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REGULATORY STUDIES CENTER

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Hearing on

**Review of Mercury Pollution's Impacts to  
Public Health and the Environment**

Before the

**Committee on Environment and Public Works  
Subcommittee on Clean Air and Nuclear Safety  
United States Senate**

April 17, 2012

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Chairman Carper, Ranking Member Barrasso, and distinguished members of the Subcommittee, thank you for inviting me to testify today on “mercury pollution’s impacts on public health and the environment.” I am Director of the George Washington University Regulatory Studies Center, and Research Professor in the Trachtenberg School of Public Policy and Public Administration.<sup>1</sup> From April 2007 to January 2009, I oversaw executive branch regulations of the federal government as Administrator of the Office of Information and Regulatory Affairs in the Office of Management and Budget. I have devoted my career to trying to improve both the framework for developing regulations and our understanding of regulations’ effects, and for over three decades have examined regulations from perspectives in government (as both a career civil servant and political appointee), academia, consulting, and the non-profit sector.

My testimony today focuses on the Environmental Protection Agency’s (EPA) estimates of the effects of its December 2011 regulations limiting mercury and air toxics emissions from electric utilities (“MATS”).<sup>2</sup>

EPA’s fact sheet highlights the benefits of the rule as reducing emissions of heavy metals, including mercury (Hg) and acid gases, which “are known or suspected of causing cancer and other serious health effects.” It focuses on mercury emissions from power plants, noting that

“once mercury from the air reaches water, microorganisms can change it into methylmercury, a highly toxic form that builds up in fish. People are primarily exposed to mercury by eating contaminated fish. Methylmercury exposure is a particular concern for women of childbearing age, unborn babies, and young children because studies have linked high levels of methylmercury to damage to the developing nervous system, which can impair children’s ability to think and learn.”<sup>3</sup>

According to EPA’s Regulatory Impact Analysis (RIA), regulatory preamble, and fact sheets, the mandated new control technologies will reduce mercury from coal-fired power plants by 90

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<sup>1</sup> The George Washington University Regulatory Studies Center raises awareness of regulations’ effects with the goal of improving regulatory policy through research, education, and outreach. This statement reflects my views, and does not represent an official position of the GW Regulatory Studies Center or the George Washington University.

<sup>2</sup> <http://www.gpo.gov/fdsys/pkg/FR-2012-02-16/pdf/2012-806.pdf>

<sup>3</sup> EPA Fact Sheet, “Mercury and Air Toxics Standards for Power Plants,” available at: <http://www.epa.gov/mats/pdfs/2011221MATSummaryfs.pdf>

percent, avoid as many as 11,000 premature deaths per year, and have annual economic benefits of up to \$90 billion per year.<sup>4</sup>

This testimony examines those benefits.

## **Public health effects of reductions in mercury and air toxic emissions**

Methylmercury (MeHg) is a neurotoxin that can impair children's cognitive function. In its analysis supporting the regulation, EPA focused "on exposure to MeHg through ingestion of fish, as it is the primary route for human exposures in the U.S., and potential health risks do not likely result from Hg inhalation exposures associated with Hg emissions from utilities."<sup>5</sup> Relying on IQ as a measure of neurological effects, EPA developed a model that involved complex chemical, biological, and physical interactions to estimate how microbes might convert Hg emitted by electric utilities into MeHg, and how that MeHg would accumulate through different trophic levels in the food web. This allowed the agency to estimate the average mercury concentrations in fish, which it combined with estimates of the consumption of freshwater fish by pregnant women, and a modeled concentration-response relationship between mercury ingestion and IQ loss to estimate the effect of mercury ingestion on the IQ of children exposed in-utero both with and without regulation.

Based on this modeling, EPA estimates the regulation will result in an increase of .00209 points in the average IQ of exposed children, for a total of 511 IQ points nationwide.<sup>6</sup> Because children in the US are exposed to mercury from other sources (natural sources, anthropogenic sources from other countries and non-utility U.S. sources), EPA estimates they will continue to experience a decrement of 23,909 IQ points nationwide after the rule is fully implemented. The rule will have reduced the IQ decrement from mercury exposure by 3 percent. EPA assigns a dollar value ranging from \$0.5 to \$6.2 million per year to these gains.

EPA was unable to quantify or value the health benefits of the other air toxic emissions that it expects this regulation will reduce.<sup>7</sup>

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<sup>4</sup> EPA provides links to several fact sheets and technical support documents from the following web page: <http://www.epa.gov/mats/actions.html>

<sup>5</sup> RIA, p. 119 <http://www.epa.gov/ttn/ecas/regdata/RIAs/matsriafinal.pdf>

<sup>6</sup> EPA estimates that in 2005, children exposed to mercury (from all sources) experience a decline of 0.1068 IQ points (relative to no exposure), for a total of 25,545 IQ points nationwide. Without the regulation, EPA estimates that in 2016, exposed children will face a 0.1000 IQ point decrement for a total of 24,419 IQ points nationwide (a 4% improvement). With the regulation in 2016, the analysis predicts exposed children will experience a 0.0979 IQ point decrement, for a total of 23,909 IQ points nationwide (a 3% improvement over the no-rule scenario).

<sup>7</sup> "Due to methodology and data limitations, we did not attempt to monetize the health benefits of reductions in HAPs in this analysis." (RIA 4-72)

If these were the only benefits of EPA's MATS rule, and if one took EPA's estimates of costs and benefits at face value, then the bottom line would be that the \$9.6 billion annual cost is between 1,500 and 19,000 times greater than the benefit.

## Co-benefits attributed to MATS

EPA goes on to argue that its rule will generate additional "co-benefits" that more than make it worthwhile. The benefits of controlling mercury and air toxics comprise less than one ten-thousandths of the total benefits reported for the mercury and air toxics rule. The claimed \$33 to \$90 billion per year in economic benefits and 11,000 in premature deaths avoided are derived instead by counting co-benefits that arise not directly from reducing toxic emissions, but from other things EPA's models predict will happen as beneficial side effects of the controls that will be required by the rule. (See figures showing composition of reported MATS rule benefits.)

One such co-benefit is a reduction in carbon emissions, which contribute to greenhouse gases in the atmosphere, but this benefit is relatively small (between one-half and one percent of the total benefits).

Ninety-nine percent of the benefits attributed to the MATS rule are derived by assigning high dollar values to reductions in emissions of fine particles (PM<sub>2.5</sub>), which are not the focus of this regulation and which are regulated elsewhere.

Section 108 of the Clean Air Act directs the EPA Administrator to set National Ambient Air Quality Standards (NAAQS) for PM<sub>2.5</sub> at a level that is "requisite to protect the public health ... allowing an adequate margin of safety." EPA must reevaluate these NAAQS every 5 years based on "air quality criteria [that] shall accurately reflect the latest scientific knowledge useful in indicating the kind and extent of all identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air, in varying quantities."<sup>8</sup> The agency last set NAAQS for PM<sub>2.5</sub> in 2006, and is reevaluating those levels now.<sup>9</sup>

EPA does not suggest that the MATS rule will help states meet the PM<sub>2.5</sub> NAAQS. Other federal and state regulations are designed to do that and, as far as I can tell, EPA correctly avoids double-counting those benefits here. Rather, EPA calculates almost all of its monetary benefits for this rule from PM<sub>2.5</sub> reductions well below the levels it has already determined are "protective of public health with an adequate margin of safety, taking into consideration effects

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<sup>8</sup> Clean Air Act §108(a)(2) The Supreme Court has confirmed EPA's interpretation that this statutory language precludes consideration of any impacts other than direct health effects from exposure to the pollutant.

<sup>9</sup> Information on the review is available here: [http://www.epa.gov/ttn/naaqs/standards/pm/s\\_pm\\_2007\\_fr.html](http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_2007_fr.html). While the spring 2010 Unified Agenda of Regulatory and Deregulatory Actions indicated a final PM<sub>2.5</sub> NAAQS rule would be issued in 2011 (<http://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201004&RIN=2060-AO47>), more recent agendas have not listed a rulemaking as forthcoming.

on susceptible populations.”<sup>10,11</sup> Using a linear, no-threshold assumption and attributing effects from small reductions in PM<sub>2.5</sub> at levels that are just measurable with modern techniques, the MATS RIA models thousands of premature mortalities from exposures to PM<sub>2.5</sub> concentrations it has determined to be protective.

These large benefits are difficult to reconcile with EPA’s determination that the 2006 standard was “requisite to protect public health” based on “latest scientific knowledge... of *all* identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air, in varying quantities.” If they are legitimate, EPA should confront them directly by lowering the PM<sub>2.5</sub> NAAQS, rather than going after them indirectly using statutory authority designed to reduce toxic air pollutants. Certainly, we would expect a PM<sub>2.5</sub> standard to achieve PM<sub>2.5</sub> reductions more cost-effectively than a standard directed at some other pollutant.<sup>12</sup>

Particularly disconcerting is the assertion that the rule will provide particular benefits to children,<sup>13</sup> when over 90 percent of the reported benefits are from averted premature deaths that EPA models will accrue to people with a median age of 80 years, who would live weeks or months longer as a result of the regulations.<sup>14</sup>

In principle, a benefit-cost analysis should be “complete.” It should include all the significant consequences of a policy decision: direct and indirect, intended and unintended, beneficial and harmful. In practice, all such analyses must to some degree fall short of completeness. The problem with EPA’s co-benefits exercise in the MATS rule is that it does not approach the problem objectively. On the benefits side of the equation, EPA quantifies or lists every conceivable good thing that it might attribute to a decision to set new emission limits, while on the cost side, it only considers the most obvious direct and intended costs of complying with the regulation. Thus it dismisses risks associated with reduced electric reliability, the competitiveness of the U.S. economy in international trade, or the effect that higher electricity prices will have on the family budget. The point is not that all such things can be included in the analysis, but that the boundaries of the analysis should be set with some regard to objective science. In the case of the MATS, the search for side-effects causes the benefits to rise by a multiple of 15,000 to 66,000, while the costs rise not at all.

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<sup>10</sup> The RIA states, “While benefits occurring below the standard may be less certain than those occurring above the standard, EPA considers them to be legitimate components of the total benefits estimate.” RIA, p. 23.

<sup>11</sup> [http://www.nera.com/nera-files/PUB\\_Smith\\_QualityAir\\_testimony\\_1011.pdf](http://www.nera.com/nera-files/PUB_Smith_QualityAir_testimony_1011.pdf)

<sup>12</sup> For a thorough discussion of this issue, see Anne Smith, “Technical Comments on the Regulatory Impact Analysis Supporting EPA’s Proposed Rule for Utility MACT and Revised NSPS (76 FR 24976),” available at: [http://www.nera.com/nera-files/PUB\\_Smith\\_EPA\\_report\\_0811.pdf](http://www.nera.com/nera-files/PUB_Smith_EPA_report_0811.pdf).

<sup>13</sup> See, for example, EPA’s press statements and blog: <http://blog.epa.gov/blog/2011/12/21/cutting-mercury/>

<sup>14</sup> See table 5-8 of U.S. EPA “The Benefits and Costs of the Clean air Act, 1990-2020,” March 2011. Available at: <http://www.epa.gov/air/sect812/feb11/fullreport.pdf>. For a critique of PM benefits, see: <http://www.cmpa.com/pdf/ReassessingCleanAirAug22.pdf>.

## Improving public health and welfare

The MATS regulation will make little progress toward reducing exposure to the toxic emissions that EPA is statutorily obligated to address. EPA estimates that U.S. utilities contribute about 1 percent of all anthropogenic mercury emissions,<sup>15</sup> and the agency was unable to quantify any health or welfare effects from the other air toxics targeted by the rule.

One would also be hard pressed to claim that the MATS rule would effectively advance the goal of increasing the IQ of children exposed to methylmercury. EPA's modeling indicates that, even if it could eliminate *all* mercury emissions from U.S. electric utilities, the IQ of affected children would improve by less than .003 points. EPA estimates that under the final rule, the average IQ of exposed children will improve by just .002 points.

To put this in context, EPA estimated that its 1986 regulations removing lead from gasoline would raise the average IQ of exposed children by 4 points – a factor of 2,000 greater than the per child benefits EPA attributes to the MATS rule.<sup>16</sup>

Further, the costs of the MATS rule alone could have negative impacts on the targeted populations. EPA expects the rule will increase the costs of electricity by an average of 3 percent nationwide, and over 6 percent in some parts of the country. These price increases could have a significant negative impact on the health and welfare of families, particularly low-income families. Not only will these increases directly affect the affordability of such things as heat and air conditioning, but higher electricity prices will increase the costs of food and other goods, and divert scarce family resources from priorities such as their children's education, or health care.

## Conclusions

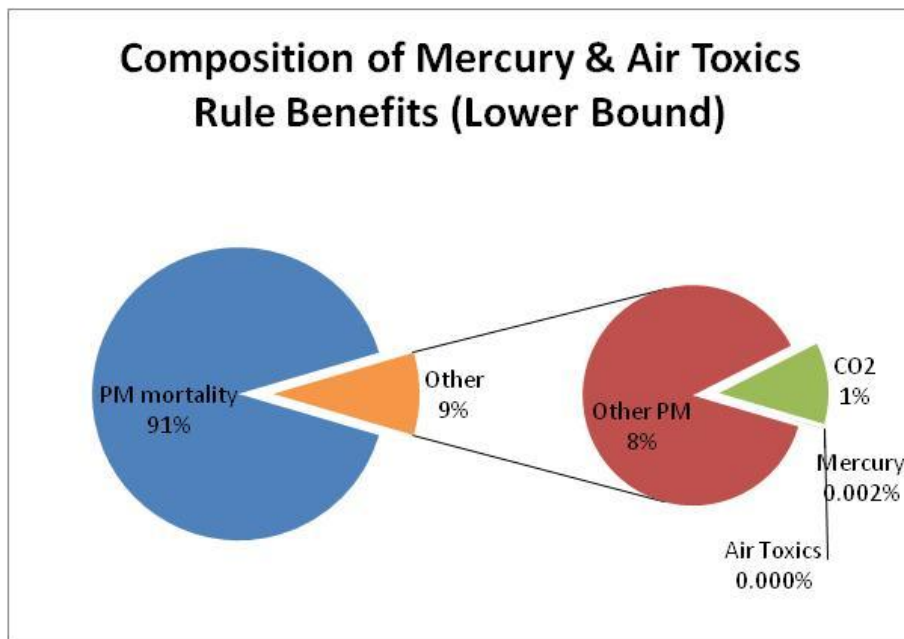
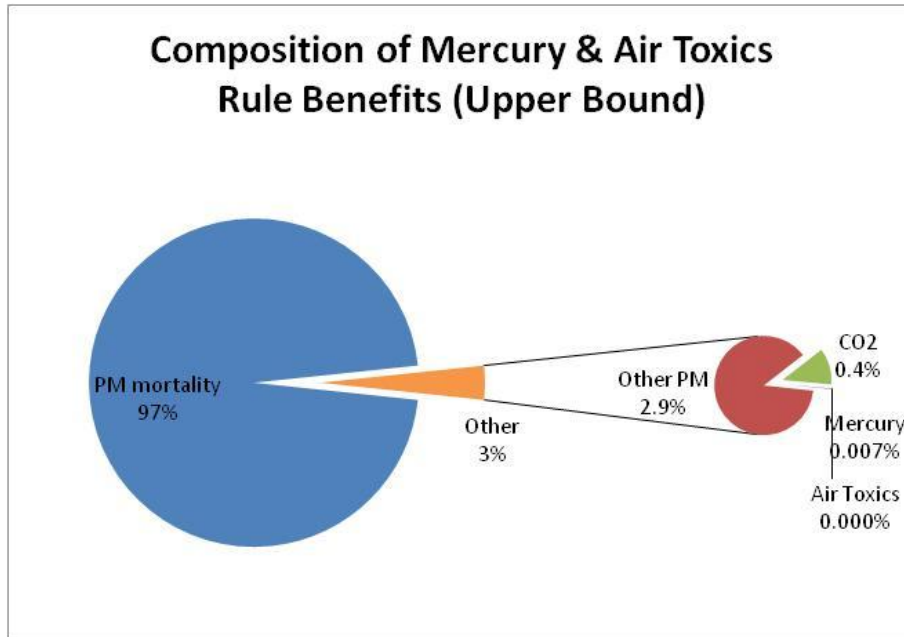
The emissions reductions resulting from MATS rule will do little to reduce children's exposure to methylmercury, and according to EPA's estimates, will have an infinitesimally small effect on their IQ and welfare. On the other hand, the estimated \$9.6 billion per year in costs will be borne by all Americans, who will pay more for electricity and anything that uses it. Not only

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<sup>15</sup> EPA's Risk Assessment Technical Support Document states "Current estimates of U.S. EGU mercury emissions are ~29 tons per year, compared with global anthropogenic mercury emissions, excluding biomass burning, estimated at approximately 2,320 tons. Available at: <http://www.epa.gov/airquality/powerplanttoxics/pdfs/20111216MercuryRiskAssessment.pdf>

<sup>16</sup> EPA, "Costs and Benefits of Reducing Lead in Gasoline: Final Regulatory Impact Analysis," February 1985. EPA-230-05-85-006. Available at: [http://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0034-1.pdf/\\$file/EE-0034-1.pdf](http://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0034-1.pdf/$file/EE-0034-1.pdf) Recent research reinforces the dramatic improvements in IQ and welfare world-wide as a result of reduced exposure to lead. See Tsai and Hatfield, "Global Benefits from the Phaseout of Leaded Fuel," *Journal of Environmental Health*; Dec2011, Vol. 74 Issue 5, p8-14, 7p

will the rule increase the cost of heating, air conditioning, food, and other goods and services that contribute to public health, but it will divert scarce resources from much more pressing problems and activities that could contribute to improved health and economic well-being.



Source: U.S. EPA Final MATS RIA Tables 4-7 and 5-19.  
<http://www.epa.gov/ttn/ecas/regdata/RIAs/matsriafinal.pdf>