In an issue brief entitled "PM2.5 Reductions and Impact on Premature Death: An EPRI Perspective" (February 2009), the Electric Power Research Institute (EPRI) discussed the inherent inaccuracies in estimating avoided deaths and health impacts due to changes in air quality. In their conclusions, EPRI considers that studies' "estimates of impact vary substantially" and "Estimates of changes in atmospheric pollutants and their resultant impact on mortality should reflect this reality and recognize these estimates remain burdened with considerable uncertainty."

As you well know, within the OIRA report, they state in the introductory paragraphs that "It is important to emphasize that the figures here have significant limitations" and In addition, and significantly, prospective estimates may contain erroneous assumptions producing inaccurate predictions; retrospective analysis, recently required by Executive Order 13563, can be an important way of increasing accuracy." Therefore, while the benefits in the OIRA draft report are a correct compilation of the EPA regulatory contribution, the actual benefits associated with the various regulatory actions are debatable.

3. **What is the potential for utilizing carbon capture and sequestration for the Cypress Creek Power Station to meet EPA's proposed rules?**

First and foremost, if the proposed New Source Performance Standards (NSPS) for greenhouse gas emissions is finalized with the current requirements, Cypress Creek will not be constructed. The future compliance obligations and the associated liability would not allow for financing of the project. With that said, ODEC has always tried to leave open avenues for utilization of technology in the future whenever it may become commercially available. Speaking from purely a technological standpoint, to implement CCS at Cypress Creek, there are numerous hurdles that would have to be overcome:

1. The capture technology would have to progress to the point of being able to adequately capture the exhaust volumes from a large plant without a heavy parasitic load burden to run what amounts to essentially a chemical plant.

2. Because the proposed sites are not in close proximity to an area even being considered for research as a storage repository, the transportation infrastructure would have to be fully permitted, designed and deployed i.e. barge, rail or pipeline. All of this requires multiple public hearings with multiple government agencies, an expensive and time consuming process. Also there is no guarantee at the end of the process we will have the necessary permits and then multiple legal suits will be filed by environmental organizations.

3. Long-term storage locations would have to be carefully studied and fully explored before a final repository could be selected.

4. The legal liability questions have to be answered. Who is responsible for the long term storage of millions of gallons of carbon dioxide for the next 50 or 100 plus years from now? What happens when a seismic event occurs and releases an odorless, colorless and tasteless gas that is deadly to all life?

Only when all the compounding issues of capture, transport, monitoring, storage, liability and cost are resolved can CCS be effectively and completely addressed. The current technological issues with capture alone are daunting. However, couple those with the technological, environmental, cost and legal issues associated with transport and storage of CO_2, ODEC does not believe these fundamental issues can be resolved within 10 years, if at all.

ODEC has been and continues to be a member of the Southeast Regional Carbon Sequestration Partnership (SECARB). ODEC recognizes the need for these partnerships to facilitate exploration and expansion of this nation's technological capabilities with CCS. However, ODEC cannot and will not rush to judgment on this issue as to its viability, affordability and applicability in the real world

A rule of this unprecedented magnitude will surely have significant unintended consequences which will have widespread negative impact on the stability of our nation's electrical infrastructure and our economy. Because of the significant impact this will have on the electric generation industry as a whole, and more importantly, on ODEC's ability to construct new base load generation that will be affordable for all of our member owners, ODEC urges the Subcommittee to request the EPA to withdraw this rule. It's simply not workable.

Again, ODEC appreciates the opportunity to provide additional information. If you have further questions or require any additional clarifications, feel free to contact me.

Sincerely,

David Hudgins
Director, Member & External Relations

cc (via e-mail):
Lisa Johnson
Ken Alexander
David Smith

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY & ENVIRONMENT

Questions for the Record
The Honorable Andy Harris

EPA's Impact on Jobs and Energy Affordability: Understanding the Real Costs and Benefits of Environmental Regulations

Mr. Richard Trzupek

1. Dr. Honeycutt described how EPA regulations rely on a series of assumptions about current air quality causing tens or hundreds of thousands of deaths. Can you describe the state of air quality in the United States and progress that has been made over the last several decades? Do you think current ambient concentrations are as harmful as EPA claims?

2. According to OIRA's Draft Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities, the benefits from EPA air quality regulations that affect particulate matter represent almost 80 percent of all benefits from all regulations across the entire federal government. Do you find that claim to be credible?

3. OIRA has recommended in their Report to Congress that federal agencies should conduct a jobs analysis for major rules. In reading recent EPA rules, do you have any indication that the Agency is looking seriously at employment impacts?

4. Do you think that recent EPA regulatory activity is consistent with an "all of the above" energy policy?

5. EPA relies on particulate matter co-benefits to justify many of its regulations on the power sector. In your view, is EPA focusing on the most important sources of PM and other pollutants?

6. I understand that EPA recently conducted some experiments where they exposed people to high levels of PM. What are the implications of these experiments?

Appendix 2

Additional Material for the Record

March 1, 2012

An Economic Impact Analysis of EPA's Mercury and Air Toxics Standards Rule

NERA
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INTRODUCTION

On December 16, 2011, EPA released its final Mercury and Air Toxics Standards (MATS) Rule, accompanied by a Regulatory Impact Analysis (RIA) that reported the incremental cost to the U.S. electricity sector would be $9.6 billion per year in 2015. This is a large cost to the U.S. economy and, therefore, the Rule merits close examination. NERA has the capability to analyze the electric sector impacts and associated macroeconomic impacts of emissions policies. In this paper, we analyze the economic impacts of the MATS Rule. Our analysis is designed to generally match the EPA assumptions in its own analysis, and to offer a broader range of insights about the impacts of that Rule than EPA provided in its RIA. This paper briefly summarizes the approach in our MATS analysis, compares our results to those that EPA has reported, and provides some further results that are available from our own analysis. A particular addition that this paper offers is insight into the overall economy-wide impacts of the Rule that can be expected to result from the costs that the U.S. electric sector is projected to bear under the MATS Rule – EPA did not provide such an economy-wide assessment in its RIA.

NERA's N_{ew}ERA MODEL

NERA's analysis was performed using NERA's N_{ew}ERA model.[1] The N_{ew}ERA model is an economy-wide economic model that includes a detailed representation of the electric sector. It has been designed to assess, on an integrated basis, system costs to the power sector to meet any specified policy scenario as well as the overall macroeconomic impacts of that policy scenario. For the power sector, N_{ew}ERA uses a unit-level representation of the power generation system that considers the actions each generator takes to new policies such as MATS by providing compliance options such as retrofitting, retiring, fuel switching and re-dispatching. The outputs of the model include a variety of electric sector-specific results such as number of retrofits (and types), number of retirements, number and types of new capacity additions, fuel usage, and total sector costs. In addition, because the N_{ew}ERA model includes all sectors of the economy we can also evaluate changes in fuel markets (most importantly, natural gas markets) and macroeconomic indicators such as GDP, consumption and employment measures. Additional information about the N_{ew}ERA model is included in Appendix A.

MATCHING EPA's ANNUAL COST OF $10 BILLION IN 2015

The initial focus of the analysis was to see how closely our own projected electric sector impacts might match the analysis that EPA performed. Note that EPA only considered the impacts of the policy on the electric sector; they did not consider the broader economic effects of the Rule on the economy that arise because of the impacts of the Rule on prices and resources throughout the economy. EPA forecast the impacts of the MATS Rule using the IPM model. EPA analyzed two policy scenarios: 1) a Baseline, which included the Cross-State Air Pollution Rule (CSAPR) that has since been stayed by the court,[2] and 2) MATS, which layers the requirements of the

[1] For additional technical details on the N_{ew}ERA model see http://www.nera.com/67_7607.htm.

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INTRODUCTION

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MATS Rule on top of the Baseline; the impacts of the Rule (MATS) are calculated by comparing these two scenarios. The IPM model projected the incremental compliance costs to the electric sector in 2015 would be $9.4 billion (in 2007$).[3] EPA added another $0.2 billion to that cost to reflect monitoring and administrative costs, which accounts for EPA's total cost being reported as $9.6 billion. Our analysis did not include the extra $0.2 billion, so our cost results, when stated as the annual cost in 2015, should be compared to IPM's estimate of $9.4 billion (2007$). Since the N_{ew}ERA model produces results in 2010$, it is useful to convert the IPM cost estimate of $9.4 billion in 2007$ to its value in 2010$: $9.7 billion.

NERA initially analyzed the same two policy scenarios in the N_{ew}ERA model – a Baseline with CSAPR and a scenario with the addition of MATS on top of CSAPR. We also used EPA's assumptions about retrofit options and their costs.[4] Doing so, we projected the incremental compliance costs to the electric sector in 2015 to be $10.4 billion (in 2010$), which is the result that is comparable to EPA's $9.7 billion (in 2010$). Figure 1 compares our cost results to those from IPM with more years, and also stated as present values.[5]

Figure 1: Comparison of Annualized Incremental Compliance Costs for MATS, Relative to CSAPR

Annualized and Present Value Incremental Compliance Costs (Billions of 2010$)				
	2015	2020	2030	PV (2014-2034)
EPA (IPM)	$9.7	$9.0	$7.7	$89.9
NERA (N_{ew}ERA)	$10.4	$10.8	$11.9	$94.8

CAPITAL COST REQUIREMENTS ARE ATTRIBUTABLE TO BOTH RETROFITS AND REPLACEMENT CAPACITY

The U.S. electric sector must not only comply with the MATS Rule, but will likely also need to comply with CSAPR, which has been stayed by the U.S. Court of Appeals. Given the investments that will need to be made to comply with CSAPR (if the stay is removed) as utilities also work towards complying with MATS, it is useful to also compare the costs to comply with the MATS Rule and with CSAPR, relative to a Baseline that includes the Clean Air Interstate Rule (CAIR), which specifies the current SO_2 and NO_X limits that generators must meet.

We addressed this issue by evaluating a scenario that did not include CSAPR in the Baseline and instead had only CAIR, which is presently the actual existing regulation. CAIR is assumed to continue into its second phase starting in 2015. Thus, we are able to make comparisons of a scenario that includes both the MATS Rule and CSAPR with one that includes CAIR, but does not include either the MATS Rule or CSAPR. The remaining results presented in this paper are based on this comparison, unless otherwise stated.

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[3] Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards, December 2011, p. 3-13.

[4] The only difference in assumptions about retrofit options in the N_{ew}ERA runs was to limit Dry Sorbent Injection (DSI) to units burning subbituminous coals and that have capacity less than 300 MW.

[5] In calculating the net present value, we used a real discount rate of 5%.

There are some important details about costs that EPA did not report, but that we can report from our own analysis based on the N_{ew}ERA model. One of these is the level of total capital that electric companies will need to raise within the implementation period. EPA only reports the annual capital payments that companies incur over time to "pay back" the upfront spending. Annualized costs have relevance because they may affect electricity rates. However, the level of spending that must occur upfront is of relevance for other reasons. For example, it indicates how leveraged companies may have to become, which can affect their borrowing costs and their stock valuate.

The capital costs are associated with both pollution control retrofits and new capacity to replace capacity retired as a result of the Rule. Reporting only the annualized costs masks the significant increase in capital that would be required in order to comply with the MATS Rule. We thus turn to the key drivers of capital spending prior to 2015.

Retrofits

EPA's analysis shows that in 2015 the MATS Rule (incremental to CSAPR being fully implemented first) will entail 60 GW of scrubber retrofits (wet scrubbers, dry scrubbers and dry sorbent injection combined), 63 GW of scrubber upgrades, 99 GW of activated carbon injection (ACI) and at least 102 GW of fabric filters.[6] In contrast, our analysis shows an incremental 64 GW of scrubbers, 70 GW of ACI and 124 GW of fabric filters (the scrubber retrofit numbers are 70 GW if compared relative to CAIR). The details on the retrofits are in Figure 2.

Figure 2: Summary of 2015 Retrofit Additions

Scenario	WFGD	DFGD	DSI	Total Scrub	SCR	ACI	FF
EPA Results (IPM)							
Base (CSAPR)	55	6	9	70	0	0	0
CSAPR/MATS	52	26	52	130	0	99	102
Delta	***-3***	***19***	***44***	***60***	***0***	***99***	***102***
NERA Results (N_{ew}ERA)							
CAIR	18	0	0	18	15	7	4
CSAPR	18	6	0	24	15	7	9
CSAPR/MATS	19	47	22	88	16	78	128
Delta from CSAPR	***1***	***41***	***22***	***64***	***2***	***70***	***124***
Delta from CAIR	***1***	***47***	***22***	***70***	***2***	***70***	***124***

Note: Deltas may not add up due to rounding.

[6] Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards, p. 3-15.

Retirements

The other component of the capital spending relates to new capacity to replace coal-fired generators that economically retire due to the compliance requirements of the MATS Rule. EPA projects that the MATS Rule will result in an incremental 5 GW of coal-fired capacity retiring by 2015 relative to CSAPR. Our analysis of the MATS Rule has an incremental 19 GW of coal-fired capacity retiring as a result of the MATS Rule relative to CSAPR. We project 23 GW of retirements relative the Baseline without CSAPR. We note, however, that the Baseline without CSAPR has 15 GW of retirements in it, so that the total capacity retired through 2015, once both CSAPR and MATS are applied, is 38 GW. (It is about the same even if only the MATS Rule is imposed on top of the CAIR-only Baseline.) Almost all of the incremental retirements are in states east of the Mississippi River.

Some of the retired capacity is replaced by new natural gas-fired combined cycle units. This has to occur in some locations in order to maintain reserve margins.[7] However, when reserve margins do not force replacement capacity, a significant part of the generation that comes from those retired units in the Baseline is replaced by greater generation from existing natural gas combined cycle units in the same region. Nationally, by 2015 there is an incremental build of 1 GW of natural gas combined cycle units and an incremental build of 1.5 GW of combustion turbines driven by the MATS and CSAPR Rules combined. (It is about the same even if only the MATS Rule is imposed on top of the CAIR-only Baseline.)

Total Capital Spending by 2015

Thus, there are capital costs incurred due to retrofits and replacement capacity. Between 2012 and 2015, the model projects that this capital requirement would be $84 billion to comply with both MATS and CSAPR. This represents a 30% increase over the capital requirements in a Baseline with either CAIR or CSAPR. Such an increase might create financing challenges for individual operating companies and the sector as a whole, which could lead to credit downgrades and possibly higher costs of borrowing. We have not attempted to include these potential costs in our estimates (nor has EPA included them in theirs).

NON-CAPITAL COSTS

The capital spending is the most significant feature of the costs. In addition, there are increased costs of generation that are due to: the greater use of natural gas to displace the coal-fired plants that retire specifically as a result of the MATS Rule, operating costs of the retrofits, and the reductions in unit efficiencies resulting from the retrofits themselves.[8] To some extent, these added operating costs are offset by reduced costs of maintaining the coal plants that are retired. The net effect of these operating costs, plus the annualized capital payments for the $84 billion in investment, is reflected in the total costs that were reported in Figure 1.

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[7] Each region in the model has a reserve margin. If the available capacity relative to the region's peak demand falls below the required reserve level then capacity must be added to the system.

[8] The retrofits often require additional power from the facility to operate, resulting in a net reduction in the efficiency of the plant.

OVERALL MACROECONOMIC IMPACTS ASSOCIATED WITH THE COSTS OF THE MATS RULE

The consequences of the MATS Rule are not just limited to the electric sector. The electric sector has to invest significant capital to comply with the MATS Rule. This capital and other added spending for compliance will induce lower industrial output (because the cost of power, natural gas, and other commodities will increase) and hence drive down income for workers. Although the investments also will create jobs installing the retrofits and building new power plants, the net effect of complying with the MATS Rule will be an increase in the costs of electricity and natural gas, and will produce a drag on the economy as a whole. EPA did not evaluate the MATS Rule using a macroeconomic model so they could not produce a net impact on jobs; instead they cited an estimated 46,000 short-term jobs and 8,000 long-term utility jobs created.[9]

Because the N_{ew}ERA model integrates electric sector costs with the rest of the economy, our analysis also directly estimates the impacts on wages and net employment as a result of the MATS Rule. Our estimate of the net impact (inclusive of job gains associated with installing retrofits and building new power plants) of the MATS Rule in 2015 is a loss in income equivalent to 180,000 full-time jobs (215,000 full-time jobs if compared relative to CAIR). Figure 3 shows that while the largest job losses are in 2015, there are continuing job losses over time as the economy shrinks due to higher energy costs.

Figure 3: Change in Full-Time Job Equivalents

Change in Full-Time Job Equivalents (Thousands)	2015	2018	2021	2024
CSAPR/MATS (relative to CSAPR)	-180	5	-60	-50
CSAPR/MATS (relative to CAIR)	-215	-15	-75	-85

The costs of the MATS Rule are also reflected in several other common economic measures. For example, the present value of GDP losses from 2012 through 2035 would be between $84 and $112 billion dollars ($84 billion is relative to CSAPR, $112 billion is relative to CAIR). Figure 4 shows the annual GDP losses and the present value loss through 2035. Not surprisingly, the largest loss is in 2015 when the MATS Rule is assumed to be fully implemented.

[9] Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards, p. 6-1.

Figure 4: Change in Gross Domestic Product

Change in GDP (Billions of 2010$)	2012	2015	2018	2021	2024	2027	2030	2033	Present Value
CSAPR/MATS (relative to CSAPR)	-$1	-$22	$1	-$4	-$4	-$4	-$5	-$5	-$84
CSAPR/MATS (relative to CAIR)	-$3	-$25	$1	-$4	-$7	-$7	-$7	-$7	-$112

Similar to GDP, the MATS Rule also leads to losses in consumption or disposable income for consumers. The present value of consumption losses from 2012 through 2035 would be between $35 and $71 billion dollars ($35 billion is relative to CSAPR, $71 billion is relative to CAIR). Figure 5 shows the annual consumption losses and the present value loss through 2035. For consumption, the largest losses are in 2012 as investment has to ramp up to meet the 2015 compliance deadline, which requires a diversion of funds from consumption to investment.

Figure 5: Change in Consumption (billions, 2010$

Change in Consumption (Billions of 2010$)	2012	2015	2018	2021	2024	2027	2030	2033	Present Value
CSAPR/MATS (relative to CSAPR)	-10	-3	1	0	0	0	-1	-1	-35
CSAPR/MATS (relative to CAIR)	-13	-5	-1	-2	-2	-2	-3	-4	-71

CONCLUSION

Both NERA's analysis with the N_{ew}ERA model and EPA's analysis with IPM find that complying with the MATS Rule will impose annual costs on the electric sector that are approximately $10 billion in 2015 and almost $100 billion on a present value through 2034. Not included in these numbers are the potential for higher financing costs due to the more than $80 billion in incremental capital that will be required in 2015.

NERA's analysis goes a step further than EPA's analysis in a few different ways. First, we also looked at the cost of complying with the MATS Rule relative to a Baseline with CAIR (instead of CSAPR). This comparison may be more relevant given that the electric sector must be working towards compliance with both the MATS Rule and CSAPR (assuming that the current stay is lifted). Second, because the N_{ew}ERA model is an integrated model of the entire economy, we are able to identify the economic impacts outside of the electric sector, which were largely ignored by EPA. These include significant net declines in labor wages, which would result in losses of full-time job equivalents; declines in the growth of the U.S. economy as measured by GDP; and declines in consumption, or household disposable income.

APPENDIX A – Additional Details on the N_{ew}ERA Model

NERA developed the N_{ew}ERA model to forecast the impact of policy, regulatory, and economic factors on the energy sectors and the economy. When evaluating policies that have significant impacts on the entire economy, one needs to use a model that captures the effects as they ripple through all sectors of the economy and the associated feedback effects. The N_{ew}ERA model combines a macroeconomic model with all sectors of the economy (except for the electric sector) with a detailed electric sector model. This combination allows for a complete understanding of the economic impacts of different policies on all sectors of the economy.

The macroeconomic model incorporates all production sectors and final demand of the economy. Policy consequences are transmitted throughout the economy as sectors respond until the economy reaches equilibrium. The production and consumption functions employed in the model enable gradual substitution of inputs in response to relative price changes, thus avoiding all-or-nothing solutions.

The main benefit of the integrated framework is that the electric sector can be modeled in great detail yet through integration the model captures the interactions and feedbacks between all sectors of the economy. Electric technologies can be well represented according to engineering specifications. The integrated modeling approach also provides consistent price responses since all sectors of the economy are modeled. In addition, under this framework we are able to model electricity demand response.

There are great uncertainties about how the U.S. natural gas market will evolve, and the N_{ew}ERA model is designed explicitly to address the key factors affecting future natural gas supply and prices. One of the major uncertainties is the availability of shale gas in the United States. To account for this uncertainty and the subsequent effect it could have on the domestic and international markets, the N_{ew}ERA model includes resource supply curves for U.S. natural gas. The model also accounts for foreign imports and U.S. exports of natural gas, by using a supply (demand) curve for U.S. imports (exports) that represents how the global LNG market price would react to changes in U.S. imports or exports.

The electric sector model is a detailed model of the electric and coal sectors. Each of the more than 17,000 electric generating units in the United States is represented in the model. The model minimizes costs while meeting all specified constraints, such as demand, peak demand, emissions limits and transmission limits. The model determines investments to undertake and unit dispatch. Because the N_{ew}ERA model is an integrated model of the entire U.S. economy, electricity demand can respond to changes in prices and supplies.

The steam coal sector is represented within the N_{ew}ERA model by a series of coal supply curves and a coal transportation matrix. The N_{ew}ERA model represents the domestic and international crude oil and refined petroleum markets.

The N_{ew}ERA model outputs include demand and supply of all goods and services, prices of all commodities, and terms of trade effects (including changes in imports and exports). The model outputs also include gross regional product, consumption, investment, disposable income, and changes in "job equivalents" based on labor wage income.