March 28, 2023

Dr. Lars Perlmutt
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U.S. Environmental Protection Agency

Re: Reconsideration of the National Ambient Air Quality Standards for Particulate Matter

EPA–HQ–OAR–2015–0072; FRL–8635–01–OAR, RIN 2060–AV52

Via: Regulations.gov

Dear Mr. Perlmutt,

Thank you for the opportunity to provide comments on the Proposed Rule[1] in this docket concerning the Environmental Protection Agency's (EPA's) reconsideration of the air quality criteria and the national ambient air quality standards (NAAQS) for particulate matter (PM). In the Proposed Rule, EPA seeks to tighten the primary annual PM2.5[2] standard but retain the current levels of other PM standards. The comments below explain why EPA should retain the primary annual PM2.5 standard at its current level of 12 $\mu g/m^3$.

EXECUTIVE SUMMARY

The EPA should follow the latest science and retain today's PM2.5 standards. In tightening the primary annual PM2.5 standard, the Proposed Rule:

1. Weakens the American economy;
    A. Contributes to the continued deindustrialization of America;
    B. Harms public health by exacerbating poverty;
    C. May threaten electric grid reliability;
2. Is political rather than scientific;
3. Overestimates the economic cost of PM2.5 exposure;
4. Does not establish harm from exposure to very low concentrations of PM2.5;
5. Fails to distinguish the health effects from different chemical species of PM2.5;
6. Violates the Unfunded Mandates Reform Act; and
7. Violates the Clean Air Act.

Considering the deficiencies in the Proposed Rule and the many uncertainties surrounding the health impacts from exposure to very low concentrations of PM2.5, EPA should decline to move forward with a final rule in this matter.

1. THE PROPOSED RULE WEAKENS THE AMERICAN ECONOMY

The impact of the Proposed Rule will be to limit economic activity that produces—or is deemed by regulators to produce—emissions of PM2.5 above the new, stricter annual average

[1] Reconsideration of the National Ambient Air Quality Standards for Particulate Matter, Docket ID No. EPA–HQ–OAR–2015–0072, January 27, 2023
[2] EPA explains that PM2.5 means "fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller." https://www.epa.gov/pm-pollution/particulate-matter-pm-basics

concentration. In communities that are deemed "out of compliance" with the proposed standard, regulators will constrain business growth, industrial and agricultural activity, and the jobs and economic prosperity that would be created if the standard were to remain unchanged. Specifically, the Proposed Rule will exacerbate three major problems discussed below: the continued deindustrialization of America, unacceptable levels of poverty, and an increasingly fragile electric grid. Each of these problems would have profound public health impacts. Given the calamitous harm it would cause to establish a PM2.5 standard at too low a level, the EPA should be certain it has a sound scientific basis to claim a compelling health need to tighten the PM2.5 standard as proposed.

A. THE PROPOSED RULE CONTRIBUTES TO THE CONTINUED DEINDUSTRIALIZATION OF AMERICA

The current explosion in business regulations, particularly mandates in environment and energy, must be reversed if the U.S. is to maintain its position of global economic leadership. The Proposed Rule piles onto the litany of regulation that is stifling American industry and forcing industrial activity overseas. Even if the Biden Administration has no interest in ensuring a robust domestic manufacturing industry, it should care about the negative impacts of regulations like the Proposed Rule on its own climate agenda.

To take one example—the mining of rare earth minerals—the Biden Administration seems to be preventing via regulations the very transition it foisted upon the American people with the partisan Inflation Reduction Act. In promulgating new regulations, the EPA Administrator should consider the ability of the U.S. to meet the energy and mineral requirements of the Biden Administration's goal to achieve a Net Zero electric grid by 2035.[3]

Further, deindustrializing the American economy cedes necessary mining and manufacturing activity to parts of the world with the worst track records regarding pollution. In addition to China's poor overall environmental stewardship and astronomical levels of particulate matter pollution, China's use of forced labor in the energy-technology sector is morally abhorrent. The EPA should not surrender American industry to parts of the world that have objectionable environmental standards and forced labor.[4]

B. THE PROPOSED RULE HARMS PUBLIC HEALTH BY EXACERBATING POVERTY

Restricting economic growth harms public health. If EPA chooses to continue tightening the annual PM2.5 standard, the effect could be to cripple entire industries and stifle economic growth. This is one of the many reasons EPA should decline to tighten the PM2.5 standard at all, let alone to the very low levels it discussed in the Proposed Rule, such as 9 $\mu g/m^3$.

Heritage Foundation modeling shows that policies aimed at eliminating the use of hydrocarbons would have devastating effects on Americans' livelihoods. Below is an illustrative look at the impact of anti-industrial policy on jobs and incomes. To estimate the impacts of the Green New Deal, Heritage pushed the government's model to the breaking point by implementing a 56

[3] https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions/executive-summary
[4] https://www.nytimes.com/2022/06/20/business/economy/forced-labor-china-supply-chain.html

percent reduction in CO_2 emissions from 2010 levels (achieved by ramping up a CO_2 tax to $300/ton). The results of such a policy regime were estimated to be:

- An overall average shortfall of over 1.1 million jobs;
- A peak employment shortfall of over 5.2 million jobs;
- A total income loss of more than $165,000 for a family of four;
- An aggregate gross domestic product loss of over $15 trillion; and
- Increases in household electricity expenditures averaging 30 percent.[5]

The health impacts of declining economic prosperity and increasing poverty can be devastating. The Department of Health and Human Services notes:

> Across the lifespan, residents of impoverished communities are at increased risk for mental illness, chronic disease, higher mortality, and lower life expectancy. Children make up the largest age group of those experiencing poverty. Childhood poverty is associated with developmental delays, toxic stress, chronic illness, and nutritional deficits. Individuals who experience childhood poverty are more likely to experience poverty into adulthood, which contributes to generational cycles of poverty. In addition to lasting effects of childhood poverty, adults living in poverty are at a higher risk of adverse health effects from obesity, smoking, substance use, and chronic stress. Finally, older adults with lower incomes experience higher rates of disability and mortality.[6]

Even if the EPA's sole concern is protecting public health, it should not deindustrialize the U.S. because of the dire public health problems associated with economic decline and poverty.

C. THE PROPOSED RULE MAY THREATEN ELECTRIC GRID RELIABILITY

Compliance with stricter PM2.5 standards could threaten the operation of existing coal, oil, and natural gas-fueled electric generation resources. Unfortunately, the Proposed Rule does not explain the extent to which EPA may have consulted with the Federal Energy Regulatory Commission (FERC)—the agency responsible for ensuring the reliability of the bulk power system—or the North American Electric Reliability Corporation (NERC).

In its most recent Long Term Reliability Assessment (LTRA), NERC highlighted the acute grid reliability problems facing the United States in the near term. The LTRA states that "[w]ithin the 10-year horizon, over 88 GW of generating capacity is confirmed for retirement."[7] For context, the same report states that the combined on-peak capacity of wind and solar in 2022 is just 70 GW, far short of the known retirements in the near term.

Speaking to the press about the report, John Moura, NERC's director of reliability assessment and performance analysis, said "[w]e are living in extraordinary times, from an electric industry perspective. There are extraordinary reliability challenges and opportunities in front of us."[8]

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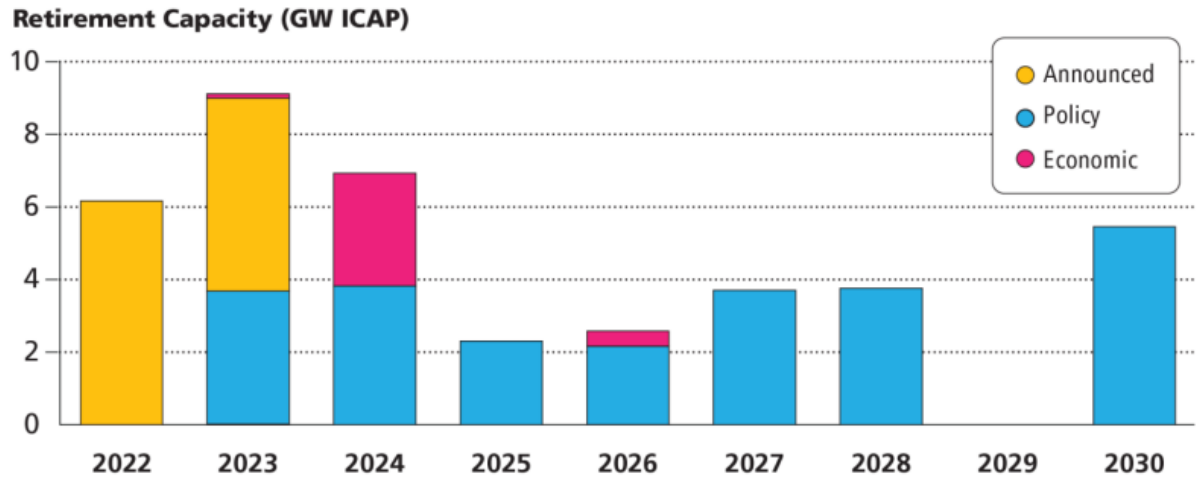
[5] https://www.heritage.org/sites/default/files/2019-07/BG3427.pdf
[6] https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/poverty
[7] https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2022.pdf
[8] https://www.utilitydive.com/news/nerc-grid-resource-adequacy-shortfall-reliability-assessment/638949/

NERC has been warning about the speed of the energy transition for years. Moura told reporters: "Just to say it for the fourth or fifth time: Managing the pace of our generation retirements and our resource changes to ensure we have enough energy and essential services is an absolute necessity."[9]

PJM Interconnection, the largest regional transmission organization in the U.S., has sounded similar alarms regarding the rapid retirement of generation resources. PJM notes:

> Historically, thermal resources have provided the majority of the reliability services in PJM. Today, a confluence of conditions, including state and **federal policy requirements**, industry and corporate goals requiring clean energy, reduced costs and/or subsidies for clean resources, **stringent environmental standards**, age-related maintenance costs, and diminished energy revenues are hastening the decline in thermal resources.[10]

The following figure illustrates forecast retirements in PJM, of which policy-driven retirements comprise the majority. The total expected closures—40 GW—represent 21 percent of PJM's installed generating capacity.



Taken together, the suite of EPA regulations facing the electricity sector (including the Proposed Rule) poses a significant threat to the reliable operation of the nation's bulk power system. The Administrator should consider electric reliability impacts among the adverse public health, welfare, social, economic, and energy effects resulting from compliance with the new standard. Further, the connection between access to electric power and public health is well established—blackouts are clearly a public health hazard.[11]

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[9] *Id*

[10] https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx (emphases added)

[11] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7749027/

2. THE PROPOSED RULE IS POLITICAL RATHER THAN SCIENTIFIC

Under Section 109(b)(1) of the Clean Air Act, the EPA Administrator has the authority to set the primary annual PM2.5 NAAQS standard at a level "which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health."[12] Historically, the question of whether such level was chosen through an arbitrary and capricious process—not to mention key statutory interpretation of the Clean Air Act by the EPA—received little scrutiny from the courts.[13]

Also, despite the Proposed Rule and its precursors establishing safe concentrations of ambient PM2.5, the EPA continues to cite PM2.5 co-benefits in justifying rules concerning other pollutants, such as the Mercury and Air Toxics Standard under EPA's authority to set standards for Hazardous Air Pollutants. The double-counting problem is well established.[14]

The new wrinkle in the Proposed Rule is its explicit connection to the Biden Administration's climate agenda. The Proposed Rule clearly states that it is motivated by an executive order:

> On January 20, 2021, President Biden issued an "Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis" (Executive Order 13990; 86 FR 7037, January 25, 2021), which directed review of certain agency actions. An accompanying fact sheet provided a non-exclusive list of agency actions that agency heads should review in accordance with that order, including the 2020 Particulate Matter NAAQS Decision.[15]

As a preliminary matter, NAAQS decisions should be based on sound science, not a politically motivated executive order purporting to "tackle the climate crisis." Also, by following the directive of an EO rather than the normal five-year review process, EPA invites questions about compliance with the Administrative Procedure Act. House Republicans on the Energy and Commerce Committee raised this concern in an October 14, 2022 letter to Administrator Regan, in which they questioned whether the EPA can "remain sufficiently open minded."[16]

Further, EO 13990 and the Proposed Rule are based on questionable premises. Specifically, the studies informing EO 13990:

1. Favor climate risk assessments based on warm-biased models run with warm-biased emissions scenarios.
2. Attribute to climate change damages that chiefly reflect societal factors such as increases in population and exposed wealth.
3. Overlook the increasing sustainability of our chiefly fossil-fuel-powered civilization.

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[12] https://www.law.cornell.edu/uscode/text/42/7409

[13] In fact, the practice of affording "Chevron deference" to Administrative agencies originated in a NAAQS case: https://www.everycrsreport.com/reports/R43203.html

[14] See https://www.scientificamerican.com/article/planned-changes-to-epa-pollution-analyses-align-with-industry-requests/

[15] Proposed Rule at page 5567

[16] https://energycommerce.house.gov/posts/e-and-c-republicans-urge-epa-not-to-shortcut-review-of-proposed-air-quality-standards-to-avoid-destroying-local-economies

4. Assume away the capacity for adaptation to mitigate climate change damages.
5. Underestimate the resilience of financial markets to climate-related risks.
6. Exaggerate the political prospects of the NetZero agenda.
7. Ignore the vast potential of climate policies to destroy jobs and growth.
8. Overlook the economic, environmental, and geopolitical risks of mandating a transition from a fuel-intensive to a material-intensive energy system.
9. Downplay the regulatory impediments to building a "clean energy economy."
10. Ignore the systemic risks that would be created if the EPA pursues an extreme anti-fossil-fuel policy agenda—an ideologically charged, mandate- and subsidy-fueled "green" investment bubble.[17]

Assuming the entire United States could eliminate all greenhouse gas emissions immediately, the leading climate models predict that doing so would only mitigate global temperatures by less than 0.2 degrees Celsius by the year 2100.[18]

As disturbing as it is, a non-science-based policy agenda at the EPA is nothing new. President Obama, in responding to a question about the EPA's ability to regulate greenhouse gas emissions, said in 2010 that "Cap and trade was just one way of skinning the cat; it was not the only way. It was a means, not an end. And I'm going to be looking for other means to address this problem."[19]

Administrator Regan continues this pattern of using EPA rules to achieve a White House-dictated policy agenda that is not based on strong science. In a speech last year at CERAWeek in Houston, Regan said:

> The adverse health effects alone from power plant-related air pollution are valued at $80 billion per year, and that is before we consider the costs of climate change. … Over the past two decades, thanks to much of your leadership, the cost of renewable energy technology has plummeted – making it competitive with existing coal and gas generation. … This is a pivotal moment for the sector, and EPA is ready to seize it. … If EPA's actions unfold while the rest of the federal family, leading states, and leading firms in the sector are mobilizing their tools and resources, then our actions and the clean-energy investment signals they send, will work as they should – hand in glove.[20]

EPA clearly sees its role as supportive of a broader political scheme to advance the interests of the renewable energy industry and climate alarmists who think the U.S. can "tackle the climate crisis." This dynamic is troubling because American consumers and taxpayers are bearing the brunt of state and federal policies to force a transition to more renewables in the power sector.

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[17] For a detailed explanation of each of these flawed premises, see: https://cei.org/wp-content/uploads/2022/06/CEI-Lewis-Comments-SEC-Climate-Risk-Disclosure-June-17-2022-Final-Amended-Version-with-changes-accepted.docx.pdf

[18] Kevin Dayaratna, Katie Tubb, and David Kreutzer, "The Unsustainable Costs of President Biden's Climate Agenda," The Heritage Foundation, *Backgrounder* No. 3713, June 16, 2022, https://www.heritage.org/sites/default/files/2022-06/BG3713_0.pdf

[19] https://obamawhitehouse.archives.gov/the-press-office/2010/11/03/press-conference-president

[20] https://www.epa.gov/speeches/administrator-michael-regan-remarks-ceraweek-about-epas-approach-deliver-certainty-power

The EPA and the Biden Administration should desist from pursuing the goals stated in EO 13990—and should forgo attempting to achieve via regulation what Democrats have been unable to accomplish via legislation.

Political considerations also appear to have influenced the makeup of the ostensibly independent advisory body called the Clean Air Scientific Advisory Committee (CASAC). E&E News noted the problems with the CASAC shakeup and quoted former Heritage Foundation Senior Research Fellow Daren Bakst as saying, "This shocking move, made before the EPA's decision to review the standards, certainly gives the impression, right or wrong, that the administrator wants to hear only from those who will support President Biden's agenda."[21]

The E&E article also notes that the "CASAC dismissals, as well as a similar wholesale shakeup of another EPA advisory panel, are the target of a lawsuit brought by two former members who were among those fired." Firing dissidents may seem like an expedient way to appear to reach consensus among experts, but it only worsens EPA's politicization problem.

3. THE PROPOSED RULE OVERESTIMATES THE HEALTH RISK AND ECONOMIC COST OF EXPOSURE TO HIGH CONCENTRATIONS OF PM2.5

Undoubtedly there is a health risk from exposure to very high concentrations of PM2.5. Indeed, there is a clear understanding of the phenomenon of cigarette smoking and the attendant public health problems. However, smoking cigarettes exposes the smoker to *incredibly* high PM2.5 concentrations. Steve Milloy writes:

> Smokers are exposed to relatively immense amounts of PM2.5 as compared to levels in outdoor air. Someone breathing typical U.S. outdoor air, may inhale 100 micrograms (millionths of a gram) per day of PM2.5. Smoking a single cigarette, however, exposes a smoker to 10,000 to 40,000 micrograms in just a few minutes.[22]

How does this acknowledgement of the PM2.5 exposure from smoking help inform the health risk and economic cost of PM2.5 exposure? First, it offers a counterpoint to the idea that PM2.5 is acutely deadly. We understand that smoking causes health problems such as lung cancer in the long term. What is less clear is whether, if the EPA is correct about the acute deadliness of PM2.5, we should witness smokers dropping dead as they inhale tobacco smoke. As stated above, a single cigarette exposes a smoker to levels of PM2.5 well over 100 times higher than present PM2.5 standards allow for an entire day. In order for the epidemiological studies linking PM2.5 pollution to acute illness and death to be true, smoking would also have to trigger *acute* illness and death in addition to the long-term health effects primarily associated with smoking.

Second, noting that approximately 12.5 percent of the American public voluntarily smokes cigarettes,[23] it seems questionable that the EPA would place a high average value on avoiding premature death from exposure to PM2.5 based on an individual's willingness to pay. Because

[21] https://www.eenews.net/articles/epa-science-advisers-unanimously-back-tighter-soot-limits/
[22] https://cei.org/sites/default/files/Steve_Milloy_-_Will_CAFE_Reform_Proposal_Create_Deadly_Air_Pollution%20%281%29.pdf
[23] https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm

12.5 percent of the American people go out of their way to inhale PM2.5, something is amiss in EPA's approach to individual preferences regarding safety from inhaled particles. In other words, avoidance of PM2.5 exposure is not a universal value across the population, and hence EPA's high assumed value for PM2.5 avoidance may be a significant overestimate.

Further, a study of air pollution in California, which has the highest non-attainment of PM2.5 standards in the country, did not find conclusive connections between PM2.5 and acute deaths:

> Our analysis finds little evidence for association between air quality and acute deaths. These results are consistent with those for the widely cited [National Morbidity and Mortality Air Pollution Study] dataset when the latter are restricted to California. The daily death variability was mostly explained by time of year or weather variables; Neither PM2.5 nor ozone added appreciably to the prediction of daily deaths. These results call into question the widespread belief that association between air quality and acute deaths is causal/near-universal.[24]

EPA establishes NAAQS standards based on public health considerations rather than cost, so the importance of getting an accurate estimate of the cost of PM2.5 exposure may not change the outcome of this rulemaking process. However, it could have profound effects on cost-benefit analyses for other EPA programs, such as the Hazardous Air Pollutant rules and relevant rulemakings like the Mercury and Air Toxics Standard. A more accurate estimate of "co-benefits" from PM2.5 removal would improve cost-benefit assessments for EPA rules across the board.[25]

4. THE PROPOSED RULE DOES NOT ESTABLISH HARM FROM EXPOSURE TO VERY LOW CONCENTRATIONS OF PM2.5

Although problems associating harm and death with PM2.5 exposure are difficult enough at higher concentrations, the associations become more tenuous as exposure levels fall. One group of researchers characterized the problem of comparing high versus low concentrations as follows:

> Molecular epidemiological research is expanding; however, studies are only being conducted in specific localities with high levels of ambient and indoor air pollution, which appear to be emphasized in the literature. This complicates the interpretation of general and local influences of air pollutants with the potential to cause significant health problems; hence, the conclusions from these studies have been deemed questionable in terms of their generalizability to other parts of the world.[26]

What happens when people are exposed to ever-shrinking concentrations of PM2.5? EPA's methodology for risk assessments, especially its application of a linear "no safe threshold" regression analysis, may not stand up to scientific scrutiny. The Proposed Rule states:

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[24] https://www.sciencedirect.com/science/article/abs/pii/S0273230017301538

[25] https://www.heritage.org/agriculture/commentary/will-epa-stop-its-abuse-costly-pollution-control-co-benefits-assessments

[26] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9223652/

> Although difficulties remain in assessing the shape of the short-term PM2.5-mortality C–R relationship, to date, studies have not conducted systematic evaluations of alternatives to linearity and recent studies evaluated in the [Integrated Science Assessment] Supplement continue to provide evidence of a no-threshold linear relationship, with less confidence at concentrations lower than 5 mg/m^3.[27]

How can the EPA move forward with this rule without conducting systematic evaluations of alternatives to the linear "no safe threshold" theory? Keep in mind that the linear theory holds that human health is damaged by ambient PM2.5 at any level, even concentrations approaching zero. Given the statutory imperative to set NAAQS levels at concentrations that protect public health, wouldn't the EPA have to conclude—if it believes in the linear "no safe threshold" theory—that the necessary standard to protect human health from PM2.5 pollution is zero? Such an obviously absurd conclusion should motivate further scrutiny of the underlying models.

The incremental benefits of tightening PM2.5 standards below 12 $\mu g/m^3$ are speculative. Moving from an already world-leading PM2.5 standard to an even lower threshold puts the U.S. in uncharted territory. In fact, the annual PM2.5 standard for most European countries is nearly twice the current annual standard in the U.S., at 20 $\mu g/m^3$.[28] As the Final Policy Assessment[29] notes:

> The use of interpolation and extrapolation to simulate just meeting annual standards with levels of 11.0 and 9.0 $\mu g/m^3$, respectively, does not fully capture potential non-linearities associated with real-world changes in air quality.[30] … Uncertainty in the biological pathways through which PM2.5 exposures could cause serious health effects increases as the ambient concentrations being considered fall farther below the PM2.5 exposure concentrations shown to cause effects in experimental studies. In the current review, such studies generally examine the occurrence of PM2.5-attributable effects following exposures to PM2.5 concentrations well-above those likely to occur in the ambient air in areas meeting the current primary PM2.5 standards.[31] … Uncertainty in the potential public health impacts of air quality improvements increases as the ambient concentrations being considered fall farther below those present in studies that report improved health with reductions in PM2.5 concentrations.[32] … Few key epidemiologic studies (and only one key U.S. study) report positive and statistically significant health effect associations for PM2.5 air quality distributions with overall mean concentrations below 9.6 $\mu g/m^3$.[33] There is increasing uncertainty in PM2.5 exposure estimates in some of the largest key studies at lower ambient concentrations (i.e., those that use hybrid model

[27] Proposed Rule at page 5585
[28] https://environment.ec.europa.eu/topics/air/air-quality/eu-air-quality-standards_en
[29] https://www.epa.gov/system/files/documents/2021-10/final-policy-assessment-for-the-review-of-the-pm-naaqs-01-2020.pdf
[30] Final Policy Assessment at page 3-96
[31] *Id* at page 3-106
[32] *Id* at page 3-106/107
[33] *Id* at page 3-116/117

> predictions to estimate exposures), given the more limited information available to develop and validate model predictions.[34]

For the foregoing reasons, the EPA should decline to tighten PM2.5 standards at this time. There is simply not sufficient evidence of adverse health impacts at levels below the current standard. Further, it is important for the Administrator to recognize the uncertainty regarding public health impacts at low concentrations of PM2.5 and weigh that uncertainty against the known public health impacts of overregulation discussed in Section 1 above.

5. THE PROPOSED RULE FAILS TO DISTINGUISH THE HEALTH EFFECTS FROM DIFFERENT CHEMICAL SPECIES OF PM2.5

The Proposed Rule treats all species of PM2.5 as equally toxic. This is a woefully incorrect assumption and should be remedied if the Agency moves forward with a final rule. A recent study in the journal Nature explains the variability in toxicity among different chemical species of PM2.5 (and even among combustion temperatures and engine sizes for the same fuel).[35]

> Among the combustion aerosols, diesel engine exhaust particles (engine displacement of 2800 cc) were identified as the most toxic based on chemical and biological responses. … Gasoline engine exhaust particles also showed comparable or lower toxicity relative to diesel engine exhaust particles based on various endpoints. … Both rice straw and pine stem burning particles (popular biomasses used in East Asia) showed significant toxicity in terms of effects on cell viability comparable to that of diesel engine exhaust particles. Pine stem burning particles were associated with higher inflammatory responses than rice straw burning particles. … In the case of coal combustion particles (burned at 1100 °C and 550 °C), the biological responses were relatively low compared to other combustion particle types. … Two burning temperatures were used for simulation: residential coal combustion (low temperature) and power plant coal combustion (high temperature). Coal combustion particles generated at a temperature of 550 °C showed relatively higher toxicity in many endpoints than those at 1100 °C. … Ammonium sulfate and ammonium nitrate particles which were aerosolized and dried from their solutions showed little toxicity in almost all endpoints. … Fine particles (< 2.5 μm) from Arizona dust mainly consisting of mineral/soil components showed little toxicity. Additionally, low toxicity was observed for sea spray aerosols from natural seawater based on [oxidative potential] and cell viability analyses (data not shown). However, we observed significant toxicity of resuspended fine dust collected from the roadsides and tunnels at urban sites based on oxidative potential, cell viability, and inflammation endpoints, which may be attributable to carbonaceous species and heavy metals originating from vehicles (engine exhaust, tire wear, and brake pad). Fine particles from carbon black powder (Cabot Inc., USA) exerted a little toxicity, suggesting that carbon black itself would not be so harmful but adsorbed components, such as organics and heavy metals, are

[34] *Id*

[35] https://www.nature.com/articles/s41598-018-35398-0

> the greater contributory factors. … [secondary organic aerosols] showed substantial toxicity in [oxidative potential] and inflammatory response arrays.

Noting the wide range of toxicity of the various chemical components and sources of PM2.5 pollution, the EPA should endeavor to target the most toxic forms of PM2.5 if it moves forward with a final rule. Similarly, the EPA should not prevent economic activity that generates only very low-toxicity PM2.5, such as mineral dust, carbon black, and high-temperature coal combustion particles.

6. THE PROPOSED RULE VIOLATES THE UNFUNDED MANDATES REFORM ACT

The Proposed Rule must satisfy section (a)(3)(B) of the Unfunded Mandates Reform Act (UMRA).[36] The UMRA establishes that "before promulgating any general notice of proposed rulemaking that is likely to result in promulgation of any rule that includes any Federal mandate that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100,000,000 or more (adjusted annually for inflation) in any 1 year … the agency shall prepare a written statement" containing five categories of analysis, including "a qualitative and quantitative assessment of the anticipated costs and benefits of the Federal mandate," "any disproportionate budgetary effects of the Federal mandate upon any particular regions of the nation or particular State, local, or tribal governments, urban or rural or other types of communities, or particular segments of the private sector," and "a description of the extent of the agency's prior consultation with elected representatives … of the affected State, local, and tribal governments."

The Proposed Rule acknowledges that it would have major financial impacts but claims the UMRA does not apply. EPA states:

> This action does not contain any unfunded mandate as described in the [UMRA] and does not significantly or uniquely affect small governments. … The EPA acknowledges, however, that if corresponding revisions to associated [State Implementation Plan] requirements and air quality surveillance requirements are proposed at a later time, those revisions might result in such effects. Any such effects would be addressed as appropriate if and when such revisions are proposed.[37]

If the EPA moves forward with a final rule, it should explain why it finds that the federal mandates included in the Proposed Rule would not result in the expenditure by the private sector of $100 million in any one year. As drafted, the Proposed Rule does not detail how it has satisfied the above procedural requirements of the UMRA and does not indicate that the EPA has undertaken any of the required analysis of the impacts on states and local governments and tribes of compliance with the Proposed Rule.

[36] 2 U.S.C. 1532. Available at: https://www.law.cornell.edu/uscode/text/2/1532
[37] Proposed Rule at page 5688

7. THE PROPOSED RULE VIOLATES THE CLEAN AIR ACT

In helping the Administrator develop the Proposed Rule, the CASAC failed to fulfill its statutory duties under the Clean Air Act. Section 109(d)(2)(C) of the Clean Air Act states that an independent scientific review committee shall:

> (iii) advise the Administrator on the relative contribution to air pollution concentrations of natural as well as anthropogenic activity, and (iv) advise the Administrator of any adverse public health, welfare, social, economic, or energy effects which may result from various strategies for attainment and maintenance of such national ambient air quality standards.[38]

Since the early 1980s, this independent review function has been performed by the CASAC. Regarding both (iii) and (iv) as they relate to the Proposed Rule, the CASAC fell short of its statutory obligations. Considering (iii), the CASAC review does not appear to advise the Administrator on the relative contribution to PM2.5 pollution concentrations of natural versus anthropogenic activity. More troubling, as discussed above, the CASAC review does not appear to have advised the Administrator on (iv), meaning the adverse public health, welfare, social, economic, or energy effects resulting from compliance with the new, stricter standards. As discussed above, these effects could lead to the continued deindustrialization of America, unacceptable levels of poverty, and an increasingly fragile electric grid.

Perhaps this lapse is not the fault of the CASAC itself but rather the result of a rushed process. The *CASAC Review of the EPA's Supplement to the 2019 Integrated Science Assessment for Particulate Matter (External Review Draft – October 2021)* states:

> The CASAC is concerned that the compressed timeframe for this and other recent CASAC reviews has made it difficult for the CASAC to provide the highest quality review possible. The compressed timeframe has necessitated simultaneous review of large documents, which is not optimal. The timeframe does not allow for development of second drafts of documents that incorporate CASAC advice (should the CASAC recommend second drafts). The CASAC recommends that for future reviews, the EPA follow a review plan that allows for adequate time for the CASAC to review the documents and sufficient time for the EPA to incorporate CASAC advice into second drafts (if requested by the CASAC).[39]

Without the statutorily required substantive input from an independent scientific review committee, the EPA should decline to implement stricter PM2.5 standards. The EPA should only revisit the Proposed Rule once it has received and fully considered independent advice regarding the adverse public health, welfare, social, economic, or energy effects resulting from compliance with the new, stricter standards.

[38] https://www.law.cornell.edu/uscode/text/42/7409

[39] https://casac.epa.gov/ords/sab/f?p=113:0:9895873668768:APPLICATION_PROCESS=REPORT_DOC:::REPORT_ID:1093

CONCLUSION

Thank you for the opportunity to comment on the proposed NAAQS for PM2.5. For the foregoing reasons, the EPA should retain the 2020 primary and secondary PM NAAQS without revision, consider revising its approach to estimating the willingness to pay to avoid PM2.5 exposure, and evaluate of alternatives to the linear "no safe threshold" theory regarding health impacts from PM2.5 exposure.

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