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PUBLIC INTEREST COMMENT

CONTROL OF AIR POLLUTION FROM MOTOR VEHICLES: Tier 3 Motor Vehicle Emission and Fuel Standards RIN 2060-AQ86

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INTRODUCTION

The Regulatory Studies Program of the Mercatus Center at George Mason University is dedicated to advancing knowledge about the effects of regulation on society. As part of its mission, the program conducts careful and independent analyses that employ contemporary economic scholarship to assess rulemaking proposals and their effects on the economic opportunities and the social well-being available to all members of American society.

This comment addresses the efficiency and efficacy of this proposed rule from an economic point of view. Specifically, it examines how the proposed rule may be improved by more closely examining the societal goals the rule intends to achieve and whether this proposed regulation will successfully achieve those goals. In many instances, regulations can be substantially improved by choosing more effective regulatory options or more carefully assessing the actual societal problem.

SUMMARY

The Environmental Protection Agency (EPA) is proposing new vehicle emissions standards and a reduction in the sulfur content legally permitted in gasoline. According to the EPA, these new standards will generate improvements to the environment and to public health, primarily by lowering the emissions of pollutants, like particulate matter (PM) and ozone. The EPA believes these pollutants contribute to increases in human mortality and other health problems.

We find that the EPA has failed to acknowledge the high degree of uncertainty surrounding its estimates of benefits from this regulation. A growing literature calls into question the causal link

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between the total concentration of ambient particulate matter and mortality levels, especially at the low doses that exist today in many parts of the United States. Additionally, the EPA failed to consider other adverse effects of its rules, such as impacts on low-income individuals and adverse employment effects that were overlooked in the EPA's scant employment impact analysis.

UNCERTAINTY ABOUT BENEFITS ESTIMATES

While the EPA should be commended for pursuing the laudable goal of a cleaner environment and improvements in public health, there are several reasons to be skeptical of the benefits the EPA has claimed will result from this regulation.

First, over 50 percent of the quantified benefits from the regulation are due to reductions in total particulate matter. However, a growing literature raises doubts about the causal link between ambient $PM_{2.5}$ levels and increases in mortality. Additionally, the EPA regulates both PM and Ozone under the National Ambient Air Quality Standards (NAAQS), which makes the proposed regulation an indirect, and perhaps impractical, way to achieve the EPA's objectives.

Additionally, there is a high degree of uncertainty, which the EPA itself acknowledges, surrounding the EPA's benefits estimates. For example, the EPA describes criticisms related to its uncertainty analysis made by the National Resource Council in a 2002 report.[1] Despite the EPA's acknowledgement of these criticisms, the EPA continues to evaluate uncertainty in a similar manner.[2] The EPA also acknowledges uncertainty with regards to its benefits analysis, including these points from table 8-16 of the Regulatory Impact Analysis for the rule:

1. The extrapolation of effect estimates is beyond the range of ozone or PM concentrations observed in the source epidemiological study.

2. Direct causal agents within the complex mixture of PM have not been identified.

Each point is important. First, the EPA states that its estimates go beyond those confirmed in the epidemiological study upon which it bases its findings. This means benefits of the regulation are based primarily upon model selection, not empirical evidence. The EPA assumes a linear-dose response down to the origin, resulting in large benefits estimates. Selecting another model, such as a threshold- or hormetic-dose response at low doses, would produce vastly lower benefits estimates. Recent academic literature has suggested there may be reason to believe PM exhibits a hormetic-dose response at low doses.[3]

Next, the EPA fails to address whether the concentration of total particulate mass or the composition of those particulates are the cause of the health effects found in the cited studies. Moreover, because the composition of rural particulates is different from urban particulates, the health effects are likely to be different than those estimated.[4] In order to provide a causal link, the EPA should be able to determine which components of particulate matter are the sources of the higher morbidity and mortality rates. For instance, Bell finds that higher concentrations of $PM_{2.5}$ Nickel are associated with higher rates of cardiovascular or respiratory hospitalizations.[5]

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1. Committee on Estimating the Health-Risk-Reduction Benefits of Proposed Air Pollution Regulations, National Research Council, *Estimating the Public Health Benefits of Proposed Air Pollution Regulations* (Washington, DC: National Academies Press, 2002).
2. EPA, *Draft Regulatory Impact Analysis: Tier 3 Motor Vehicle Emission and Fuel Standards* (Washington, DC: 2013) 8–29.
3. L.A. Cox Jr., "Hormesis for Fine Particulate Matter (PM2.5)," *Dose-Response* 10, no. 2 (2012): 209–218, doi: 10.2203/dose-response.11-040.Cox.
4. Venkatesh Rao, Neil Frank, Alan Rush, and Fred Dimmick, "Chemical Speciation of PM2.5 in Urban and Rural Areas," *National Air Quality and Emissions Trends Report*, 2003 Special Studies Edition, U.S. Environmental Protection Agency. EPA Publication No. EPA 454/R-03-005.
5. Michelle L. Bell, HEI Health Review Committee, "Assessment of the Health Impacts of Particulate Matter Characteristics," *Research Report*

As Bell et al. conclude:

> Because of these limitations, health risks could be associated with the true concentrations of a component or set of components that co-varies with $PM_{2.5}$ total mass, even if measured concentrations in this data set do not co-vary with $PM_{2.5}$ total mass because of measurement error. Further, we did not investigate the possibility that observed $PM_{2.5}$ health effects could result from a set of components with a collective concentration that co-varies with $PM_{2.5}$ total mass, although individual component concentrations do not.[6]

Without a clear link between the chemical components of $PM_{2.5}$ that are associated with health effects, the EPA is left to assume that the overall level of $PM_{2.5}$ is the source of health risks, rather than particular components of the total $PM_{2.5}$. If the health effects are due to a particular component, a more targeted, lower-cost, and potentially higher-benefit air pollution regulation might be warranted. The EPA does acknowledge that the causal connection between PM and human health outcomes is uncertain, as point 2 above demonstrates.

Points 1 and 2 above imply that a benefits estimate of zero is within the realm of possibility for benefits resulting from reductions in particulate matter. Acknowledging this uncertainty should be a part of the Regulatory Impact Analysis (RIA). Elsewhere in the RIA, the EPA acknowledges that the "EPA estimated PM-related mortality without applying an assumed concentration threshold (section 8-9 of RIA)." Thus, the EPA assumes PM-related health benefits continue all the way down to very low levels. However, Cox has shown that there may be a hormetic-, or J-shaped-, dose-response curve for PM at low dose levels.[7] If true, this implies there may be no negative health effects and potentially even health *benefits* to PM exposure at low-dose levels, rather than the harm the EPA assumes by model selection. Elsewhere, Cox has argued that the causal link between PM and human health benefits has not been adequately demonstrated at low doses.[8] The EPA appears to be pointing to correlations without assessing whether causation is present. Fortunately, there are tests that can be done to demonstrate causation.[9] The EPA would benefit from running these tests with the data available and presenting these results to the public.

Additionally, Lutter and Fraas show that uncertainties surrounding benefits estimates from PM reductions may greatly exceed those that the EPA acknowledges in previous analyses for PM-related rules.[10] Lutter and Fraas give the EPA the benefit of the doubt and assume a causal relationship exists between PM and increases in mortality. They go on to demonstrate that benefits estimates vary greatly by modifying assumptions such as the value of reducing mortality risk or whether the toxicity is above or below the average for fine particles.

Other experts in the field of environmental risk assessment have shown similar skepticism about the benefits of PM-related regulations.[11] For example, the number of lives saved may be vastly overstated.

(Health Effects Institute) 161 (Jan. 2012): 5–38. PubMed PMID: 22393584.

6. Michelle L. Bell, Francesca Dominici, Keita Ebisu, Scott L. Zeger, and Jonathan M. Samet, "Spatial and Temporal Variation in PM2.5 Chemical Composition in the United States for Health Effects Studies," *Environmental Health Perspectives* 115, no. 7 (July 2007): 989–995, doi: 10.1289/ehp.9621.

7. Cox, "Hormesis for Fine Particulate Matter."

8. See for example L. A. Cox Jr., "Miscommunicating Risk, Uncertainty, and Causation: Fine Particulate Air Pollution and Mortality Risk as an Example," *Risk Analysis* 32, no. 5 (2012): 765–767.

9. L. A. Cox Jr., "Improving Causal Inferences in Risk Analysis," George Washington University Regulatory Studies Center Working Paper, George Washington University, Washington, DC, 2012.

10. Art Fraas and Randall Lutter, "Uncertain Benefits Estimates for Reductions in Fine Particle Concentrations," *Risk Analysis* 33 (2013): 434–449, doi: 10.1111/j.1539-6924.2012.01883.x.

11. *Prepared Statement at a Hearing on "Quality Science for Quality Air," Before the Subcommittee on Energy and the Environment, Committee on Science, Space, and Technology*, 112th Cong., (October 4, 2011) (statement of Anne E. Smith).

The EPA's methodology appears to be at odds with the very standards it applied to its own analyses prior to 2009.[12] The EPA even acknowledges this methodological problem in point 1 above. Smith estimates that the EPA's assumptions could lead to the highly unlikely conclusion that 25 percent of all deaths in the United States as recently as 1980 were related to concentrations of $PM_{2.5}$.There are also several unusual aspects to this rule worth mentioning. First, a revision of the ozone NAAQS standards was recently returned to the EPA by the Administrator of the Office of Information and Regulatory Affairs.[13] The EPA was urged to reconsider its ozone proposal until after a new review of the scientific literature has been conducted by the Clean Air Science Advisory Committee (CASAC). The EPA may want to consider following the same advice for this regulation since it is also related to ozone.

Another unusual aspect of the regulation is that one outcome the agency identifies as a basis for regulating is to help states and localities comply with other EPA regulations. The Notice of Proposed Rulemaking (NPRM) states, "these reductions would help state and local agencies in their effort to attain and maintain health-based National Ambient Air Quality Standards (NAAQS)."[14] The EPA should allow states flexibility to achieve standards in ways they think are best, rather than mandating how to comply through further regulations.

It is also odd that the EPA would seek to reduce PM levels beyond those the EPA just finalized in new NAAQS standards for PM in January. If there are so many unclaimed benefits from reducing PM, why not make the NAAQS standards even lower when the EPA had the chance? At a minimum, the EPA should explain its reasoning on this matter. It seems odd to use Tier 3 gasoline standards to reduce PM levels when the EPA has the authority to reduce PM directly through the NAAQS.

EMPLOYMENT EFFECTS

The EPA cites three different ways in which regulations may impact employment: demand effects, cost effects, and factor-shift effects. The first method reduces employment in a regulated industry, the second increases it, and the last effect is ambiguous. However, the EPA should be careful to acknowledge that both jobs gained and jobs destroyed are costs of the proposed regulation. Ideally, compliance jobs should be minimized, not viewed as a benefit of a regulation.[15]

The EPA should consider some of the long-term effects of its rules on those who lose their jobs at this unusual moment in time, with unemployment at a level that exceeds historical norms. The literature shows that these effects can be significant. For example, recent estimates of earning losses resulting from job loss range from 1.4 years of earnings in times of low unemployment to 2.8 years during times of high unemployment.[16] Similarly, research shows that after reemployment it can take as long as 20 years for workers to catch up on lost earnings, largely due to skill mismatches between the jobs lost and the new jobs created in the economy.[17] Additionally, the EPA should acknowledge that those who lose jobs and those who gain them are not in fact the same individuals; vastly different skill sets may be required in one type of employment relative to the other. Moving from one area of employment to the other may require significant skills retraining if those laid off are to be reemployed in the new line of compliance work.

12. Anne E. Smith, "An Evaluation of the $PM_{2.5}$ Health Benefits in Regulatory Impact Analysis for Recent Air Regulations," *NERA Economic Consulting Report*, December 2011.
13. See OIRA Administrator Cass Sunstein to EPA Administrator Lisa Jackson on September 2, 2011, http://www.whitehouse.gov/sites/default/files/ozone_national_ambient_air_quality_standards_letter.pdf
14. Environmental Protection Agency,"Control of Air Pollution From Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards," 78 Fed. Reg. 98 (May 21, 2013).
15. See for example Keith Hall, "Goodbye to Green Jobs, You Won't Be Missed," *Forbes*, April 4, 2013, http://www.forbes.com/sites/realspin/2013/04/04/goodbye-to-green-jobs-you-wont-be-missed/.
16. Keith Hall, "The Employment Costs of Regulation." (Working Paper No. 13-06, Mercatus Center at George Mason University, Arlington, VA, March 2013), http://mercatus.org/publication/employment-costs-regulation.
17. Ibid.

REGRESSIVE EFFECTS

While the EPA estimates that that this regulation will have a minimal impact (approximately one penny) on fuel costs, others have estimated the impact to be significantly greater, perhaps as much as 9 cents per gallon.[18] Exactly how much gasoline prices may rise is difficult to say, but given that energy costs consume a higher proportion of low-income individuals' income relative to high-income individuals, it is worth acknowledging that this regulation may impose a disproportionate impact on low-income individuals. Similarly, recent academic research has shown that regulations, such as the proposed regulation, are often more in line with risk preferences of wealthy households.[19] It is unlikely that poor households are worried about the risks posed from $PM_{2.5}$ and ozone when they face much larger risks elsewhere in their lives. The income they lose to comply with this regulation may be better utilized toward other risk mitigation.

CONCLUSION

The EPA has issued this regulation as a result of the authority granted it by the Clean Air Act. Given that this regulation is not required by statute, the EPA would be well advised to consider holding off on issuing such a regulation until the benefits are more certain. Finally, the EPA should go further to estimate unintended effects of its rules on employment and on low-income populations.

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18. David Tamm and Kevin Milburn, "Addendum to Potential Supply and Cost Impacts of Lower Sulfur, Lower RVP Gasoline," (American Petroleum Institute, Houston, TX, March 2012).
19. Diana Thomas, "Regressive Effects of Regulation." (Working Paper No. 12-35, Mercatus Center at George Mason University, Arlington, VA, November 2012), http://mercatus.org/publication/regressive-effects-regulation.