EPA's Authority to Regulate Hazardous Air Pollutants from Power Plants: The Appropriate and Necessary Finding

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EPA's Mercury and Air Toxics Standards (MATS), finalized in 2012 and under section 112 of the Clean Air Act, regulates the amount of mercury and other hazardous air pollutants (HAPs) that can be emitted from coal- and oil-fired electric utility steam generating units (EGUs). In response to the Supreme Court's 2015 decision, *Michigan v. EPA*, EPA is required to determine whether it is "appropriate and necessary" to regulate toxic pollution from these power plants. While the Trump EPA finalized a rule (2020 Reconsideration) that reversed the 2016 Obama EPA's determination that it *is* appropriate and necessary, President Biden's Executive Order 13990 instructed EPA to review that reconsideration.

In response, on January 31, 2022, EPA released a proposal to reaffirm the finding that it is appropriate and necessary to regulate HAPs from power plants and revoke the Trump administration's 2020 Reconsideration.[1] Recognizing that EGUs have already fully complied with the requirements of MATS, the proposal also examines how the sector complied and did so relatively cheaply, as the 2012 projections "almost certainly overestimated the actual costs of the regulation by a significant amount."[2] The Biden EPA also rejects the 2020 Reconsideration's use of a benefit-cost analysis that focused first and foremost on quantifiable and monetizable HAPs benefits. It reasons that the Clean Air Act does not require EPA to only compare dollar values to dollar values and recognizes that such an approach discounts the significant adverse health and environmental impacts that result from HAP emissions simply because EPA cannot assign a dollar value to them.

These steps, however, reflect only the first phase of reviewing the 2020 Reconsideration as EPA must also consider—as part of the residual risk and technology review (RTR) process—whether there remains a public health risk that would obligate EPA to tighten the 2012 standards.[3] To support that evaluation, EPA requests, in the proposal, input on the performance and cost of new or improved technologies used to reduce HAP emissions as well as risk-related information.

In this piece, I explore the history and legal questions underlying EPA's conclusion that it is appropriate and necessary to regulate HAP emissions from EGUs, and the considerations EPA will need to evaluate in deciding whether the record supports a more stringent standard as part of a future RTR.

History of MATS

Under the 1990 CAA amendments, Congress directed EPA to study the reasonably anticipated hazards to public health from EGUs.[4] The purpose of the study was to assess the health risks that remained after applying other CAA restrictions to EGU emissions. Based on that study, EPA was required to determine whether regulation of EGU emissions under section 112 of the CAA was appropriate and necessary.[5] To inform that determination, EPA commissioned multiple studies of EGUs and

mercury.[6] In December 2000, EPA released its Utility Air Toxics Determination that the regulation of HAP emissions from EGUs was appropriate and necessary.[7]

However, in March 2005, EPA revised that determination, concluding that it was neither appropriate nor necessary to regulate power plants under section 112. EPA based this conclusion in part on the argument that the agency could address risks from EGU HAP emissions using the Clean Air Mercury Rule (CAMR), which EPA issued under a different provision of the CAA—section 111.[8] However, the D.C. Circuit vacated CAMR in *New Jersey v. EPA*, finding that EPA failed to comply with the requirements to delist EGUs as a source category under CAA section 112(c)(9).[9] Following the vacatur, EPA finalized MATS in February 2012 affirming the 2000 Determination that it was appropriate and necessary to regulate HAP emissions from EGUs.

While many aspects of MATS were challenged in the D.C. Circuit, the court upheld the standards and findings of EPA's appropriate and necessary determination in *White Stallion Energy Center v. EPA*.[10] The Supreme Court granted review on one question and held in *Michigan v. EPA* that EPA erred when it failed to consider costs in determining that it is appropriate and necessary to regulate HAP emissions from EGUs.[11]

In response, EPA published a Supplemental Finding on April 25, 2016 that found it appropriate and necessary to regulate given the costs and benefits of MATS.[12] However, on May 22, 2020, EPA, under the Trump administration, revised its 2016 determination (the 2020 Reconsideration) concluding that regulation of HAP emissions from EGUs was not appropriate and necessary. Despite this revision, EPA retained the 2012 emissions standards.[13] EPA also conducted an RTR and found that the residual risk from EGU emissions was acceptable and no revisions to the standards were warranted at that time.[14]

Which leads us back to the Biden EPA's January 2022 proposal to reaffirm the Obama EPA's 2016 finding that it is appropriate and necessary to regulate HAP emissions from EGUs. In returning to the 2016 decision, however, there are several interesting questions. First, EPA needs to explain how it proposes to consider the costs and benefits of MATS. And, six years after the industry complied with the standards, there is data on costs incurred by the industry and additional data on the benefits of reducing HAPs that EPA can now consider.

Recognizing this new data, EPA states that the CAA is silent as to whether it may consider updated information when acting on a remand.[15] EPA proposes that while the CAA does not *require* it to consider the most-up-to-date information when it is compelled to revisit the appropriate and necessary determination, the statute also does not *preclude* EPA from considering such new information where reasonable. Thus, the proposal includes new and updated information as a way to "bolster[] the finding and support[] a determination that it is appropriate and necessary to regulate EGUs for HAP."[16]

Second, as with any reversal of a prior administration's decision, EPA must explain the basis for reversing the Trump administration's determination. For this question, EPA's reasoning rejecting a comparison of costs to only monetized benefits will have important implications for other rulemakings.

Legal Basis for Reaffirming the Appropriate and Necessary Determination

In *Michigan v EPA*, the Supreme Court held that "the phrase 'appropriate and necessary' requires at least some attention to cost" and that "'cost' includes more than the expense of complying with regulations; any disadvantage could be termed a cost."[17] To respond to the Court, EPA proposes two frameworks to reaffirm that it is appropriate and necessary to regulate EGUs under section 112. EPA's preferred framework considers "the totality-of-the-circumstances" based on the Court's direction to "pay[] attention to the advantages and disadvantages of [EPA's] decision[]."[18] The alternative approach is a formal benefit-cost analysis (BCA). Under both approaches, EPA proposes to conclude that it remains appropriate and necessary to regulate HAP emissions from EGUs when considering the costs and benefits of doing so.

EPA's proposal is notable because it interprets section 112 to require consideration of risks to communities that are most overburdened by pollution. The proposal focuses on how Congress created "the clear goal in CAA section 112(n)(1)(C) and elsewhere to consider risks to the most exposed and susceptible populations."[19] EPA also notes that new risk screening analyses show that some groups are more impacted from EGU emissions than others. EPA states "[w]e think it is highly relevant that while EGUs generate power for all, and EGU HAP pollution poses risks to all Americans exposed to such HAP, a smaller set of Americans who live near EGUs face a disproportionate risk of being significantly harmed by toxic pollution."[20]

Under the totality-of-the-circumstances framework, EPA discusses the health benefits of MATS. To demonstrate that it remains appropriate and necessary to regulate HAP emissions from EGUs, EPA relies on data available at the time of the 2012 rulemaking. EPA reasons that it should use the data available in 2012 to justify why the original 2012 MATS rule was appropriate and necessary. However, the proposal also discusses updated information to further justify its determination.

Health Benefits of Mercury Emissions Reduction

The proposal discusses the adverse health effects from methylmercury (mercury is transformed by microbial action into methylmercury in soil and aquatic environments) including neurodevelopmental effects in children exposed prenatally, such as IQ loss.[21] EPA can quantify some of these health risks. For example, EPA includes modeled mercury exposure for subsistence fishers to determine that 29 percent of watersheds would expose female subsistence fishers to an amount of methylmercury above the reference dose for that substance based on *in utero* effects of exposure.[22] EPA also explains that prior to the 2012 rule, it was also known that "dietary exposure to methylmercury [was] linked to a higher risk of acute myocardial infarction (MI), coronary heart disease, or cardiovascular heart disease."[23]

In recognition that new information has been produced since the 2012 rule, EPA discusses, but does not rely on, three new studies to bolster its finding that it is still appropriate and necessary to regulate EGUs. EPA points to risk assessments of subsistence fishers who are exposed to mercury through self-caught fish and the general US population exposed via commercially-sourced fish.[24] For subsistence fishers,

the assessments focused on specific regions and found that low-income Black people in the Southeast and Native American people near the Great Lakes had risk levels significantly above that of other

subsistence fishers across the US.[25] The proposal also discusses the incidence of myocardial infarction mortality from commercially-sourced fish in the general US population. This study looked only at methylmercury exposure due to US EGU mercury emissions and estimated that 5 to 91 excess deaths would be caused each year from these emissions.[26] The third new screening-level risk analysis examined the loss of IQ points in children that were the result of their mothers consuming commercially sourced fish that contained methylmercury from US EGUs.[27] The analysis estimated a loss of between 1,600-6,000 IQ points across the US, but also noted that the distribution of this loss would likely not be uniform across the country.

Non-mercury HAP Emissions Reduction Benefits

In addition to the health benefits associated with reducing exposure to mercury, EPA explains the health benefits associated with reducing non-mercury HAPs. EGUs are the largest source of hydrogen chloride, hydrogen fluoride, and selenium emissions which can cause a variety of adverse health effects including lung irritation and detrimental effects to the central nervous system.[28] They are also a major source of arsenic, chromium, and nickel—classified as human carcinogens—along with cadmium, selenium, and lead—classified as probable human carcinogens.[29] After MATS was implemented, EPA found that acid gas HAP emissions from EGUs decreased by 96 percent and non-mercury metal HAP emissions decreased by 81 percent compared to 2010 levels.[30] Thus, based on its analysis, "EPA concludes that cancer risks associated with these HAP emissions supports a finding that it is appropriate to regulate HAP emissions from EGUs."[31]

Environmental Benefits

The proposal also discusses the environmental benefits associated with regulating both methylmercury and non-mercury HAPs. For example, regulation helps to mitigate harmful effects on birds and mammals including slower growth and development, reduced reproduction, and premature mortality when exposed to higher levels of methylmercury.[32] Risks to the environment from non-mercury HAP include hydrogen chloride emissions which form hydrochloric acid when dissolved in water. EPA also notes that even after the Acid Rain Program "was largely implemented in 2005, EGU sources comprised 82 percent of all anthropogenic [hydrogen chloride] (a useful surrogate for all acid gas HAP) emissions in the U.S."[33] EPA, therefore, concludes that the environmental impacts from EGU HAP emissions strengthen EPA's determination that it is appropriate and necessary to regulate EGUs.

Assessing Non-Quantifiable Benefits and Benefits from non-HAP Emissions Reductions

One criticism of the Obama EPA's 2016 determination was that the monetized costs outweighed the monetized benefits of reducing HAP emissions. In this proposed rule, EPA explains that the "vast majority of the post-control benefits of reducing HAP cannot be quantified or monetized with sufficient quality."[34] Nevertheless, EPA argues that these benefits are significant. These benefits include reduced neurodevelopmental and cardiovascular harms from exposure to methylmercury, reduced health risks from non-mercury HAP, and reduced health risks to subpopulations that face disproportionally high exposure to HAP from EGUs.[35]

In the proposal, EPA emphasizes that the severity of health impacts from HAP emissions implies the economic value of reducing such harms may be substantial.[36] EPA points to the Transportation Security Administration's (TSA) decision to require Advanced Imaging Technology despite criticism of the

high cost for deploying the technology. In that rulemaking, TSA noted that it must consider both quantifiable costs such as a terrorist attack causing an airplane crash, as well as social benefits that are hard to measure, such as reducing fear.[37] As with TSA's rulemaking, EPA concludes that benefits that are challenging to measure nevertheless strongly support EPA's finding that it is appropriate and necessary to regulate EGUs and are important to consider.

In the proposal, EPA also assesses the benefits of reducing emissions of non-HAP pollutants, including CO_2, SO_2, NO_x, and $PM_{2.5}$. For example, EPA determined that reductions in $PM_{2.5}$ from MATS may prevent 4,200 to 11,000 premature deaths.[38] EPA states that this consideration is consistent with the Court's opinion in *Michigan*: "the *Michigan* court directed that 'any disadvantage could be termed a cost.' The corollary is that any advantage could be termed a benefit."[39] EPA explains that while the non-HAP benefits are not essential to EPA's conclusion that it is appropriate and necessary to regulate, these benefits are nevertheless "appropriate to consider" under a "totality-of-the-circumstances approach."[40] Thus, EPA makes clear it is not relying on such information but is considering the additional benefits to further support its determination.

Cost of Compliance and its Overestimation

When EPA issued MATS in 2012, the agency projected that the compliance costs in 2015 would be $9.6 billion.[41] However, the proposal points to several studies that find the actual cost of compliance was much lower.[42] For example, Andover Technology Partners estimated that the actual cost of compliance with MATS was approximately $2 billion rather than the $9.6 billion projected at the time of the rulemaking.[43] The Edison Electric Institute (EEI) estimated that by April 2019,[44] EGUs had incurred cumulative compliance costs of more than $18 billion—approximately $2.6 billion per year, to comply with MATS.[45] EPA attributes this difference in cost projections to multiple factors, including a dramatic decrease in the cost of natural gas. While EPA affirms that, at the time of the MATS rulemaking, the estimated benefits still exceeded the $9.6 billion cost estimate, EPA points to the updated actual cost estimate to further support its proposal.

In addition to compliance costs, under *Michigan v. EPA*, the agency must also consider costs that extend beyond compliance costs including disadvantages of the regulation.[46] For this proposal, EPA considers the costs relative to the sector's electricity sales and annual capital expenditures, the impact on generating capacity, and the effects on retail electricity prices.[47] Even using the higher compliance cost projections, EPA notes that the compliance costs of MATS only represented 2.9 percent of electricity sales in 2019—the year with the lowest electricity sales after 2011.[48] Similarly, the estimated costs of complying with MATS represented less than 4 percent of power sector capital expenditures in 2019.[49] In terms of impacts on power generating capacity and costs to the general population, EPA notes that the regulations did not significantly impact power generation and reliability. In 2012, EPA's modeling projected coal facility retirements would be distributed throughout the power grid, and EPA notes in the current proposal that that it "has not been made aware of reliability or resource adequacy problems attributable to MATS."[50] Additionally, facilities that were deemed critical

to sector reliability applied for a waiver, giving those units an additional year to comply.[51] Retail electricity prices also fell following the promulgation of MATS[52], and EPA notes that even its projected increase in electricity prices at the time of rulemaking was within the historical range.[53]

EPA concludes that costs, "while large in absolute terms, were shown in our analyses to be within the range of other expenditures and commensurate with revenues generated by the sector, and our analysis demonstrated that these expenditures would not and did not have any significant impacts on electricity prices or reliability."[54]

Benefit-Cost Analysis Framework

As noted above, while EPA's preferred approach for considering costs consistent with *Michigan v. EPA* is the totality-of-the-circumstances framework, the agency also includes a benefit-cost analysis (BCA) approach. It notes that a key to performing a BCA lies in the ability to quantify both costs and benefits. Consistent with OMB Circular A-4, EPA notes that "a formal BCA that estimates net outcomes (i.e., by comparing total losses and gains) and conforms to established economic best practices and accounts for all of the effects of the rule that can be quantified should be used."[55]

In this proposal, EPA emphasizes that because there are costs and benefits that cannot be monetized, EPA prefers the totality-of-the-circumstances framework. However, EPA concludes that the BCA approach also supports its decision that it is appropriate and necessary to regulate HAP emissions from EGUs. EPA bases its BCA on the analysis used in the 2012 rulemaking, which calculated the net monetized benefits to be between $37–90 billion using a 3 percent discount rate[56] and between $33–81 billion using a 7 percent discount rate in 2007 dollars.[57] EPA cites OMB Circular A-4 to note that an agency's analysis "should look beyond the direct benefits and direct costs of your rulemaking and consider any important ancillary benefits and countervailing risks."[58] As in 2012, EPA continues to include all monetizable benefits in its BCA and found that the benefits still outweighed the original cost estimates of $9.6 billion and support the conclusion from the earlier BCA, to regulate.[59]

Legal Basis to Revoke the 2020 Reconsideration

EPA proposes to revoke the Trump administration's 2020 action on the basis that the "framework used to consider cost in 2020, which centered the agency's mandated determination under CAA section 112(n)(1)(A) on a comparison of costs to monetized HAP benefits, was an approach ill-suited to making the appropriate and necessary determination."[60] EPA asserts that this approach is not a proper BCA as "[t]here is no economic theory or guidance of which we are aware that endorses the version of BCA presented in the 2020 Final Action, in which total costs are compared against a small subset of total benefits."[61] EPA also notes that the rule "fail[ed] to consider critical aspects of the inquiry posed to the EPA by Congress in CAA section 112(n)(1)"[62] and "gave no consideration to the important statutory objective of protecting the most at-risk subpopulations."[63]

Thus, EPA concludes that the framework used in 2020 was not acceptable, and even if it were, the agency has the discretion to select a new framework to use in analyzing whether it is appropriate and necessary to regulate HAPs emissions from EGUs.

Review of the 2020 RTR

Executive Order 13990 also instructed EPA to review the Trump administration's 2020 RTR. In reviewing the RTR, EPA must consider whether the 2020 RTR's conclusion to not revise the MATS was

correct.[64] To support this process, EPA requests additional data and comments to help evaluate whether continued HAP emissions from EGUs pose a risk to public health and whether the MATS rule needs to be revised "to provide an ample margin of safety to protect public health or to prevent, taking into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect."[65]

To inform its reevaluation of the 2020 RTR, EPA is seeking comments on:

- "data or information – including risk-related information – that will assist in the review of the RTR"[66]
- "information on performance or cost of new or additional control technologies, improved methods of operation, or other practices and technologies that may result in cost-effective reductions of HAP emissions from coal- or oil-fired EGUs"[67]
- "information on improvements or upgrades to existing controls that may result in cost-effective reductions of HAP emissions from coal- or oil-fired EGUs"[68]
- "information on the cost or performance of technologies and practices relating to monitoring of HAP emissions, and control of HAP emissions during startup and shutdown events, that could result in cost-effective reductions in HAP or assure improved operation of existing controls"[69]

Next Steps

The proposed rule is currently open for comment until April 11, 2022. EPA will use these comments to assess its revocation of the 2020 Reconsideration. EPA will also use comments, including those that introduce risk-related information, to review the 2020 RTR and decide whether more stringent MATS regulations should be put into place to protect public health.

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[1] The proposed rule was published in the Federal Register on February 9, 2022. 87 Fed. Reg. 7628 (Feb. 9, 2022).
[2] 87 Fed. Reg. 7628 (Feb. 9, 2022).
[3] Within 8 years of setting the standard, EPA is required to evaluate the residual risk and the agency must set further risk-based standards if necessary to provide an ample margin of safety to protect public health. *Setting Emissions Standards for Major Sources of Toxic Air Pollutants*, U.S. Env't Prot. Agency, https://www.epa.gov/clean-air-act-overview/setting-emissions-standards-major-sources-toxic-air-pollutants (last visited Feb. 27,2022).
[4] 42 U.S.C. § 7412(n).

[5] *Id.*
[6] U.S. Env't Prot. Agency, Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress. EPA–453/R–98–004a. (1998); U.S. Env't Prot. Agency, Mercury Study Report to Congress. EPA–452/R–97–003 (1997); Nat'l Inst. of Env't Health Sciences, Report on Mercury (1993).
[7] 65 Fed. Reg. 79826 (Dec. 20, 2000).
[8] 70 Fed. Reg. 15994 (Mar. 29, 2005).
[9] 517 F.3d 574, 578 (D.C. Cir. 2008).
[10] 748 F.3d 1222 (2014).
[11] 576 U.S. 743, 752 (2015).
[12] 81 Fed. Reg. 24420 (Apr. 25, 2016).
[13] 85 Fed. Reg. 31286, 31312 (May 22, 2020).
[14] 85 Fed Reg. 31314 (May 22, 2020).
[15] 87 Fed. Reg. 7628, 7635 (Feb. 9, 2022).
[16] *Id.* at 7636.
[17] 576 U.S. 743, 752 (2015).
[18] *Michigan v. EPA*, 576 U.S. 743, 753 (2015); 87 Fed. Reg. 7627 (Feb. 9, 2022).
[19] 87 Fed. Reg. 7662 (Feb. 9, 2022).
[20] *Id.* at 7627.
[21] I*d.* at 7638–39.
[22] *Id.*
[23] *Id.* at 7639.
[24] *Id.* at 7648.
[25] *Id.* at 7644, 7648.
[26] *Id.* at 7644.
[27] *Id.*
[28] *Id.* at 7640.
[29] *Id.*
[30] *Id.* at 7665.
[31] *Id.* at 7640.
[32] *Id.* at 7640.
[33] *Id.* at 7641.
[34] *Id.* at 7644.
[35] *Id.*
[36] *Id.* at 7646.
[37] *Id.* at 7663
[38] *Id.* at 7648.
[39] *Id.* at 7668 (internal citation omitted).
[40] *Id.*
[41] *Id.* at 7649.
[42] *Id.* at 7651. EPA discusses the challenges of producing retrospective cost estimates for a regulation, including estimating what would have occurred without the rule. To do that, EPA would need "to accurately attribute changes in the power sector that were due to MATS requirements" rather than to changes in technology or other regulations; then the agency "would need actual information of the

incremental costs that had been associated with facility-level operational changes due to MATS." *Id.* at 7650
[43] *Id.* at 7651.
[44] MATS had been in place for seven years at the time of this EEI analysis.
[45] *Id.*
[46] *Michigan v. EPA*, 576 U.S. 743, 752 (2015)
[47] *Id.*
[48] 87 Fed. Reg. 7624, 7657 (Feb. 9, 2022).
[49] *Id.*
[50] *Id.* at 7568.
[51] *Id.*
[52] *Id.* at 7567.
[53] *Id.* at 7658.
[54] *Id.* at 7668.
[55] *Id.* at 7670.
[56] Discount rates allow benefits and costs that occur at different times to be compared by expressing those values in present terms.
[57] *Id.* at 7631.
[58] *Id.* at 7670.
[59] *Id.* at 7671.
[60] *Id.* at 7659.
[61] *Id.* at 7661.
[62] *Id.* at 7660.
[63] *Id.*
[64] 85 Fed. Reg. 31286, 31314 (May 22, 2020).
[65] 85 Fed. Reg. 31286, 31314 (May 22, 2020).
[66] 87 Fed. Reg. 7624, 7672 (Feb. 9, 2022).
[67] *Id.*
[68] *Id.*
[69] *Id.*