EPA-452/R-24-005
April 2024

Regulatory Impact Analysis for the Final National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units Review of the Residual Risk and Technology Review

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Health and Environmental Impacts Division
Research Triangle Park, NC

COSTS, EMISSIONS, AND ENERGY IMPACTS

3.1 Introduction

This section presents the compliance cost, emissions, and energy impact analysis performed for the MATS RTR. EPA used the Integrated Planning Model (IPM), developed by ICF Consulting, to conduct its analysis. IPM is a dynamic linear programming model that can be used to examine air pollution control policies for SO_2, NO_X, Hg, HCl, PM, and other air pollutants throughout the U.S. for the entire power system. Documentation for EPA's Power Sector Modeling Platform 2023 using IPM (hereafter IPM Documentation) can be found at *https://www.epa.gov/power-sector-modeling* and is available in the docket for this action.

3.2 EPA's Power Sector Modeling Platform 2023 using IPM

IPM is a state-of-the-art, peer-reviewed, dynamic linear programming model that can be used to project power sector behavior under future business-as-usual conditions and to examine prospective air pollution control policies throughout the contiguous U.S. for the entire electric power system. For this RIA, EPA used IPM to project likely future electricity market conditions with and without this rulemaking.

IPM, developed by ICF, is a multi-regional, dynamic, deterministic linear programming model of the contiguous U.S. electric power sector. It provides estimates of least cost capacity expansion, electricity dispatch, and emissions control strategies while meeting energy demand and environmental, transmission, dispatch, and reliability constraints. IPM's least-cost dispatch solution is designed to ensure generation resource adequacy, either by using existing resources or through the construction of new resources. IPM addresses reliable delivery of generation resources for the delivery of electricity between the 78 IPM regions, based on current and planned transmission capacity, by setting limits to the ability to transfer power between regions using the bulk power transmission system. Notably, the model includes cost and performance estimates for state-of-the-art air pollution control technologies with respect to Hg, fPM, and other HAP controls.

EPA has used IPM for almost three decades to better understand power sector behavior under future business-as-usual conditions and to evaluate the economic and emissions impacts of prospective environmental policies. The model is designed to reflect electricity markets as

accurately as possible. EPA uses the best available information from utilities, industry experts, gas and coal market experts, financial institutions, and government statistics as the basis for the detailed power sector modeling in IPM. The model documentation provides additional information on the assumptions discussed here as well as all other model assumptions and inputs.[36]

The model incorporates a detailed representation of the fossil-fuel supply system that is used to estimate equilibrium fuel prices. The model uses natural gas fuel supply curves and regional gas delivery costs (basis differentials) to simulate the fuel price associated with a given level of gas consumption within the system. These inputs are derived using ICF's Gas Market Model (GMM), a supply/demand equilibrium model of the North American gas market.[37]

IPM also endogenously models the partial equilibrium of coal supply and EGU coal demand levels throughout the contiguous U.S., taking into account assumed non-power sector demand and imports/exports. IPM reflects 36 coal supply regions, 14 coal grades, and the coal transport network, which consists of over four thousand linkages representing rail, barge, and truck and conveyer linkages. The coal supply curves in IPM were developed during a thorough bottom-up, mine-by-mine approach that depicts the coal choices and associated supply costs that power plants would face if selecting that coal over the modeling time horizon. The IPM documentation outlines the methods and data used to quantify the economically recoverable coal reserves, characterize their cost, and build the 36 coal regions' supply curves.[38]

To estimate the annualized costs of additional capital investments in the power sector, EPA uses a conventional and widely accepted approach that applies a capital recovery factor (CRF) multiplier to capital investments and adds that to the annual incremental operating expenses. The CRF is derived from estimates of the power sector's cost of capital (i.e., private discount rate), the amount of insurance coverage required, local property taxes, and the life of capital.[39] It is important to note that there is no single CRF factor applied in the model; rather, the

[36] Detailed information and documentation of EPA's Baseline run using EPA's Power Sector Modeling Platform 2023 using IPM, including all the underlying assumptions, data sources, and architecture parameters can be found on EPA's website at: *https://www.epa.gov/power-sector-modeling*.
[37] See Chapter 8 of EPA's IPM Documentation, available at: *https://www.epa.gov/power-sector-modeling*.
[38] See Chapter 7 EPA's IPM Documentation, available at: *https://www.epa.gov/power-sector-modeling*.
[39] See Chapter 10 of EPA's IPM Documentation, available at: *https://www.epa.gov/power-sector-modeling*.

CRF varies across technologies, book life of the capital investments, and regions in the model in order to better simulate power sector decision-making.

EPA has used IPM extensively over the past three decades to analyze options for reducing power sector emissions. Previously, the model has been used to estimate the costs, emission changes, and power sector impacts in the RIAs for the Clean Air Interstate Rule (U.S. EPA, 2005), the Cross-State Air Pollution Rule (U.S. EPA, 2011a), the Mercury and Air Toxics Standards (U.S. EPA, 2011b), the Clean Power Plan for Existing Power Plants (U.S. EPA, 2015b), the Cross-State Air Pollution Update Rule (U.S. EPA, 2016), the Repeal of the Clean Power Plan, and the Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units (U.S. EPA, 2019), the Revised Cross-State Air Pollution Update Rule (U.S. EPA, 2021), and the Good Neighbor Plan (2023b).

EPA has also used IPM to estimate the air pollution reductions and power sector impacts of water and waste regulations affecting EGUs, including contributing to RIAs for the Cooling Water Intakes (316(b)) Rule (U.S. EPA, 2014a), the Disposal of Coal Combustion Residuals from Electric Utilities rule (U.S. EPA, 2015c), the Steam Electric Effluent Limitation Guidelines (U.S. EPA, 2015a), and the Steam Electric Reconsideration Rule (U.S. EPA, 2020).

The model and EPA's input assumptions undergo periodic formal peer review. The rulemaking process also provides opportunity for expert review and comment by a variety of stakeholders, including owners and operators of capacity in the electricity sector that is represented by the model, public interest groups, and other developers of U.S. electricity sector models. The feedback that the Agency receives provides a highly detailed review of key input assumptions, model representation, and modeling results. IPM has received extensive review by energy and environmental modeling experts in a variety of contexts. For example, in September 2019, U.S. EPA commissioned a peer review[40] of EPA's v6 Reference Case using the Integrated Planning Model (IPM). Additionally, and in the late 1990s, the Science Advisory Board reviewed IPM as part of the CAA Amendments Section 812 prospective studies[41] that are periodically conducted. The Agency has also used the model in a number of comparative modeling exercises sponsored by Stanford University's Energy Modeling Forum over the past 20

[40] See Response and Peer Review Report EPA Reference Case Version 6 Using IPM, available at: *https://www.epa.gov/power-sector-modeling/ipm-peer-reviews*.
[41] *http://www2.epa.gov/clean-air-act-overview/benefits-and-costs-clean-air-act*.

years. IPM has also been employed by states (e.g., for the Regional Greenhouse Gas Initiative, the Western Regional Air Partnership, Ozone Transport Assessment Group), other Federal and state agencies, environmental groups, and industry.

3.3 Baseline

The modeled "baseline" for any regulatory impact analysis is a business-as-usual scenario that represents expected behavior in the electricity sector under market and regulatory conditions in the absence of a regulatory action. As such, the baseline run represents an element of the baseline for this RIA.[42] EPA frequently updates the baseline modeling to reflect the latest available electricity demand forecasts from the U.S. EIA as well as expected costs and availability of new and existing generating resources, fuels, emission control technologies, and regulatory requirements.

For our analysis of the MATS RTR rule, EPA used EPA's Power Sector Modeling Platform 2023 using IPM to provide power sector emissions projections for air quality modeling, as well as a companion updated database of EGU units (the National Electricity Energy Data System or NEEDS for IPM 2023[43]) that is used in EPA's modeling applications of IPM. The baseline for this final rule includes the Good Neighbor Plan (Final GNP), the Revised CSAPR Update, CSAPR Update, and CSAPR, as well as MATS. The baseline run also includes the 2015 Effluent Limitation Guidelines (ELG) and the 2015 Coal Combustion Residuals (CCR), and the recently finalized 2020 ELG and CCR rules.[44]

This version of the model, which is used as the baseline for this RIA, also includes recent updates to state and federal legislation affecting the power sector, including Public Law 117-169, 136 Stat. 1818 (August 16, 2022), commonly known as the Inflation Reduction Act of 2022 (the IRA). The IPM Documentation includes a summary of all legislation reflected in this version of the model as well as a description of how that legislation is implemented in the model.

---

[42] As described in Chapter 5 of EPA's *Guidelines for Preparing Economic Analyses*, the baseline "should incorporate assumptions about exogenous changes in the economy that may affect relevant benefits and costs (e.g., changes in demographics, economic activity, consumer preferences, and technology), industry compliance rates, other regulations promulgated by EPA or other government entities, and behavioral responses to the proposed rule by firms and the public." (U.S. EPA, 2014b).

[43] *https://www.epa.gov/power-sector-modeling/national-electric-energy-data-system-needs*.

[44] For a full list of modeled policy parameters, please see: *https://www.epa.gov/power-sector-modeling*.

Under the baseline, the impacts of the IRA result in an acceleration of the ongoing shift towards lower emitting generation and declining generation share for fossil-fuel fired generation. A range of studies have outlined how reliability continues to be maintained under high variable renewable penetration scenarios. U.S. EPA (2023a) summarized results from fourteen multi-sector and power sector models under the IRA in 2030 and 2035. Across the models, wind and solar resources provide 22 to 54 percent of generation (with median of 45 percent) in 2030 and 21 to 80 percent (with median of 50 percent) in 2035. The North American Renewable Integration Study (Brinkman et al., 2021) showed how the U.S. could accommodate between 70 to 79 percent of wind and solar generation by 2050. The Solar Futures Study (DOE, 2021) illustrated power systems with upwards of 80 percent of renewable energy by 2050. Finally, Cole et al. (2021) demonstrates a 100 percent renewable power system for the contiguous U.S.

The inclusion of the final GNP and other regulatory actions (including federal, state, and local actions) in the base case is necessary in order to reflect the level of controls that are likely to be in place in response to other requirements apart from the scenarios analyzed in this section. This base case will provide meaningful projections of how the power sector will respond to the cumulative regulatory requirements for air emissions in totality, while isolating the incremental impacts of MATS RTR relative to a base case with other air emission reduction requirements separate from this final action.

The analysis of power sector cost and impacts presented in this section is based on a single policy run compared to the baseline run. The difference between the two runs represents the incremental impacts projected solely as a result of compliance with the final MATS RTR.

3.4 Regulatory Options Analyzed

For this RIA, EPA analyzed the regulatory options summarized in the table below, which are described in more detail in Section 1.3.1. The remainder of this section discusses the approach used for estimating the costs and/or emissions impacts of each provision of this final rule.

Table 3-1 Summary of Final Regulatory Options Examined in this RIA

Provision	Regulatory Options Examined in this RIA	
	Less Stringent	**Final Rule**
FPM Standard (Surrogate Standard for Non-Hg HAP Metals)	Retain existing fPM standard of 0.030 lb/MMBtu	Revised fPM standard of 0.010 lb/MMBtu
Hg Standard	Retain Hg standard for lignite-fired EGUs of 4.0 lb/TBtu	Revised Hg standard for lignite-fired EGUs of 1.2 lb/TBtu
Continuous Emissions Monitoring Systems (PM CEMS)	Require installation of PM CEMS to demonstrate compliance	Require installation of PM CEMS to demonstrate compliance
Startup Definition	Remove startup definition #2	Remove startup definition #2

As explained in Section 1.3.1, both the final rule and less stringent options described in Table 3-1 have not been changed from the proposed and less stringent options examined in the RIA for the proposal of this action. The proposal RIA included a more stringent regulatory option that projected the impacts of lowering the fPM standard to 0.006 lb/MMBtu, while holding the other three proposed amendments unchanged from the proposed option. EPA solicited comment on this more stringent fPM standard in the preamble of the proposed rule. As explained in section V.A.4. of the preamble of the final rule, EPA determined not to pursue a more stringent standard for fPM emissions, such as a limit of 0.006 lb/MMBtu. After considering comments to the proposed rule and after conducting additional analysis, EPA determined that a lower fPM standard would not be compatible with PM CEMS due to measurement uncertainty. As a result, this RIA does not examine a more stringent option than the suite of requirements that constitute the final rule; the final rule represents the most stringent suite of regulatory options available under the technology review.

The revisions to the fPM standard and the Hg standard are modeled endogenously within IPM. For the fPM standard, emissions controls and associated costs are modeled based on information available in the memorandum titled "2024 Update to the 2023 Proposed Technology Review for the Coal- and Oil-Fired EGU Source Category," which is available in the docket. This memorandum summarizes the fPM emissions rate for each existing EGU. Based on the emissions rates detailed in this memorandum, EPA assumed various levels of O&M, ESP

upgrades, upgrades to existing fabric filters, or new fabric filter installations to comply with each of the finalized standards in the modeling. Those assumptions are detailed in Table 3-2.

Table 3-2 PM Control Technology Modeling Assumptions[a]

PM Control Strategy	Cost (in 2019 dollars)	fPM Reduction
Operation & Maintenance (O&M)	$100,000/year	Unit-specific
Minor ESP Upgrades	$20/kW	20%
Typical ESP Upgrades	$40/kW	40%
ESP Rebuild	$80/kW	55% (0.005lb/MMBtu floor)
Upgrade Existing FF Bags	Unit-specific, approximately $15K - $500K annual O&M	50% (0.002 lb/MMBtu floor)
New Fabric Filter (6.0 A/C Ratio)	Unit-specific, $150-360/kW*	90% (0.002 lb/MMBtu floor)

[a] Capital costs are expressed here in terms of $/kW. O&M costs are expressed here on an annual basis.
* *https://www.epa.gov/system/files/documents/2021-09/attachment_5-7_pm_control_cost_development_methodology.pdf*

The cost and reductions associated with control of Hg emissions at lignite-fired EGUs are also modeled endogenously and reflect the assumption that each of these EGUs replace standard powdered activated carbon (PAC) sorbent with halogenated PAC sorbent.

While more detail on the costs associated with the PM CEMS requirement and the change in the startup definition is presented in Section 3.5.2, we note here that these costs were estimated exogenously without the use of the model that provides the bulk of the cost analysis for this RIA. As a result, the results of the power sector modeling do not include costs associated with these provisions, but the costs associated with requiring PM CEMS and the change in the startup definition are included in the total cost projections for the rule for each of the regulatory options analyzed in this RIA. As the incremental costs of requiring PM CEMS are small relative to the ongoing costs of operations, we do not think the endogenous incorporation of these costs would change any projected results in a meaningful way.

3.5 Power Sector Impacts

3.5.1 Emissions

As indicated previously, this RIA presents emissions reductions estimates in years 2028, 2030, and 2035 based on IPM projections.[45] Table 3-3 presents the estimated impact on power sector emissions resulting from compliance with the final rule in the contiguous U.S. The quantified emission estimates presented in the RIA include changes in pollutants directly covered by this rule, such as Hg and non-Hg HAP metals, and changes in other pollutants emitted from the power sector as a result of the compliance actions projected under this final rule. The model projections capture the emissions changes associated with implementation of HAP mitigation measures at affected sources as well as the resulting effects on dispatch as the relative operating costs for some affected units have changed. The projections indicate that the final rule results in reductions in emissions of Hg in all run years, of 16 percent, 17 percent, and 18 percent in 2028, 2030, and 2035, respectively, as well as reductions in $PM_{2.5}$ and PM_{10} emissions in all run years.

[45] Note that baseline mercury emissions projections are higher than proposal due to a revision in final baseline modeling to better reflect current ACI performance at existing lignite-fired units.

Table 3-3 EGU Emissions and Projected Emissions Changes for the Baseline and the Final Rule for 2028, 2030, and 2035[a]

		Total Emissions			
	Year	Baseline	Final Rule	Change from Baseline	% Change under Final Rule
Hg (lbs.)	2028	6,129	5,129	-999.1	-16.3%
	2030	5,863	4,850	-1,013	-17.3%
	2035	4,962	4,055	-907.0	-18.3%
$PM_{2.5}$ (thousand tons)	2028	70.5	69.7	-0.77	-1.09%
	2030	66.3	65.8	-0.53	-0.79%
	2035	50.7	50.2	-0.47	-0.93%
PM_{10} (thousand tons)	2028	79.5	77.4	-2.07	-2.60%
	2030	74.5	73.1	-1.33	-1.79%
	2035	56.0	54.8	-1.18	-2.11%
SO_2 (thousand tons)	2028	454.3	454.0	-0.290	-0.06%
	2030	333.5	333.5	0.025	0.01%
	2035	239.9	239.9	-0.040	-0.02%
Ozone-season NO_X (thousand tons)	2028	189.0	188.8	-0.165	-0.09%
	2030	174.99	175.4	0.488	0.28%
	2035	116.99	119.1	2.282282	1.95%
Annual NO_X (thousand tons)	2028	460.55	460.3	-0.283	-0.06%
	2030	392.88	392.7	-0.022	-0.01%
	2035	253.44	253.5	0.066	0.03%
HCl (thousand tons)	2028	2.474	2.474	0.000	0.01%
	2030	2.184	2.184	0.000	0.01%
	2035	1.484	1.485	0.001	0.06%
CO_2 (million metric tons)	2028	1,158.8	1,158.7	-0.0655	-0.01%
	2030	1,098.3	1,098.3	0.0361	0.00%
	2035	724.2	724.1	-0.099	-0.01%

[a] This analysis is limited to the geographically contiguous lower 48 states. Values are independently rounded and may not sum.

We also estimate that the final rule will reduce at least seven tons of non-Hg HAP metals in 2028, five tons of non-Hg HAP metals in 2030, and four tons of non-Hg HAP metals in 2035. These reductions are composed of reductions in emissions of antimony, arsenic, beryllium,

cadmium, chromium, cobalt, lead, manganese, nickel, and selenium.[46] Table 3-4 summarizes the total emissions reductions projected over the 2028 to 2037 analysis period.

Table 3-4 Cumulative Projected Emissions Reductions for the Final Rule, 2028 to 2037[a,b]

Pollutant	Emissions Reductions
Hg (pounds)	9,500
$PM_{2.5}$ (tons)	5,400
CO_2 (thousand tons)	650
SO_2 (tons)	770
NO_x (tons)	220
Non-Hg HAP metals (tons)	49

[a] Values rounded to two significant figures.
[b] Estimated reductions from model year 2028 are applied to 2028 and 2029, those from model year 2030 are applied to 2031 and 2032, and those from model year 2035 are applied to 2032 through 2037. These values are summed to generate total reduction figures.

Importantly, the continuous monitoring of fPM required in this rule will likely induce additional emissions reductions that we are unable to quantify. Continuous measurements of emissions accounts for changes to processes and fuels, fluctuations in load, operations of pollution controls, and equipment malfunctions. By measuring emissions across all operations, power plant operators and regulators can use the data to ensure controls are operating properly and to assess continuous compliance with relevant standards. Because CEMS enable power plant operators to quickly identify and correct problems with pollution control devices, it is possible that fPM emissions could be lower than they otherwise would have been for up to three months—or up to three years if testing less frequently under the LEE program— at a time. This potential reduction in fPM and non-Hg HAP metals emission resulting from the information provided by continuous monitoring coupled with corrective actions by plant operators could be sizeable over the existing coal-fired fleet and is not quantified in this rulemaking.

As we are finalizing the removal of paragraph (2) of the definition of "startup," the time period for engaging fPM or non-Hg HAP metal controls after non-clean fuel use, as well as for full operation of fPM or non-Hg HAP metal controls, is expected to be reduced when

[46] The estimates on non-mercury HAP metals reductions were obtained my multiplying the ratio of non-mercury HAP metals to fPM by estimates of PM_{10} reductions under the rule, as we do not have estimates of fPM reductions using IPM, only PM_{10}. The ratios of non-mercury HAP metals to fPM were based on analysis of 2010 MATS Information Collection Request (ICR) data. As there may be substantially more fPM than PM_{10} reduced by the control techniques projected to be used under this rule, these estimates of non-mercury HAP metals reductions are likely underestimates. More detail on the estimated reduction in non-mercury HAP metals can be found in the docketed memorandum *Estimating Non-Hg HAP Metals Reductions for the 2024 Technology Review for the Coal-Fired EGU Source Category.*

transitioning to paragraph (1). The reduced time period for engaging controls therefore increases the duration in which pollution controls are employed and lowers emissions.

To the extent that the CEMS requirement and removal of the second definition of startup leads to actions that may otherwise not occur absent the amendments to those provisions in this final rule, there may be emissions impacts we are unable to estimate.

3.5.2 Compliance Costs

3.5.2.1 Power Sector Costs

The power industry's "compliance costs" are represented in this analysis as the change in electric power generation costs between the baseline and policy scenarios and are presented in Table 3-5. In other words, these costs are an estimate of the increased power industry expenditures required to implement the final rule requirements. The total compliance costs, presented in Section 3.5.2.4, are estimated for this RIA as the sum of two components. The first component, estimated using the modeling discussed above, is presented below in Table 3-5. This component constitutes the majority of the incremental costs for the final. The second component, the costs of the final rule PM CEMS requirement, is discussed in Section 3.5.2.2.

EPA projects that the annual incremental compliance cost of the final rule is $110 million, $110 million, and $93 million (2019 dollars) in 2028, 2030, and 2035, respectively. The annual incremental cost is the projected additional cost of complying with the final rule in the year analyzed and includes the amortized cost of capital investment and any applicable costs of operating additional pollution controls, investments in new generating sources, shifts between or amongst various fuels, and other actions associated with compliance. This projected cost does not include the compliance calculated outside of IPM modeling, namely the compliance costs related to PM CEMS. See Section 3.5.2.2 for further details on these costs. EPA believes that the cost assumptions used for this RIA reflect, as closely as possible, the best information available to the Agency today. See Section 3.5.4 for a discussion of projected capacity changes and Section 3.6 for a discussion of the uncertainty regarding necessary pollution controls.

Table 3-5 Power Sector Annualized Compliance Cost Estimates under the Final Rule in 2028, 2030, and 2035 (millions of 2019 dollars)

Analysis Year	Final Rule
2028	110
2030	110
2035	93

Note: Values have been rounded to two significant figures. As explained in Section 3.4, the incremental costs of requiring PM CEMS are small relative to the ongoing costs of operation, so the less stringent regulatory alternative in this RIA was not modeled using IPM. As a result, power sector impacts are not estimated for the less stringent regulatory option, but the costs associated with requiring PM CEMS (Table 3-6) are included in the total cost across regulatory options (Table 3-7).

3.5.2.2 PM CEMS Costs

In addition to revising the PM emission standard for existing coal-fired EGUs, EPA is revising the requirements for demonstrating compliance with the PM emission standard for coal- and oil-fired EGUs. The final PM standard renders the current limit for the LEE program moot since it is lower than the current PM LEE limit. Therefore, EPA is removing PM from the LEE program. Currently, EGUs that are not LEE units can demonstrate compliance with the fPM standard either by conducting performance testing quarterly, use of PM continuous parameter monitoring systems (CPMS) or using PM CEMS.

After considering updated information on the costs for performance testing compared to the cost of PM CEMS and capabilities of PM CEMS measurement abilities, as well as the benefits of using PM CEMS, which include increased transparency, compliance assurance, and accelerated identification of anomalous emissions, EPA is finalizing the requirement that all coal-fired EGUs and oil-fired EGUs demonstrate compliance with the PM emission standard by using PM CEMS.

The revision of PM limits alters the composition and duration of testing runs in facilities that use either compliance testing methodology. Estimated costs for quarterly fPM testing and PM CEMS are provided in the "Revised Estimated Non-Beta Gauge PM CEMS and Filterable PM Testing Costs" memorandum, available in the docket. The annualized costs for units currently employing EPA Method 5 quarterly testing are estimated at about $60,000.[47] EPA calibrated its cost estimates for PM CEMS in response to observed installations, manufacturer input, public comment, and engineering analyses. These calibrations include an assumed

[47] EGUs receiving contractual or quantity discounts from performance test provides may incur lower costs.

replacement lifespan of 15 years and an interest rate of 7 percent to approximate the prevailing bank prime rate. For the portion of EGUs that employ PM CEMS, we estimate the annualized costs to be about $72,000.

To produce an inventory of total units which would require the installation of PM CEMS under the final rule as well as the incremental costs of the requirement, EPA began with an inventory of all existing coal-fired EGUs with capacity great enough to be regulated by MATS. That inventory was then filtered to remove EGUs with planned retirements or coal to gas conversions prior to 2028 from analysis of both the baseline and final rule. Within that remaining inventory of 314 EGUs, we used recent compliance data to determine that 120 units have installed PM CEMS, while 177 units use quarterly testing and do not have existing PM CEMS installations. The remaining 17 units (for which fPM compliance data were not available) are assumed to use quarterly testing and not have existing PM CEMS installations.

Table 3-6 Incremental Cost of Final Continuous Emissions Monitoring (PM CEMS) Requirement

Compliance Approach in Baseline	Units (no.)	Baseline Cost (per year per unit)	Total Baseline Costs (per year)	Final Rule (per year per unit)	Final Rule Costs (per year)	Incremental Costs (per year)
Quarterly Testing	190	$60,000	$12,000,000	$72,000	$14,000,000	$2,300,000
PM CEMS	120	$72,000	$8,700,000	$72,000	$8,700,000	$0
Total	**320**	**---**	**$20,000,000**	**---**	**$23,000,000**	**$2,300,000**

Note: Values rounded to two significant figures. Rows may not appear to add correctly due to rounding.

As detailed in Table 3-6, relative to the baseline scenario, revised PM CEMS cost estimates in the final rule leads to an estimated incremental cost of about $12,000 per year per unit for EGUs currently employing quarterly testing. The final rule results in costs of about $2.3 million per year in total.

3.5.2.3 Startup Definition Costs

EPA is finalizing the removal of one of the two options for defining the startup period for EGUs. The first option defines startup as either the first-ever firing of fuel in a boiler for the purpose of producing electricity, or the firing of fuel in a boiler after a shutdown event for any purpose. Startup ends when any of the steam from the boiler is used to generate electricity for sale over the grid or for any other purpose (including on-site use). In the second option, startup is

defined as the period in which operation of an EGU is initiated for any purpose. Startup begins with either the firing of any fuel in an EGU for the purpose of producing electricity or useful thermal energy (such as heat or steam) for industrial, commercial, heating, or cooling purposes (other than the first-ever firing of fuel in a boiler following construction of the boiler) or for any other purpose after a shutdown event. Startup ends four hours after the EGU generates electricity that is sold or used for any other purpose (including on-site use), or four hours after the EGU makes useful thermal energy (such as heat or steam) for industrial, commercial, heating, or cooling purposes, whichever is earlier. This second option, referred to as paragraph (2) of the definition of "startup," required clean fuel use to the maximum extent possible, operation of PM control devices within one hour of introduction of primary fuel (*i.e.*, coal, residual oil, or solid oil-derived fuel) to the EGU, collection and submission of records of clean fuel use and emissions control device capabilities and operation, as well as adherence to applicable numerical standards within four hours of the generation of electricity or thermal energy for use either on site or for sale over the grid (*i.e.*, the end of startup) and to continue to maximize clean fuel use throughout that period.

According to EPA analysis, owners or operators of coal- and oil-fired EGUs that generated over 98 percent of electricity in 2022 have made the requisite adjustments, whether through greater clean fuel capacity, better tuned equipment, better trained staff, a more efficient and/or better design structure, or a combination of factors, to be able to meet the requirements of paragraph (1) of the startup definition. This ability points out an improvement in operation that all EGUs should be able to meet at little to no additional expenditure since the additional recordkeeping and reporting provisions associated with the work practice standards of paragraph (2) of the startup definition were more expensive than the requirements of paragraph (1) of the definition. As a result, this RIA does not incorporate any additional costs of this finalized provision.

3.5.2.4 Total Compliance Costs

The estimates of the total compliance costs are presented in Table 3-7. The total costs are composed of the change in electric power generation costs between the baseline and policy scenarios as presented in Table 3-5 and the incremental cost of the final PM CEMS requirement as detailed in Table 3-6. There are no anticipated costs associated with this rule prior to 2028.

Table 3-7 Stream of Projected Compliance Costs for the Final Rule and Less Stringent Regulatory Alternative (millions of 2019 dollars)[a]

	Regulatory Alternative	
Year	**Final Rule[b]**	**Less Stringent**
2028 (applied to 2028 and 2029)[b]	110	2.3
2030 (applied to 2030 and 2031)[b]	120	2.3
2035 (applied to 2032 to 2037)[b]	95	2.3
2% Discount Rate		
PV	**860**	**19**
EAV	**96**	**2.3**
3% Discount Rate		
PV	**790**	**18**
EAV	**92**	**2.1**
7% Discount Rate		
PV	**560**	**13**
EAV	**80**	**1.8**

[a] Values rounded to two significant figures. PV and EAV discounted to 2023.
[b] IPM run years apply to particular calendar years as reported in the table. The run year information as applied to individual calendar years is thus used to calculate PV and EAVs. Values rounded to two significant figures.

3.5.3 Projected Compliance Actions for Emissions Reductions

Electric generating units subject to the Hg and fPM emission limits in this final rule will likely use various Hg and PM control strategies to comply. This section summarizes the projected compliance actions related to each of these emissions limits.

The 2028 baseline includes approximately 5 GW of operational minemouth EGU capacity designed to burn low rank virgin coal. All of this capacity is currently equipped with Activated Carbon Injection (ACI) technology, and operation of this technology is reflected in the baseline. Each of these EGUs projected to consume lignite is assigned an additional variable operating cost that is consistent with achieving a 1.2 lb/MMBtu limit. Under the final rule, this additional cost does not result in incremental retirements for these units, nor does it result in a significant change to the projected generation level for these units.

The baseline also includes 11.6 GW of operational coal capacity that, based on the analysis documented in the EPA docketed memorandum titled "2024 Update to the 2023 Proposed Technology Review for the Coal- and Oil-Fired EGU Source Category," EPA assumes would either need to improve existing PM controls or install new PM controls to comply with the

final rule in 2028. The various PM control upgrades that EPA assumes would be necessary to achieve the emissions limits analyzed are summarized in Table 3-8.

Table 3-8 Projected PM Control Strategies under the Final Rule in 2028 (GW)

PM Control Strategy	Projected Actions and Retrofits under the Final Rule
Additional O&M	3.7
Minor ESP Upgrades	0.7
Typical ESP Upgrades	2.0
ESP Rebuild	2.4
FF Bag Upgrade	1.3
New Fabric Filter	1.5
Total	**11.6**

Except for one facility (Colstrip, located in Montana), all of the 11.6 GW of operational coal capacity that EPA assumes would need to take some compliance action to meet the final standards are currently operating existing ESPs and/or fabric filters. All of that capacity is projected to install the controls summarized in Table 3-8 and remain operational in 2028.

3.5.4 Generating Capacity

In this section, we discuss the projected changes in capacity by fuel type, building on and adding greater context to the information presented in the previous section. We first look at total capacity by fuel type, then retirements by fuel type, and finally new capacity builds by fuel type for the 2028, 2030, and 2035 run years.

Table 3-9 shows the total net projected capacity by fuel type for the baseline and the final rule for 2028, 2030, and 2035. Here, we see the net effects of projected retirements (Table 3-10) and new capacity builds (see Table 3-11). There are no significant incremental changes in capacity projected in response to the final rule for any given fuel type.

Table 3-9 2028, 2030, and 2035 Projected U.S. Capacity by Fuel Type for the Baseline and the Final Rule

	Total Generation Capacity (GW)			
	Baseline	Final Rule	Change under Final Rule	
			GW	%
2028				
Coal	105.8	105.8	0.0	0.0%
Natural Gas	471.0	471.0	0.0	0.0%
Oil/Gas Steam	62.6	62.6	0.0	0.0%
Non-Hydro RE	394.1	394.1	0.0	0.0%
Hydro	102.4	102.4	0.0	0.0%
Energy Storage	46.7	46.7	0.0	0.0%
Nuclear	93.6	93.6	0.0	0.0%
Other	6.5	6.5	0.0	0.0%
Total	**1,282.7**	**1,282.7**	**0.0**	**0.0%**
2030				
Coal	85.0	85.0	0.0	0.0%
Natural Gas	478.6	478.6	0.0	0.0%
Oil/Gas Steam	64.3	64.3	0.0	0.0%
Non-Hydro RE	440.2	440.2	0.0	0.0%
Hydro	103.7	103.7	0.0	0.0%
Energy Storage	58.6	58.6	0.0	0.0%
Nuclear	90.9	90.9	0.0	0.0%
Other	6.5	6.5	0.0	0.0%
Total	**1,327.7**	**1,327.7**	**0.0**	**0.0%**
2035				
Coal	51.6	51.6	0.0	0.0%
Natural Gas	476.0	476.0	0.0	0.0%
Oil/Gas Steam	55.3	55.3	0.0	0.0%
Non-Hydro RE	698.5	698.5	0.0	0.0%
Hydro	107.3	107.3	0.0	0.0%
Energy Storage	113.6	113.6	0.0	0.0%
Nuclear	83.7	83.7	0.0	0.0%
Other	6.5	6.5	0.0	0.0%
Total	**1,592.4**	**1,592.4**	**0.0**	**0.0%**

Note: In this table, "Non-Hydro RE" includes biomass, geothermal, landfill gas, solar, and wind.

Table 3-10 shows the total capacity projected to retire by fuel type for the baseline and the final rule in all run years. The final rule is not projected to result in changes to projected retirements.

Table 3-10 2028, 2030, and 2035 Projected U.S. Retirements by Fuel Type for the Baseline and the Final Rule

	Projected Retirements (GW)		% Change under Final Rule
	Baseline	Final Rule	
2028			
Coal	37.8	37.8	0.0%
Natural Gas	1.3	1.3	0.0%
Oil/Gas Steam	12.4	12.4	0.0%
Non-Hydro RE	2.9	2.9	0.0%
Hydro	0.1	0.1	0.0%
Nuclear	0.0	0.0	0.0%
Other	0.0	0.0	0.0%
Total	**54.4**	**54.4**	**0.0%**
2030			
Coal	56.7	56.6	0.0%
Natural Gas	1.7	1.7	0.0%
Oil/Gas Steam	12.4	12.4	0.0%
Non-Hydro RE	2.9	2.9	0.0%
Hydro	0.1	0.1	0.0%
Nuclear	2.7	2.7	0.0%
Other	0.0	0.0	0.0%
Total	**76.5**	**76.5**	**0.0%**
2035			
Coal	83.7	83.7	0.0%
Natural Gas	4.3	4.3	0.0%
Oil/Gas Steam	22.7	22.7	0.0%
Non-Hydro RE	3.0	3.0	0.0%
Hydro	0.1	0.1	0.0%
Nuclear	9.9	9.9	0.0%
Other	0.1	0.1	0.0%
Total	**123.7**	**123.7**	**0.0%**

Note: In this table, "Non-Hydro RE" includes biomass, geothermal, landfill gas, solar, and wind.

Finally, Table 3-11 shows the projected U.S. new capacity builds by fuel type for the baseline and the final rule in all run years. For the final rule, the incremental changes in projected new capacity for any given fuel type are negligible.

Table 3-11 2028, 2030, and 2035 Projected U.S. New Capacity Builds by Fuel Type for the Baseline and the Final Rule

	New Capacity (GW)		
	Baseline	**Final Rule**	**% Change under Final Rule**
	2028		
Coal	0.0	0.0	0.0%
Natural Gas	26.2	26.2	0.0%
Energy Storage	3.2	3.2	0.2%
Non-Hydro RE	44.8	44.8	0.0%
Hydro	0.0	0.0	0.0%
Nuclear	0.0	0.0	0.0%
Other	0.0	0.0	0.0%
Total	**74.3**	**74.3**	**0.0%**
	2030		
Coal	0.0	0.0	0.0%
Natural Gas	34.3	34.3	0.0%
Energy Storage	15.2	15.2	0.0%
Non-Hydro RE	90.8	90.8	0.0%
Hydro	1.3	1.3	0.0%
Nuclear	0.0	0.0	0.0%
Other	0.0	0.0	0.0%
Total	**141.5**	**141.6**	**0.0%**
	2035		
Coal	0.0	0.0	0.0%
Natural Gas	34.2	34.2	0.0%
Energy Storage	70.2	70.2	0.1%
Non-Hydro RE	349.4	349.4	0.0%
Hydro	4.9	4.9	0.0%
Nuclear	0.0	0.0	0.0%
Other	0.0	0.0	0.0%
Total	**458.6**	**458.6**	**0.0%**

Note: In this table, "Non-Hydro RE" includes biomass, geothermal, landfill gas, solar, and wind.

3.5.5 Generation Mix

In this section, we discuss the projected changes in generation mix for 2028, 2030, and 2035 for the final rule. Table 3-12 presents the projected generation and percentage changes in

national generation mix by fuel type for run years 2028, 2030, and 2035. These generation mix estimates reflect limited changes in energy generation as a result of the final rule in any run year. Estimated changes in coal and natural gas use under the final rule are examined further in Section 3.5.6.

Table 3-12 2028, 2030, and 2035 Projected U.S. Generation by Fuel Type for the Baseline and the Final Rule

	Generation Mix (TWh)		Incremental Change under Final Rule	
	Baseline	**Final Rule**	**TWh**	**%**
		2028		
Coal	472	472	-0.1	0.0%
Natural Gas	1,652	1,652	0.1	0.0%
Oil/Gas Steam	26	26	0.0	0.0%
Non-Hydro RE	1,141	1,141	0.0	0.0%
Hydro	293	293	0.0	0.0%
Energy Storage	53	53	0.0	0.1%
Nuclear	751	751	0.0	0.0%
Other	31	31	0.0	0.0%
Total	**4,418**	**4,418**	**0.0**	**0.0%**
		2030		
Coal	410	410	0.0	0.0%
Natural Gas	1,670	1,670	0.0	0.0%
Oil/Gas Steam	25	25	0.0	0.0%
Non-Hydro RE	1,329	1,329	0.0	0.0%
Hydro	298	298	0.0	0.0%
Energy Storage	69	69	0.0	0.0%
Nuclear	729	729	0.0	0.0%
Other	31	31	0.0	0.0%
Total	**4,560**	**4,560**	**0.0**	**0.0%**
		2035		
Coal	236	236	-0.1	0.0%
Natural Gas	1,344	1,344	0.0	0.0%
Oil/Gas Steam	8	8	0.0	-0.4%
Non-Hydro RE	2,229	2,229	0.0	0.0%
Hydro	319	319	0.0	0.0%
Energy Storage	148	148	0.1	0.1%
Nuclear	667	667	0.0	0.0%
Other	31	31	0.0	0.0%
Total	**4,981**	**4,981**	**0.0**	**0.0%**

Note: In this table, "Non-Hydro RE" includes biomass, geothermal, landfill gas, solar, and wind.

3.5.6 Coal and Natural Gas Use for the Electric Power Sector

In this section we discuss the estimated changes in coal use and natural gas use in 2028, 2030, and 2035. Table 3-13 and Table 3-14 present percentage changes in national coal usage by EGUs by coal supply region and coal rank, respectively. These fuel use estimates show small changes in national coal use in the final rule relative to the baseline in all run years. Additionally, the final rule is not projected to result in significant coal switching between supply regions or coal rank.

Table 3-13 2028, 2030, and 2035 Projected U.S. Power Sector Coal Use by Coal Supply Region for the Baseline and the Final Rule

Region	Year	Million Tons		% Change under Final Rule
		Baseline	Final Rule	
Appalachia	**2028**	39.8	39.8	0.1%
Interior		37.8	37.8	-0.1%
Waste Coal		7.3	7.3	0.0%
West		166.1	166.0	-0.1%
Total		**250.9**	**250.8**	**0.0%**
Appalachia	**2030**	38.8	38.8	0.0%
Interior		35.1	35.1	0.0%
Waste Coal		7.1	7.1	0.0%
West		141.5	141.5	0.0%
Total		**222.5**	**222.5**	**0.0%**
Appalachia	**2035**	31.8	31.9	0.1%
Interior		19.4	19.4	-0.1%
Waste Coal		6.8	6.8	0.0%
West		89.0	89.1	0.1%
Total		**147.1**	**147.2**	**0.0%**

Table 3-14 2028, 2030, and 2035 Projected U.S. Power Sector Coal Use by Rank for the Baseline and the Final Rule

Rank	Year	Million Tons		% Change under Final Rule
		Baseline	Final Rule	
Bituminous	2028	72.1	72.1	0.00%
Subbituminous		145.1	145.1	0.00%
Lignite		32.5	32.3	-0.60%
Total		**249.6**	**249.5**	**0.00%**
Bituminous	2030	62.8	62.8	0.00%
Subbituminous		125.8	125.8	0.00%
Lignite		29.3	29.3	0.00%
Total		**218**	**218**	**0.00%**
Bituminous	2035	42.4	42.4	0.00%
Subbituminous		74.1	74.2	0.10%
Lignite		24.5	24.5	0.00%
Total		**140.9**	**141**	**0.00%**

Table 3-15 presents the projected changes in national natural gas usage by EGUs in the 2028, 2030, and 2035 run years. These fuel use estimates reflect negligible changes in projected gas generation in 2028, 2030, and 2035.

Table 3-15 2028, 2030, and 2035 Projected U.S. Power Sector Natural Gas Use for the Baseline and the Final Rule

Year	Trillion Cubic Feet		% Change under Final Rule
	Baseline	Final Rule	
2028	11.6	11.6	0.0%
2030	11.7	11.7	0.0%
2035	9.3	9.3	0.0%

3.5.7 Fuel Price, Market, and Infrastructure

The projected impacts of the final rule on coal and natural gas prices are presented below in Table 3-16 and Table 3-17, respectively. As with the projected impact of the final rule on fuel use, there is no significant change projected for minemouth and delivered coal prices due to the final rule.

Table 3-16 2028, 2030, and 2035 Projected Minemouth and Power Sector Delivered Coal Price (2019 dollars) for the Baseline and the Final Rule

	Year	$/MMBtu		% Change under Final Rule
		Baseline	Final Rule	
Minemouth	2028	0.98	0.98	0.0%
Delivered		1.54	1.54	0.0%
Minemouth	2030	1.02	1.02	0.0%
Delivered		1.56	1.56	0.0%
Minemouth	2035	1.07	1.07	0.0%
Delivered		1.55	1.55	0.0%

Consistent with the projection of no significant change in natural gas use under the final rule, Henry Hub and power sector delivered natural gas prices are not projected to significantly change under the final rule over the period analyzed. Table 3-17 summarizes the projected impacts on Henry Hub and delivered natural gas prices in 2028, 2030, and 2035.

Table 3-17 2028, 2030, and 2035 Projected Henry Hub and Power Sector Delivered Natural Gas Price (2019 dollars) for the Baseline and the Final Rule

	Year	$/MMBtu		% Change under Final Rule
		Baseline	Final Rule	
Henry Hub	2028	2.78	2.78	0.0%
Delivered		2.84	2.84	0.0%
Henry Hub	2030	2.89	2.89	0.0%
Delivered		2.95	2.95	0.0%
Henry Hub	2035	2.87	2.87	0.0%
Delivered		2.88	2.88	0.0%

3.5.8 Retail Electricity Prices

EPA estimated the change in the retail price of electricity (2019 dollars) using the Retail Price Model (RPM).[48] The RPM was developed by ICF for EPA and uses the IPM estimates of changes in the cost of generating electricity to estimate the changes in average retail electricity prices. The prices are average prices over consumer classes (i.e., consumer, commercial, and industrial) and regions, weighted by the amount of electricity used by each class and in each region. The RPM combines the IPM annual cost estimates in each of the 64 IPM regions with

[48] See documentation available at: *https://www.epa.gov/airmarkets/retail-price-model*.

EIA electricity market data for each of the 25 electricity supply regions (shown in Figure 3-1) in the electricity market module of the National Energy Modeling System (NEMS).[49]

Table 3-18, Table 3-19, and Table 3-20 present the projected percentage changes in the retail price of electricity for the regulatory control alternatives in 2028, 2030, and 2035, respectively. Consistent with other projected impacts presented above, the projected impacts on average retail electricity prices at both the national and regional level are projected to be small in all run years.

[49] See documentation available at: *https://www.eia.gov/outlooks/aeo/nems/documentation/electricity/pdf/EMM_2022.pdf*.

Table 3-18 Projected Average Retail Electricity Price by Region for the Baseline and under the Final Rule, 2028

All Sectors	2028 Average Retail Electricity Price (2019 mills/kWh)		
Region	Baseline	Final Rule	% Change under Final Rule
TRE	73.4	73.4	0.0%
FRCC	96.4	96.4	0.0%
MISW	92.3	92.3	0.0%
MISC	87.9	88.0	0.2%
MISE	95.2	95.2	0.0%
MISS	81.3	81.3	0.0%
ISNE	141.8	141.8	0.0%
NYCW	208.4	208.4	0.0%
NYUP	121.5	121.5	0.0%
PJME	116.9	116.9	0.0%
PJMW	90.4	90.4	0.0%
PJMC	72.4	72.4	0.0%
PJMD	70.8	70.8	0.0%
SRCA	94.7	94.7	0.0%
SRSE	96.7	96.7	0.0%
SRCE	71.6	71.6	0.0%
SPPS	75.3	75.3	0.0%
SPPC	98.5	98.4	0.0%
SPPN	64.1	64.1	0.0%
SRSG	101.3	101.3	0.0%
CANO	138.7	138.7	0.0%
CASO	170.5	170.5	0.0%
NWPP	75.0	75.4	0.5%
RMRG	96.4	96.4	0.0%
BASN	96.8	96.8	0.0%
National	97.1	97.1	0.0%

Table 3-19 Projected Average Retail Electricity Price by Region for the Baseline and under the Final Rule, 2030

All Sectors	2030 Average Retail Electricity Price (2019 mills/kWh)		
Region	Baseline	Final Rule	% Change under Final Rule
TRE	73.3	73.3	0.0%
FRCC	97.6	97.6	0.0%
MISW	93.2	93.2	0.0%
MISC	91.3	91.5	0.2%
MISE	109.4	109.4	0.0%
MISS	85.7	85.7	0.0%
ISNE	156.6	156.6	0.0%
NYCW	210.3	210.3	0.0%
NYUP	125.7	125.7	0.0%
PJME	109.9	109.9	0.0%
PJMW	97.3	97.3	0.0%
PJMC	89.3	89.3	0.0%
PJMD	76.5	76.5	0.0%
SRCA	92.1	92.2	0.0%
SRSE	94.7	94.7	0.0%
SRCE	70.7	70.7	0.0%
SPPS	77.7	77.8	0.0%
SPPC	97.3	97.3	0.0%
SPPN	65.1	65.1	0.0%
SRSG	101.7	101.6	0.0%
CANO	142.9	142.9	0.0%
CASO	173.8	173.9	0.0%
NWPP	81.6	81.7	0.1%
RMRG	100.7	100.7	0.0%
BASN	96.3	96.3	0.0%
National	99.6	99.6	0.0%

Table 3-20 Projected Average Retail Electricity Price by Region for the Baseline and under the Final Rule, 2035

All Sectors	2035 Average Retail Electricity Price (2019 mills/kWh)		
Region	Baseline	Final Rule	% Change under Final Rule
TRE	78.4	78.4	0.0%
FRCC	91.9	91.9	0.0%
MISW	84.5	84.5	0.0%
MISC	81.5	81.5	0.1%
MISE	95.7	95.7	0.0%
MISS	79.2	79.2	0.0%
ISNE	156.1	155.8	-0.2%
NYCW	208.9	208.9	0.0%
NYUP	124.6	124.6	0.0%
PJME	108.5	108.5	0.0%
PJMW	91.8	91.8	0.0%
PJMC	75.1	75.1	0.0%
PJMD	71.4	71.4	0.0%
SRCA	89.4	89.4	0.0%
SRSE	90.1	90.1	0.0%
SRCE	67.1	67.1	0.0%
SPPS	69.5	69.5	0.0%
SPPC	80.4	80.4	0.0%
SPPN	63.0	63.0	0.0%
SRSG	103.4	103.4	0.0%
CANO	139.5	139.5	0.0%
CASO	172.8	172.8	0.0%
NWPP	78.5	78.9	0.4%
RMRG	93.4	93.4	0.0%
BASN	96.9	97.0	0.0%
National	95.9	95.9	0.0%

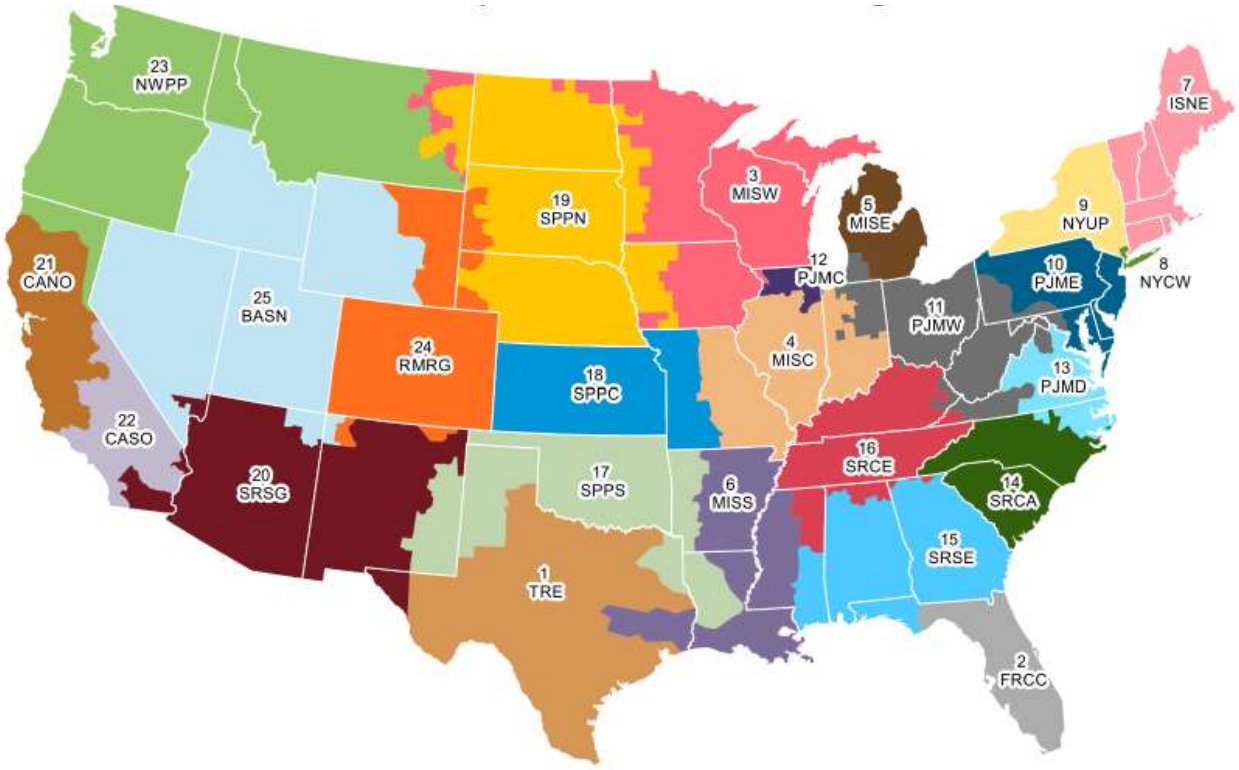

Figure 3-1 Electricity Market Module Regions
Source: EIA (*http://www.eia.gov/forecasts/aeo/pdf/nerc_map.pdf*)

3.6 Limitations of Analysis and Key Areas of Uncertainty

EPA's power sector modeling is based on expert judgment of various input assumptions for variables whose outcomes are uncertain. As a general matter, the Agency reviews the best available information from engineering studies of air pollution controls and new capacity construction costs to support a reasonable modeling framework for analyzing the cost, emission changes, and other impacts of regulatory actions for EGUs. The annualized cost of the final rule, as quantified here, is EPA's best assessment of the cost of implementing the rule on the power sector.

The IPM-projected annualized cost estimates of private compliance costs provided in this analysis are meant to show the increase in production (generating) costs to the power sector in response to the finalized requirements. To estimate these annualized costs, as discussed earlier, EPA uses a conventional and widely accepted approach that applies a capital recovery factor (CRF) multiplier to capital investments and adds that to the annual incremental operating expenses to calculate annual costs. The CRF is derived from estimates of the cost of capital

(private discount rate), the amount of insurance coverage required, local property taxes, and the life of capital. The private compliance costs presented earlier are EPA's best estimate of the direct private compliance costs of the rule.

In addition, there are several key areas of uncertainty related to the electric power sector that are worth noting, including:

- **Electricity demand:** The analysis includes an assumption for future electricity demand. To the extent electricity demand is higher and lower, it may increase/decrease the projected future composition of the fleet.
- **Natural gas supply and demand:** To the extent natural gas supply and delivered prices are higher or lower, it would influence the use of natural gas for electricity generation and overall competitiveness of other EGUs (e.g., coal and nuclear units).
- **Longer-term planning by utilities:** Many utilities have announced long-term clean energy and/or climate commitments, with a phasing out of large amounts of coal capacity by 2030 and continuing through 2050. These announcements are not necessarily reflected in the baseline and may alter the amount of coal capacity projected in the baseline that would be covered under this rule.
- **FPM emissions and control:** As discussed above, the baseline fPM emissions rates for each unit are based on the analysis documented in the memorandum titled "2024 Update to the 2023 Proposed Technology Review for the Coal- and Oil-Fired EGU Source Category." For those EGUs with rates greater than the final limit, EPA assumes that control technology summarized in Section 3.4 would be necessary to remain operational. While the baseline emissions rate for each EGU and the cost and performance assumption for each PM control technology are the best available to EPA at this time, it is possible that some EGUs may be able to achieve the revised fPM emissions limits with less costly control technology (e.g., an ESP upgrade instead of a fabric filter installation). It is also possible that EPA's cost assumptions reflect higher technology costs than might be incurred by EGUs.

These are key uncertainties that may affect the overall composition of electric power generation fleet and/or compliance with the finalized emissions limits and could thus have an effect on the estimated costs and impacts of this action. While it is important to recognize these key areas of uncertainty, they do not change EPA's overall confidence in the projected impacts of the final rule presented in this section. EPA continues to monitor industry developments and makes appropriate updates to the modeling platforms in order to reflect the best and most current data available.

Estimated impacts of the Revised 2023 and Later Model Year Light-Duty Vehicle GHG Emissions Standards are captured in the baseline,[50] while estimated impacts of the Proposed Rule: Model Years 2027 and Later Light-Duty and Medium-Duty Vehicle Emissions Standards are not captured in the baseline.[51] The latter rule (in its proposal) is projected to increase the total demand for electricity by 0.4 percent in 2030 and 3.4 percent in 2040 relative to the baseline electricity demand projections assumed in this analysis. Estimated impacts of the 2023 Final Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review are also not included in this analysis. The RIA for oil and natural gas sector rule projected small increases in the price of natural gas as result of the requirements (U.S. EPA, 2023c). All else equal, inclusion of these two programs would likely result in a modest increase in the fPM reductions and total cost of compliance for this rule. While we might see less retired capacity in the baseline due to higher electricity demand, and thus more PM controls under the RTR, the magnitude of the potential incremental impacts would likely be very small.

3.7 References

Brinkman, G., Bain, D., Buster, G., Draxl, C., Das, P., Ho, J., . . . Zhang, J. (2021). The North American Renewable Integration Study (NARIS): A U.S. Perspective. Retrieved from United States: https://www.osti.gov/biblio/1804701

Cole, W. J., Greer, D., Denholm, P., Frazier, A. W., Machen, S., Mai, T., . . . Baldwin, S. F. (2021). Quantifying the challenge of reaching a 100% renewable energy power system for the United States. Joule, 5(7), 1732-1748. doi:10.1016/j.joule.2021.05.011

DOE. (2021). The Solar Futures Study. Retrieved from United States: https://www.osti.gov/biblio/1820105

U.S. EPA. (2005). Regulatory Impact Analysis for the Final Clean Air Interstate Rule. Research Triangle Park, NC: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Health and Environmental Impact Division. https://www.epa.gov/sites/default/files/2020-07/documents/transport_ria_final-clean-air-interstate-rule_2005-03.pdf

U.S. EPA. (2011a). Regulatory Impact Analysis for the Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone in 27 States; Correction of SIP Approvals for 22 States. Research Triangle Park, NC: U.S. Environmental Protection

[50] 86 FR 43726. The RIA for this rule available at: *https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1012ONB.pdf*.
[51] 88 FR 29184.

Agency, Office of Air Quality Planning and Standards, Health and Environmental Impact Division. https://www3.epa.gov/ttn/ecas/docs/ria/transport_ria_final-csapr_2011-06.pdf

U.S. EPA. (2011b). Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards. (EPA-452/R-11-011). Research Triangle Park, NC: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Health and Environmental Impact Division. http://www.epa.gov/ttn/ecas/regdata/RIAs/matsriafinal.pdf

U.S. EPA. (2014a). Economic Analysis for the Final Section 316(b) Existing Facilities Rule. (EPA-821-R-14-001). Washington DC: U.S. Environmental Protection Agency. https://www.epa.gov/sites/default/files/2015-05/documents/cooling-water_phase-4_economics_2014.pdf

U.S. EPA. (2014b). Guidelines for Preparing Economic Analyses. (EPA 240-R-10-001). Washington DC: U.S. Environmental Protection Agency, Office of Policy, National Center for Environmental Economics. https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses

U.S. EPA. (2015a). Benefit and Cost Analysis for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category. (EPA-821-R-15-005). Washington DC: U.S. Environmental Protection Agency. https://www.epa.gov/sites/default/files/2015-10/documents/steam-electric_benefit-cost-analysis_09-29-2015.pdf

U.S. EPA. (2015b). Regulatory Impact Analysis for the Clean Power Plan Final Rule. (EPA-452/R-15-003). Research Triangle Park, NC: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Health and Environmental Impact Division. https://www.epa.gov/sites/default/files/2020-07/documents/utilities_ria_final-clean-power-plan-existing-units_2015-08.pdf

U.S. EPA. (2015c). Regulatory Impact Analysis: EPA's 2015 RCRA Final Rule Regulating Coal Combustion Residual (CCR) Landfills and Surface Impoundments At Coal-Fired Electric Utility Power Plants. (EPA-821-R-20-003). Washington DC: U.S. Environmental Protection Agency. https://www.regulations.gov/document/EPA-HQ-RCRA-2009-0640-12034

U.S. EPA. (2016). Regulatory Impact Analysis of the Cross-State Air Pollution Rule (CSAPR) Update for the 2008 National Ambient Air Quality Standards for Ground-Level Ozone. (EPA-452/R-16-004). Research Triangle Park, NC: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Health and Environmental Impact Division. https://www.epa.gov/sites/default/files/2020-07/documents/transport_ria_final-csapr-update_2016-09.pdf

U.S. EPA. (2019). Regulatory Impact Analysis for the Repeal of the Clean Power Plan, and the Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units. (EPA-452/R-19-003). Research Triangle Park, NC: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Health

and Environmental Impact Division. https://www.epa.gov/sites/production/files/2019-06/documents/utilities_ria_final_cpp_repeal_and_ace_2019-06.pdf

U.S. EPA. (2020). Benefit and Cost Analysis for Revisions to the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category. (EPA-821-R-20-003). Washington DC: U.S. Environmental Protection Agency. https://www.epa.gov/sites/default/files/2020-08/documents/steam_electric_elg_2020_final_reconsideration_rule_benefit_and_cost_analysis.pdf

U.S. EPA. (2021). Regulatory Impact Analysis for the Final Revised Cross-State Air Pollution Rule (CSAPR) Update for the 2008 Ozone NAAQS. (EPA-452/R-21-002). Research Triangle Park, NC: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Health and Environmental Impact Division. https://www.epa.gov/sites/default/files/2021-03/documents/revised_csapr_update_ria_final.pdf

U.S. EPA. (2023a). Electricity Sector Emissions Impacts of the Inflation Reduction Act: Assessment of projected CO2 emission reductions from changes in electricity generation and use. (EPA 430-R-23-004). Retrieved from https://www.epa.gov/system/files/documents/2023-09/Electricity_Emissions_Impacts_Inflation_Reduction_Act_Report_EPA-FINAL.pdf

U.S. EPA. (2023b). Regulatory Impact Analysis for the Final Federal Good Neighbor Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standards. (EPA-452/R-23-001). Research Triangle Park, NC: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Health and Environmental Impact Division. https://www.epa.gov/system/files/documents/2023-03/SAN%208670%20Federal%20Good%20Neighbor%20Plan%2020230315%20RIA_Final.pdf

U.S. EPA. (2023c). Regulatory Impact Analysis of the Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review. (EPA-452/R-23-013). Research Triangle Park, NC: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Health and Environmental Impact Division. https://www.epa.gov/system/files/documents/2023-12/eo12866_oil-and-gas-nsps-eg-climate-review-2060-av16-ria-20231130.pdf

BENEFITS ANALYSIS

4.1 Introduction

This rule is projected to reduce emissions of Hg and non-Hg HAP metals, fine particulate matter ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen oxides (NO_X), and carbon dioxide (CO_2) nationally. The projected reductions in Hg are expected to reduce the bioconcentration of MeHg in fish. Subsistence fishing is associated with vulnerable populations, including minorities and those of low socioeconomic status. Further reductions in Hg emissions should reduce fish concentrations and exposure to HAP particularly for the subsistence fisher sub-population. The projected reductions in HAP emissions should help EPA maintain an ample margin of safety by reducing exposure to MeHg and carcinogenic HAP metals.

Regarding the potential health and ecological benefits of the rule from projected HAP reductions, we note that these are discussed only qualitatively and not quantitatively. Exposure to the HAP emitted by the source category, depending on the exposure duration and level of exposure, is associated with a variety of adverse health effects. These adverse health effects may include chronic health disorders (e.g., irritation of the lung, skin, and mucus membranes; decreased pulmonary function, pneumonia, or lung damage; detrimental effects on the central nervous system; cardiovascular disease; damage to the kidneys; and alimentary effects such as nausea and vomiting), adverse neurodevelopmental impacts, and increased risk of cancer. See 76 FR 25003–25005 for a fuller discussion of the health effects associated with HAP.

The analysis of the overall EGU sector completed for EPA's review of the 2020 appropriate and necessary finding (2023 Final A&N Review) identified significant reductions in cardiovascular and neuro-developmental effects from exposure to MeHg (88 FR 13956). However, the amount of Hg reduction projected under this rule is a fraction of the Hg estimates used in the 2023 Final A&N Review. Overall, the uncertainty associated with modeling potential benefits of Hg reduction for fish consumers would be sufficiently large as to compromise the utility of those benefit estimates—though importantly, such uncertainty does not decrease our confidence that reductions in emissions should result in reduced exposures of HAP to the general population, including MeHg exposures to subsistence fishers located near these facilities. Further, estimated risks from exposure to non-Hg HAP metals were not expected to exceed

acceptable levels, although we note that these emissions reductions should result in decreased exposure to HAP for individuals living near these facilities.

Reducing$PM_{2.5}$ and SO_2 emissions is expected to reduce ground-level $PM_{2.5}$ concentrations. Reducing NO_X emissions is expected to reduce both ground-level ozone and $PM_{2.5}$ concentrations. Below we present the estimated number and economic value of these avoided $PM_{2.5}$ and ozone-attributable premature deaths and illnesses. We also present the estimated monetized climate and health benefits associated with emission reductions projected under the final rule.

In addition to reporting results, this section details the methods used to estimate the benefits to human health of reducing concentrations of $PM_{2.5}$ and ozone resulting from the projected emissions reductions. This analysis uses methods for determining air quality changes that have been used in the RIAs from multiple previous proposed and final rules (U.S. EPA, 2019b, 2020a, 2020b, 2021a, 2022c), including the RIA for the proposal of this rule (U.S. EPA, 2023b). The approach involves two major steps: (1) developing spatial fields of air quality across the U.S. for a baseline scenario and the final rule for 2028, 2030, and 2035 using nationwide photochemical modeling and related analyses (see Air Quality Modeling Appendix, Appendix A, for more details); and (2) using these spatial fields in BenMAP-CE to quantify the benefits under the final rule and each year as compared to the baseline in that year.[52] See Section 4.3.3 for more detail on BenMAP-CE. When estimating the value of improved air quality over a multi-year time horizon, the analysis applies population growth and income growth projections for each future year through 2037 and estimates of baseline mortality incidence rates at five-year increments.

Additionally, elevated concentrations of GHGs in the atmosphere have been warming the planet, leading to changes in the Earth's climate including changes in the frequency and intensity of heat waves, precipitation, and extreme weather events, rising seas, and retreating snow and ice. The well-documented atmospheric changes due to anthropogenic GHG emissions are changing the climate at a pace and in a way that threatens human health, society, and the natural environment. There will likely be important climate benefits associated with the CO_2 emissions

[52] Note we do not perform air quality analysis on the less stringent regulatory option because it has no quantified emissions reductions associated with the finalized requirements for CEMS and the removal of startup definition number two.

reductions expected from this rule. In this RIA, we monetize climate benefits from reducing emissions of CO_2 using estimates of the SC-CO_2.

EPA is unable to quantify and monetize the potential benefits of requiring facilities to utilize CEMS rather than continuing to allow the use of quarterly testing, but the requirement has been considered qualitatively. Relative to periodic testing practices, continuous monitoring of fPM will result in increased transparency, as well as potential emissions reductions from identifying problems more rapidly. Hence, the final rule may induce further reductions of fPM and non-Hg HAP metals than we project in this RIA, and these reductions would likely lead to additional health benefits. However, due to data and methodological challenges, EPA is unable to quantify these potential additional reductions. The continuous monitoring of fPM required in this rule is also likely to provide several additional important benefits to the public which are not quantified in this rule, including greater certainty, accuracy, transparency, and granularity in fPM emissions information than exists today. Additionally, to the extent that the removal of the second definition of startup leads to actions that may otherwise not occur absent this final rule, there may be beneficial impacts we are unable to estimate. Though the rule is likely to also yield positive benefits associated with reducing pollutants other than Hg, non-Hg HAP metals, $PM_{2.5}$, ozone, and CO_2, time, resource, and data limitations prevented us from quantifying and estimating the economic value of those reductions. Specifically, in this RIA EPA does not monetize health benefits of reducing direct exposure to NO_2 and SO_2 nor ecosystem effects and visibility impairment associated with changes in air quality. We qualitatively discuss these unquantified impacts in this section of the RIA.

4.2 Hazardous Air Pollutant Benefits

This final rule is projected to reduce emissions of Hg and non-Hg HAP metals. Specifically, projected reductions in Hg are expected to help reduce exposure to MeHg for sub-populations that rely on subsistence fishing. In addition, projected emissions reductions should also reduce exposure to non-Hg HAP metals including carcinogens such as nickel, arsenic, and hexavalent chromium, for residents located in the vicinity of these facilities.

4.2.1 Hg

Hg is a persistent, bioaccumulative toxic metal that is emitted from power plants in three forms: gaseous elemental Hg (Hg0), oxidized Hg compounds (Hg+2), and particle-bound Hg (HgP). Elemental Hg does not quickly deposit or chemically react in the atmosphere, resulting in residence times that are long enough to contribute to global scale deposition. Oxidized Hg and HgP deposit quickly from the atmosphere impacting local and regional areas in proximity to sources. MeHg is formed by microbial action in the top layers of sediment and soils, after Hg has precipitated from the air and deposited into waterbodies or land. Once formed, MeHg is taken up by aquatic organisms and bioaccumulates up the aquatic food web. Larger predatory fish may have MeHg concentrations many times that of the concentrations in the freshwater body in which they live (ATSDR, 2022). MeHg can adversely impact ecosystems and wildlife.

Human exposure to MeHg is known to have several adverse neurodevelopmental impacts, such as IQ loss measured by performance on neurobehavioral tests, particularly on tests of attention, fine motor-function, language, and visual spatial ability. In addition, evidence in humans and animals suggests that MeHg can have adverse effects on both the developing and the adult cardiovascular system, including fatal and non-fatal ischemic heart disease (IHD). Further, nephrotoxicity, immunotoxicity, reproductive effects (impaired fertility), and developmental effects have been observed with MeHg exposure in animal studies (ATSDR, 2022). MeHg has some genotoxic activity and is capable of causing chromosomal damage in a number of experimental systems. EPA has classified MeHg as a "possible" human carcinogen (U.S. EPA, 2001).

The projected reductions in Hg under this final rule are expected to reduce the bioconcentration of MeHg in fish due to Hg emissions from MATS-affected sources. Risk from near-field deposition of Hg to subsistence fishers has previously been evaluated, using a site-specific assessment of a lake near three lignite-fired facilities (U.S. EPA, 2020d). The results suggest that MeHg exposure to subsistence fishers from lignite-fired units is below the current RfD for MeHg neurodevelopmental toxicity or IQ loss, with an estimated hazard quotient (HQ) of 0.06. In general, EPA believes that exposures at or below the RfD are unlikely to be associated with appreciable risk of deleterious effects.

Regarding the potential magnitude of human health risk reductions and benefits associated with this rule, we make the following observations. All of the exposure results generated as part of the 2020 Residual Risk analysis were below the presumptive acceptable cancer risk threshold and noncancer health-based thresholds. While these results suggest that the residual risks from HAP exposure are low, we do recognize that this regulation should still reduce exposure to HAP.

Regarding potential benefits of the rule to the general population of fish consumers, while we note that the analysis of the overall EGU sector completed for the 2023 Final A&N Review did identify significant reductions in cardiovascular and neuro-developmental effects, given the substantially smaller Hg reduction associated with this rule (approximately 900 to 1000 pounds per year under the final rule compared to the approximately 29 tons of Hg evaluated in the 2023 Final A&N Review), overall uncertainty associated with modeling potential benefits for the broader population of fish consumers would be sufficiently large as to compromise the utility of those benefit estimates.

Despite the lack of quantifiable risks from Hg emissions, reductions would be expected to have some impact (reduction) on the overall MeHg burden in fish for waterbodies near covered facilities. In the appropriate and necessary determination, EPA illustrated that the burden of Hg exposure is not equally distributed across the population and that some subpopulations bore disproportionate risks associated with exposure to emissions from U.S. EGUs. High levels of fish consumption observed with subsistence fishing were associated with vulnerable populations, including minorities and those with low socioeconomic status (SES). Reductions in Hg emissions should reduce MeHg exposure and body burden for subsistence fishers.

U.S. EGU Hg emissions can lead to increased deposition of Hg to nearby waterbodies. Deposition of Hg to waterbodies can also have an impact on ecosystems and wildlife. Hg contamination is present in all environmental media with aquatic systems being particularly impacted due to bioaccumulation. Bioaccumulation refers to the net uptake of a contaminant from all possible pathways and includes the accumulation that may occur by direct exposure to contaminated media as well as uptake from food. Atmospheric Hg enters freshwater ecosystems by direct deposition and through runoff from terrestrial watersheds. Once Hg deposits, it may be converted to organic MeHg mediated primarily by sulfate-reducing bacteria. Methylation is

Table 4-1 Health Effects of $PM_{2.5}$, Ambient Ozone, and Climate Effects

Category	Effect	Effect Quantified	Effect Monetized	More Information
Premature mortality from exposure to $PM_{2.5}$	Adult premature mortality based on cohort study estimates and expert elicitation estimates (age 65-99 or age 30-99)	✓	✓	PM ISA
	Infant mortality (age <1)	✓	✓	PM ISA
Nonfatal morbidity from exposure to $PM_{2.5}$	Heart attacks (age > 18)	✓	✓[1]	PM ISA
	Hospital admissions—cardiovascular (ages 65-99)	✓	✓	PM ISA
	Emergency department visits— cardiovascular (age 0-99)	✓	✓	PM ISA
	Hospital admissions—respiratory (ages 0-18 and 65-99)	✓	✓	PM ISA
	Emergency room visits—respiratory (all ages)	✓	✓	PM ISA
	Cardiac arrest (ages 0-99; excludes initial hospital and/or emergency department visits)	✓	✓[1]	PM ISA
	Stroke (ages 65-99)	✓	✓[1]	PM ISA
	Asthma onset (ages 0-17)	✓	✓	PM ISA
	Asthma symptoms/exacerbation (6-17)	✓	✓	PM ISA
	Lung cancer (ages 30-99)	✓	✓	PM ISA
	Allergic rhinitis (hay fever) symptoms (ages 3-17)	✓	✓	PM ISA
	Lost work days (age 18-65)	✓	✓	PM ISA
	Minor restricted-activity days (age 18-65)	✓	✓	PM ISA
	Hospital admissions—Alzheimer's disease (ages 65-99)	✓	✓	PM ISA
	Hospital admissions—Parkinson's disease (ages 65-99)	✓	✓	PM ISA
	Other cardiovascular effects (e.g., other ages)	—	—	PM ISA[2]
	Other respiratory effects (e.g., pulmonary function, non-asthma ER visits, non-bronchitis chronic diseases, other ages, and populations)	—	—	PM ISA[2]
	Other nervous system effects (e.g., autism, cognitive decline, dementia)	—	—	PM ISA[2]
	Metabolic effects (e.g., diabetes)	—	—	PM ISA[2]
	Reproductive and developmental effects (e.g., low birth weight, pre-term births, etc.)	—	—	PM ISA[2]
	Cancer, mutagenicity, and genotoxicity effects	—	—	PM ISA[2]
Mortality from exposure to ozone	Premature respiratory mortality based on short-term study estimates (0-99)	✓	✓	Ozone ISA
	Premature respiratory mortality based on long-term study estimates (age 30–99)	✓	✓	Ozone ISA
Nonfatal morbidity from exposure to ozone	Hospital admissions—respiratory (ages 0-99)	✓	✓	Ozone ISA
	Emergency department visits—respiratory (ages 0-99)	✓	✓	Ozone ISA
	Asthma onset (0-17)	✓	✓	Ozone ISA
	Asthma symptoms/exacerbation (asthmatics age 2-17)	✓	✓	Ozone ISA
	Allergic rhinitis (hay fever) symptoms (ages 3-17)	✓	✓	Ozone ISA
	Minor restricted-activity days (age 18–65)	✓	✓	Ozone ISA
	School absence days (age 5–17)	✓	✓	Ozone ISA
	Decreased outdoor worker productivity (age 18–65)	—	—	Ozone ISA[2]
	Metabolic effects (e.g., diabetes)	—	—	Ozone ISA[2]
	Other respiratory effects (e.g., premature aging of lungs)	—	—	Ozone ISA[2]

Table 4-1 Health Effects of $PM_{2.5}$, Ambient Ozone, and Climate Effects

Category	Effect	Effect Quantified	Effect Monetized	More Information
	Cardiovascular and nervous system effects	—	—	Ozone ISA[2]
	Reproductive and developmental effects	—	—	Ozone ISA[2]
Climate effects	Climate impacts from carbon dioxide (CO_2)	—	✓	Section 4.4
	Other climate impacts (e.g., ozone, black carbon, aerosols, other impacts)	—	—	IPCC, Ozone ISA, PM ISA

[1] Valuation estimate excludes initial hospital and/or emergency department visits.
[2] Not quantified due to data availability limitations and/or because current evidence is only suggestive of causality.

4.3.3 Calculating Counts of Air Pollution Effects Using the Health Impact Function

We use the environmental Benefits Mapping and Analysis Program—Community Edition (BenMAP-CE) software program to quantify counts of premature deaths and illnesses attributable to photochemical modeled changes in annual mean $PM_{2.5}$ and summer season average ozone concentrations for the years 2030, 2035, and 2040 using health impact functions (Sacks et al., 2020). A health impact function combines information regarding: the concentration-response relationship between air quality changes and the risk of a given adverse outcome; the population exposed to the air quality change; the baseline rate of death or disease in that population; and the air pollution concentration to which the population is exposed.

BenMAP quantifies counts of attributable effects using health impact functions, which combine information regarding the: concentration-response relationship between air quality changes and the risk of a given adverse outcome; population exposed to the air quality change; baseline rate of death or disease in that population; and air pollution concentration to which the population is exposed.

The following provides an example of a health impact function, in this case for $PM_{2.5}$ mortality risk. We estimate counts of $PM_{2.5}$-related total deaths (y_{ij}) during each year i among adults aged 18 and older (a) in each county j in the contiguous U.S. (where $j = 1, \ldots, J$ and J is the total number of counties) as:

$$y_{ij} = \Sigma_a\, y_{ija}$$

$$y_{ija} = mo_{ija} \times (e^{\beta \cdot \Delta C_{ij}} - 1) \times P_{ija}, \qquad \text{Eq[1]}$$

where mo_{ija} is the baseline total mortality rate for adults aged a = 18-99 in county j in year i stratified in 10-year age groups, β is the risk coefficient for total mortality for adults associated

NOT YET SCHEDULED FOR ORAL ARGUMENT

No. 24-1119 and consolidated cases

U.S. COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

State of North Dakota, et al.,

Petitioners,

v.

U.S. Environmental Protection Agency,

Respondent.

Petitions for Review of a Final Rule of
the U.S. Environmental Protection Agency

EPA's Combined Opposition to Motions to Stay Final Rule

Todd Kim
Assistant Attorney General

Sue Chen
Redding Cofer Cates
U.S. Department of Justice
Environment & Natural Resources Div.
Environmental Defense Section
P.O. Box 7611
Washington, D.C. 20044
202.305.0283
sue.chen@usdoj.gov

Of counsel
Matthew McNerney
U.S. Environmental Protection Agency
Office of General Counsel
Washington, D.C.

CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

As required by D.C. Circuit Rule 27(a)(4), EPA certifies:

A. Parties and amici

Petitioners are:

- Case No. 24-1119: the State of North Dakota, State of West Virginia, State of Alaska, State of Arkansas, State of Georgia, State of Idaho, State of Indiana, State of Iowa, State of Kansas, Commonwealth of Kentucky, State of Louisiana, State of Mississippi, State of Missouri, State of Montana, State of Nebraska, State of Oklahoma, State of South Carolina, State of South Dakota, State of Tennessee, State of Texas, State of Utah, Commonwealth of Virginia, and State of Wyoming;
- Case No. 24-1154: NACCO Natural Resources Corporation;
- Case No. 24-1179: National Rural Electric Cooperative Association, Lignite Energy Council, National Mining Association, Minnkota Power Cooperative, Inc., East Kentucky Power Cooperative, Inc., Associated Electric Cooperative Inc., Basin Electric Power Cooperative, and Rainbow Energy Center, LLC;
- Case No. 24-1184: Oak Grove Management Company LLC and Luminant Generation Company LLC;
- Case No. 24-1190: Talen Montana, LLC;

- Case No. 24-1194: Westmoreland Mining Holdings LLC, Westmoreland Mining LLC, and Westmoreland Rosebud Mining LLC;
- Case No. 24-1201: America's Power and Electric Generators MATS Coalition;
- Case No. 24-1217: NorthWestern Corporation; and
- Case No 24-1223: Midwest Ozone Group.

Respondents are the U.S. Environmental Protection Agency and Michael S. Regan, Administrator.

Intervenor for Petitioners is San Miguel Electric Cooperative, Inc.

Intervenors for Respondent are Air Alliance Houston, Alliance of Nurses for Healthy Environments, American Academy of Pediatrics, American Lung Association, American Public Health Association, Chesapeake Climate Action Network, Citizens for Pennsylvania's Future, Clean Air Council, Clean Wisconsin, Downwinders at Risk, Environmental Defense Fund, Environmental Integrity Project, Montana Environmental Information Center, Natural Resources Council of Maine, Natural Resources Defense Council, the Ohio Environmental Council, Physicians for Social Responsibility, and Sierra Club; and the Commonwealth of Massachusetts, State of Minnesota, State of Connecticut, State of Illinois, State of Maine, State of Maryland, State of Michigan, State of New Jersey, State of New York, State of Oregon, Commonwealth of Pennsylvania, State of Rhode Island,

State of Vermont, State of Wisconsin, District of Columbia, City of Baltimore, City of Chicago, and City of New York.

B. Rulings under review

Under review is EPA's action "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units Review of the Residual Risk and Technology Review." 89 Fed. Reg. 38508 (May 7, 2024).

C. Related cases

No related case is or was before this or any other court.

/s/ Sue Chen
Counsel for EPA

TABLE OF CONTENTS

TABLE OF AUTHORITIES

Cases

*Authorities upon which we chiefly rely are marked with asterisks

Statutes

Code of Federal Regulations

Federal Registers

GLOSSARY

2023 Andover Report	Andover Technology Partners, Assessment of Potential Revisions to the Mercury and Air Toxics Standards (June 15, 2023), attached as Lassiter Decl. Ex. A
2023 Technology Memo	EPA, Memorandum on 2023 Technology Review for the Coal- and Oil-Fired EGU Source Category (Jan. 2023), attached as Lassiter Decl. Ex. B
2024 Technical Memo	EPA, Memorandum on 2024 Update to the 2023 Proposed Technology Review for the Coal- and Oil-Fired EGU Source Category (Jan. 2024), attached as Lassiter Decl. Ex. C
2024 Technical Memo Att. 1	Attachment 1 to 2024 Technical Memo, attached as Lassiter Decl. Ex. D
2024 Technical Memo Att. 2	Attachment 2 to 2024 Technical Memo, attached as Lassiter Decl. Ex. E
Am. Power Mot.	Petitioners' Motion for Stay Pending Judicial Review (July 8, 2024) in Case No. 24-1201, filed by America's Power and Electric Generators MATS Coalition
Cichanowicz Report	J. Edward Cichanowicz et al., Technical Comments National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-fired Electric Utility Steam Generating Units Review of Residual Risk and Technology (June 19, 2023), attached as Lassiter Decl. Ex. F
EPA	U.S. Environmental Protection Agency

lb/MMBtu	pounds per million British thermal units of heat input
lb/TBtu	pounds per trillion British thermal units of heat input
Lignite Council Comment	Comment from Lignite Energy Council (June 23, 2023), attached as Lassiter Decl. Ex. G
Midwest Ozone Mot.	Motion for Stay (July 8, 2024) filed by Midwest Ozone Group in Case No. 24-1223
PM CEMS Memo	EPA, Memorandum: PM CEMS Random Error Contribution by Emission Limit (Mar. 22, 2023), attached as Lassiter Decl. Ex. H
Reg. Impact Analysis	EPA, Regulatory Impact Analysis for the Final National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units Review of the Residual Risk and Technology Review (Apr. 2024), attached as Lassiter Decl. Ex. I
Resource Adequacy Memo	EPA, Resources Adequacy Analysis: Vehicle Rules, Final 111 EGU Rules, ELG and MATS RTR: Technical Memo (Apr. 2024), attached as Lassiter Decl. Ex. J
Resp. to Comments	EPA, Summary of Public Comments and Responses on Proposed Rule (Apr. 2024), attached as Lassiter Decl. Ex. K
Rural Mot.	Petitioners' Motion for Stay of the Final Rule (June 21, 2024) in Case No. 24-1179, filed by National Rural Electric Cooperative Association et al.

Sargent & Lundy Report	Sargent & Lundy, PM Incremental Improvement Memo (Mar. 2023), attached as Lassiter Decl. Ex. L
States Mot.	Petitioners' Amended Motion for Stay (June 7, 2024) in Case No. 24-1119, filed by North Dakota et al.
Talen Mot.	Petitioner Talen Montana, LLC and Petitioner NorthWestern Corporation's Joint Motion for Stay (June 27, 2024) in Case Nos. 24-1190 and 24-1217
Westmoreland Mot.	Petitioner's Motion for Stay of the Final Rule (June 27, 2024) in Case No. 24-1194, filed by Westmoreland Mining Holdings LLC, Westmoreland Mining LLC, and Westmoreland Rosebud Mining LLC

INTRODUCTION

Congress's view on toxic air pollution is simple: Less is better. To that end, Congress decided that emission standards would be revised to reflect developments in emission-control practices, processes, and technologies.

The Clean Air Act's air-toxics program, 42 U.S.C. § 7412, embodies that approach. So does EPA's action here tightening two standards for power plants. Better and cheaper emission controls have made stricter standards feasible and their costs reasonable. So much so that almost all regulated entities can already meet those standards, while a small group of laggards emits an outsized share of toxic pollution. EPA, in line with Section 7412, thus reasonably adopted stricter standards.

Six sets of petitioners, in filings totaling over 2,400 pages, move to stay EPA's action. But quantity is not quality, and Movants offer no meritorious claim of a legal or record-based flaw in the standards. Nor can they show a clear and present need for the extraordinary relief they seek. The most that Movants can say is that the standards "may" (or may not) affect electricity grids, while the compliance date is three years away (with a one-year extension also available). That reticence confirms that there is no emergency to justify a stay. The Court should deny the motions.

BACKGROUND

I. A short history of Section 7412.

The Clean Air Act regulates emissions of hazardous air pollutants (or colloquially, air toxics) under 42 U.S.C. § 7412. These pollutants include neurotoxins like mercury, human carcinogens like arsenic and chromium, and a host of other toxic chemicals. *See id.* § 7412(b)(1)-(2); 89 Fed. Reg. 38508, 38515/2-3 (May 7, 2024).

Section 7412 began as a risk-based program. Under that regime, EPA had to assess a pollutant's risk before setting emission limits. *See Sierra Club v. EPA*, 353 F.3d 976, 979 (D.C. Cir. 2004). That approach proved "disappointing" because risk analysis was hard and slow going. *Id.*; *see* 89 Fed. Reg. at 38513/3. It took EPA 20 years to regulate just 7 air toxics. 89 Fed. Reg. at 38514/1.

Frustrated with EPA's sluggish pace in curbing air-toxics emissions, Congress in 1990 revamped Section 7412, transforming it into a technology-driven regime. *Sierra Club*, 353 F.3d at 979-80. The new regime, designed to swiftly slash emissions based on what is technologically achievable, uses a two-phase regulatory process. 89 Fed. Reg. at 38513/2.

In phase one, EPA sets emission standards for categories of sources that emit air toxics. 42 U.S.C. § 7412(d). The standards, based on maximum achievable control technologies rather than risk, are set by examining what the best-

performing 12 percent of existing sources can do. *Id.* § 7412(d)(3). These standards (dubbed the "MACT floor") serve as the stringency floor.

EPA can go beyond that floor and set stricter standards if they are "achievable." *Id.* § 7412(d)(2). In this analysis, EPA considers "the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements…." *Id.* Once EPA sets initial emission standards (be it the floor or beyond the floor), phase one ends.

Phase two entails reviewing existing standards. Section 7412 requires two reviews that proceed on "distinct, parallel" tracks. *Nat'l Ass'n for Surface Finishing v. EPA*, 795 F.3d 1, 5 (D.C. Cir. 2015). The first is a risk review, required within eight years after standards are promulgated for a source category. 42 U.S.C. § 7412(f)(2)(A). In the risk review, EPA considers whether the standards provide "an ample margin of safety" to protect public health and the environment. *Id*. If they do not, EPA must tighten the standards. *Id.*; *see Surface Finishing*, 795 F.3d at 5. Section 7412(f)(2), however, does not require EPA to eliminate all risk to public health and the environment.

The other review—at issue here—is a technology review. This is a recurring review that happens at least every eight years. 42 U.S.C. § 7412(d)(6). In the technology review, EPA considers "developments in practices, processes, and control technologies" and "revise[s the standards] as necessary." *Id.* Because

technology reviews necessarily contemplate going beyond the floor, EPA also looks to factors enumerated in Section 7412(d)(2) to determine whether stricter standards are achievable. *See* 89 Fed. Reg. at 38531/1 (explaining that technology reviews consider "costs, technical feasibility, and other factors").

II. Regulating air-toxics emissions from power plants.

Coal- and oil-fired power plants are among the largest domestic emitters of mercury, arsenic, chromium, lead, and other air toxics. *Id.* at 38509/3. In 2012 EPA found that it was "appropriate and necessary" to regulate air-toxics emissions from coal- and oil-fired electric utility steam-generating units (that is, power plants), and promulgated standards to do so. 77 Fed. Reg. 9304 (Feb. 16, 2012); 42 U.S.C. § 7412(n)(1)(A); 40 C.F.R. Part 63, subpart UUUUU.

This Court upheld the 2012 rule. *See White Stallion Energy Ctr. LLC v. EPA*, 748 F.3d 1222, 1247-51 (D.C. Cir. 2014) (per curiam). On petitions for certiorari, the Supreme Court limited review to the threshold issue of whether EPA had to consider costs in its "appropriate and necessary" finding. *Michigan v. EPA*, 576 U.S. 743 (2015). Because EPA did not do so, the Supreme Court reversed this Court's judgment. *Id.* at 760. The Supreme Court never opined on the 2012 standards themselves, and this Court remanded the rule to EPA while leaving those standards in place. Order, *White Stallion*, Case No. 12-1100 (D.C. Cir. Dec. 15, 2015).

On remand, EPA completed supplemental "appropriate and necessary" findings that address costs. 81 Fed. Reg. 24420 (Apr. 25, 2016); *see* 88 Fed. Reg. 13956, 13962/1-3 (Mar. 6, 2023) (summarizing administrative history). Most recently, in 2023 EPA considered costs and found that it is appropriate and necessary to regulate air-toxics emissions from coal- and oil-fired power plants. 88 Fed. Reg. at 13956/1. No one challenged that finding.

Meanwhile, in 2020, EPA completed its risk review and first technology review. 85 Fed. Reg. 31286 (May 22, 2020). In the risk review, EPA concluded that the 2012 standards provided an ample margin of safety and thus need not be revised. *Id.* at 31314/3. In the technology review, EPA found no developments in practices, processes, or control technologies to warrant revision. *Id.*

III. The 2024 rule.

In 2024, EPA reviewed the 2020 action. 89 Fed. Reg. at 38508/1. It did not reopen the 2020 risk review. *Id.* at 38518/1-2. But EPA disagreed with the 2020 technology review: It determined there are developments in practices, processes, and control technologies that warrant revising the 2012 standards. *Id.* at 38518/3. Although the fundamental nature of emission-control technologies had not changed since 2012, better practices, along with technical and operational improvements, made those controls more efficient and cheaper to use. *Id.* at 38530/1-2, 38537/3;

see id. at 38541/3 (noting that the 2020 review did not address these developments).

Movants focus on two standards that EPA revised for coal-fired units:

Surrogate standard for non-mercury metals: The 2012 rule set emission standards for non-mercury metals like arsenic, chromium, and lead. *Id.* at 38510/1 & n.2. It also gave regulated entities the option to use a surrogate standard based on filterable particulate matter, the control of which also reduces non-mercury metals. *Id.* at 38510/1. Almost all coal-fired units chose to use the surrogate standard in lieu of the metals standards. *Id.* In the 2024 rule, EPA tightened the surrogate standard to a level that almost 90 percent of coal-fired units could already meet. *Id.* at 38510/1, 38524/3. The stricter standard would thus bring the stragglers in line with the rest of the industry.

Mercury standard for lignite units: Lignite coal, mined mostly in North Dakota and Texas, ranks lowest among all coals in terms of quality because it has the lowest energy content. 2024 Technical Memo 37. In 2021, lignite accounted for only about 8 percent of domestic coal production. *Id.* By contrast, bituminous and subbituminous coal, both ranked higher than lignite, together accounted for over 90 percent. *Id.*

The 2012 rule set two mercury standards, one for units burning lignite coal, and a stricter standard for units burning all other types of coal. 77 Fed. Reg. 9304,

9367 (table 3) (Feb. 16, 2012); 89 Fed. Reg. at 38537/2. In the 2024 rule, EPA determined that cost-effective controls are available for lignite units to meet the same mercury limit that has applied to other coal-fired units, and it tightened the standard for lignite units accordingly. 89 Fed. Reg. at 38537/3-49/2.

* * *

The rule took effect on July 8, 2024. *Id.* at 38508/1. Power plants have three years, until July 2027, to comply, and their permitting authorities can grant a one-year extension when necessary. *Id.* at 38519/3.

IV. Procedural history.

States, power plants, mining companies, and others filed nine petitions for review of the 2024 rule. Six stay motions followed. States Mot. (June 7, 2024); Rural Mot. (June 21, 2024); Talen Mot. (June 27, 2024); Westmoreland Mot. (June 27, 2024); Midwest Ozone Mot. (July 8, 2024); Am. Power Mot. (July 8, 2024); *see* Petitioner NACCO Natural Resources Corp.'s Joinder in the State Petitioners' Motion for Stay (June 14, 2024). The Court granted EPA's request to file a consolidated response. Order (July 1, 2024).

STANDARD OF REVIEW

"On a motion for stay, it is the movant's obligation to justify the court's exercise of such an extraordinary remedy." *Cuomo v. U.S. Nuclear Regul. Comm'n*, 772 F.2d 972, 978 (D.C. Cir. 1985) (per curiam), *abrogated on other*

grounds by Winter v. NRDC, 555 U.S. 7 (2008). Movants must show (1) a likelihood of success on the merits; (2) irreparable injury to them if relief is denied; (3) lack of substantial harm to others; and (4) where the public interest lies. *Nken v. Holder*, 556 U.S. 418, 434 (2009). The last two criteria merge here. *Id.* at 435.

On the merits, the disputed standards are reviewed under the same arbitrary-and-capricious standard as under the Administrative Procedure Act. *See* 42 U.S.C. § 7607(d)(9)(A); *Miss. Comm'n on Env't Quality v. EPA*, 790 F.3d 138, 150 (D.C. Cir. 2015) (per curiam). The review is a "narrow" one and "a court is not to substitute its judgment for that of the agency." *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983); *see also Loper Bright Enters. v. Raimondo*, 144 S. Ct. 2244, 2261 (2024) ("Section 706 [of the Administrative Procedure Act] does mandate that judicial review of agency policymaking and factfinding be deferential." (emphasis omitted)). The Court should uphold a decision when the agency considered the relevant factors and articulated a rational connection between the facts found and the choices made. *State Farm*, 463 U.S. at 43. That is true even when the decision has "less than ideal clarity" so long as "the agency's path may reasonably be discerned." *Id.* (internal quotation marks omitted).

Finally, an agency's "interpretations and opinions," made in pursuance of official duty and based on special experience, constitute a "'body of experience

and informed judgment to which courts and litigants could properly resort for guidance,' even on legal questions." *Loper Bright*, 144 S. Ct. at 2259 (quoting *Skidmore v. Swift & Co.*, 323 U.S. 134, 139-40 (1944) (internal brackets omitted)).

ARGUMENT

No stay should issue. Movants have not shown a likelihood of success on the merits. Nor do they have "strong arguments about the harms they face and equities involved." *Ohio v. EPA*, 144 S. Ct. 2040, 2053 (2024). To the contrary, Movants' claims of irreparable harm lack evidence and the equities disfavor a stay.

I. Movants are unlikely to succeed on the merits.

Movants are unlikely to prevail on the merits. First, their reading of Section 7412 clashes with circuit precedent, not to mention statutory text and design. Second, their record-based arguments ignore much of the record. Third, though Movants accuse EPA of improper motive in the rulemaking, the record belies that fiction. Finally, Movants' arguments as to the Colstrip facility flout Section 7412.

A. The technology review complies with Section 7412(d)(6).

1. "Developments" in practices, processes, and technology include improvements in those areas.

Section 7412(d)(6) requires EPA to revise existing emission standards as necessary, "taking into account developments in practices, processes, and control technologies." In the 2024 rule, EPA identified a "clear trend in control efficiency,

costs, and technological improvements" since 2012—a trend that the 2020 technology review overlooked. 89 Fed. Reg. at 38521/1, 38541/3; *contra* Rural Mot. 18. These improvements include more durable filter-bag material, better monitoring practices, and the development of sulfur-resistant chemicals designed to capture mercury from bituminous and lignite coals. 89 Fed. Reg. at 38521/1, 38530/2, 38541/3. All these changes improved how effectively coal-fired units can reduce their air-toxics emissions. Partly due to those improvements, meeting the 2012 standards costs less money than expected. *Id.* at 38530/1.

Movants' contention that no "development" occurred runs aground on the facts and the law. On the facts, Movants either overlook new products (like sulfur-resistant chemicals) or downplay other advances. *E.g.*, States Mot. 7; Rural Mot. 9-11; Talen Mot. 6-10; Westmoreland Mot. 17-18. But dismissing improvements as trivial does not make them so. For example, more durable filter bags lower both the risk that a control might fail, and the wear and tear that impairs efficacy. 89 Fed. Reg. at 38530/2; *contra* Westmoreland Mot. 17-18. That is a meaningful improvement. It is unclear what kind of "validat[ion]" Movants demand, for Section 7412(d)(6) does not require EPA to "quantify" improved efficacy. Talen Mot. 8.

At bottom, Movants' dismissive attitude is rooted in a misunderstanding of the law. "Developments," Movants urge, means changes that are both "*new* and

significant." Westmoreland Mot. 16. On that view, in technology reviews EPA can consider only practices, processes, and technologies that differ fundamentally from what came before. *See* Rural Mot. 9-11; States Mot. 6-7; Talen Mot. 6-10. But that is not what Section 7412(d)(6) says. "Developments," in its ordinary usage, means "the act, process, or result of developing," which in turn means "to cause to evolve or unfold gradually." *See* "Development" and "Developing," Merriam-Webster;[1] Talen Mot. 7 (offering similar definition). The statute thus encompasses incremental changes over time. And that is how progress happens in the real world, where true overnight revolutions in technology are rare; much more common are modest changes that gradually but meaningfully improve the status quo.

This Court rejected Movants' view years ago in *Surface Finishing*. Though petitioners there did not directly challenge the meaning of "developments," they argued that EPA had failed to identify specific developments that warranted revising standards. 795 F.3d at 11. The Court disagreed, holding that EPA permissibly accounted for developments under Section 7412(d)(6)—developments that, as interpreted by EPA, covered "not only wholly new methods," but also "technological improvements," "improvements in efficiency," and "reduced costs." *Id.* (internal quotation marks omitted). In so holding, the Court necessarily agreed

[1] *Available at* https://perma.cc/K9LL-9SQP; https://perma.cc/2TE7-GNUB.

with EPA's reading of "developments" to include technologies that, though "not brand new," underwent "improvements [that] resulted in emissions reductions." *Id.*; *contra* Talen Mot. 7. The improvements identified in the 2024 rule—longer-lasting filter bags, new chemicals to control mercury emissions, improved processes—fall squarely within the kind of developments this Court recognizes as valid under Section 7412(d)(6).[2] *See* 89 Fed. Reg. at 38521/1-2.

To be sure, *Surface Finishing* applied the *Chevron* framework, which the Supreme Court recently overruled. *Loper Bright*, 144 S. Ct. at 2273; *see* 795 F.3d at 7. But *Loper Bright* did "not call into question prior cases that relied on the *Chevron* framework" despite the "change in interpretive methodology." 144 S. Ct. at 2273. So *Surface Finishing*'s holding that EPA's action was lawful remains good law. *Cf.* Talen 28(j) Letter (July 17, 2024) (advising Court of *Loper Bright*).

---

[2] In *NRDC v. EPA*, this Court did not rewrite the statute by reading "developments" to mean only "technological improvements." 529 F.3d 1077 (D.C. Cir. 2008); *contra* States Mot. 7; Talen Mot. 7; Westmoreland Mot. 18; Talen 28(j) Letter 1-2. There, the Court said that technology reviews do not involve resetting the MACT floor. 529 F.3d at 1084. But even if they did, the Court added, petitioners had not identified any "technological innovations" overlooked by EPA. *Id.* The Court never purported to interpret "developments."

And the 2024 rule did not reset MACT floors. *Contra* Rural Mot. 11. That process entails analyzing what the best-performing 12 percent of existing sources can do. 42 U.S.C. § 7412(d)(3). EPA analyzed almost all sources here. *See* 2024 Technical Memo 9, 28; 89 Fed Reg. at 38553/3 & n.88 (noting that EPA lacked relevant data for only about 6 percent of coal-fired units).

EPA's—and the Court's—reading of "developments" aligns not only with statutory text, but also statutory design. Congress rewrote Section 7412 as a technology-based regime. Whereas it ordered a one-time risk review, Congress specified that technology reviews recur at least every eight years. The goal is to ensure that, over time, EPA maintains standards that are "on pace with emerging developments that create opportunities to do even better." *La. Env't Action Network v. EPA*, 955 F.3d 1088, 1093 (D.C. Cir. 2020) (*LEAN*). Congress, in other words, wanted to keep reducing air-toxics emissions when technology allows. 89 Fed. Reg. at 38514/3. It would stymie congressional intent to ignore incremental advances that fall short of being "brand-new." Rural Mot. 10-11; *see* States Mot. 7; Talen Mot. 7-10; Westmoreland Mot. 16.

2. Section 7412 directs the technology review to proceed independently of the risk review.

Also meritless is Movants' insistence that EPA cannot tighten standards found to have an ample margin of safety in the risk review. *E.g.*, Am. Power Mot. 5-9; Midwest Ozone Mot. 5; States Mot. 6, 8; Rural Mot. 17-18; Talen 28(j) Letter 2. Once again, Movants overlook statutory text and design.

Section 7412 imposes separate and distinct requirements on risk and technology reviews. *Surface Finishing*, 795 F.3d at 5. The risk review asks whether, given currently available information, existing standards offer an ample margin of safety to protect public health and the environment. 42 U.S.C.

§ 7412(f)(2). It also directs EPA to require that margin within eight years of promulgating the original standards. *Id.*

In contrast, the technology review asks—on a recurring basis—whether advances in emission controls warrant stricter standards. *Id.* § 7412(d)(6). It applies to all standards, including those that provide ample margins of safety. Congress, in other words, wanted EPA to consider tightening standards based on developments in controls even after safety margins are in place. Otherwise, it would not have required the technology review to recur once the risk review was complete. Nor does Section 7412(d)(6) require technology reviews to account for safety margins or health and environmental risks. *See Ass'n of Battery Recyclers v. EPA*, 716 F.3d 667, 672 (D.C. Cir. 2013) (per curiam) ("[N]othing in section [74]12(d)(6)'s text suggests that EPA must consider" public-health factors); 89 Fed. Reg. at 38525/2-3.[3] Rather, technology reviews consider factors like feasibility and costs. *See* 89 Fed. Reg. at 38531/1.

This setup reflects Congress's decision that technological progress should drive the regulation of air toxics independent of EPA's risk assessment. *Id.* at

[3] EPA often tightens Section 7412 standards with ample margins of safety. *See* 89 Fed. Reg. at 38525 n.29 (giving examples). So what it did here was not a "change of position." Rural Mot. 18. Granted, EPA has, in its discretion, considered risk during technology reviews. States Mot. 4 (citing 69 Fed. Reg. 48338 (Aug. 9, 2004); 71 Fed. Reg. 76603 (Dec. 21, 2006)); Westmoreland Mot. 13. But as the agency noted on one such occasion, an ample margin of safety does not bar tightening standards under Section 7412(d)(6). 71 Fed. Reg. at 76609/2.

38525/3. After all, in revamping Section 7412, Congress made clear that air-toxics emissions are inherently dangerous and sought to reduce those emissions as much as achievable using technology. *Id.* at 38513/3-14/3. And the reality is that scientific advances and newly available data sometimes show that things we had thought "safe" are in fact risky. *See, e.g.*, 73 Fed. Reg. 66964, 66975/2 (Nov. 12, 2008) (updating air-quality standards for lead based on new evidence of neurotoxicity at low doses). In choosing technology-based standards, Congress declined to tether the air-toxics program to risk assessments that could become outdated.

Further, an "ample margin of safety" determination does not mean zero risk. *Contra* States Mot. 1, 6, 10; Rural Mot. 17-18; Talen Mot. 14-15; Westmoreland Mot. 12-13. Coal-fired units emit air toxics that cause serious health problems. Though risks are now much lower, they still exist—and these risks mattered to Congress. 89 Fed. Reg. at 38556/3, 38541/3; *see id.* at 38524/3 (noting disparity in exposure to nearby communities from well-controlled sources versus other sources); Reg. Impact Analysis 4-5, 4-7. That is why Congress directed EPA to continue to require achievable reductions in air-toxics emissions as much as possible, even when standards offer an ample margin of safety.

B. The technology review is sound.

1. EPA reasonably considered feasibility and costs.

EPA considers "costs, technical feasibility, and other factors when evaluating whether it is necessary to revise existing emission standards under [Section 7412](d)(6) to ensure the standards 'require the maximum degree of emission reductions…achievable.'" 89 Fed. Reg. at 38531/1 (quoting 42 U.S.C. § 7412(d)(2)). Here, deference is due EPA's reasonable conclusion that the two challenged standards are achievable given its consideration of those factors.

a. Surrogate standard.

The rule lowered the surrogate standard for non-mercury metals from 0.030 lb/MMBtu to 0.010 lb/MMBtu, measured on a rolling-average basis. *Id.* at 38510/2 & n.4, 38566/1. This new standard is achievable because it is feasible and its costs are reasonable. *See id.* at 38531/1. At a minimum, EPA acted reasonably in so concluding.

The standard is feasible because almost all coal-fired units showed that they could already meet it. *Id.* at 38530/1-3. In this analysis, EPA considered the units' ability to emit at or below 0.010 lb/MMBtu, and to do so over time.

First, quarterly emissions data showed that even before EPA proposed 0.010 lb/MMBtu as a standard, most coal-fired units could achieve that level. The data covers 275 out of 314 coal-fired units. 2023 Technology Memo 2; 2024 Technical

Memo 8; 89 Fed. Reg. at 38553/3. Because electricity demand—and thus emissions—peaks in winter and summer, EPA focused on data from those quarters. 2024 Technical Memo 3; Resp. to Comments 24; *cf.* Rural Mot. 14-15 (quoting *White Stallion*, 748 F.3d at 1251, to argue that "achievable" means "capable of being met under most adverse conditions which can reasonably be expected to recur"); *contra id.* at 12 (misstating that EPA reviewed data "from quarters with the lowest emission rates"); Am. Power Mot. 9-10. The winter and summer data showed that 91 percent of the units achieved emission rates of 0.010 lb/MMBtu or less. 89 Fed. Reg. at 38530/2; 2023 Technology Memo 4-8.

Then, in response to comments, EPA also considered data from other quarters. 89 Fed. Reg. at 38530/2. It reviewed all quarterly emissions data it had for 62 coal-fired units. *Id.* This review, which accounts for the lower-emitting seasons of spring and autumn, found that an even greater percentage of units—93 percent—achieved 0.010 lb/MMBtu or less. *Id.*

Second, EPA considered average emission rates at 296 coal-fired units. 2024 Technical Memo 9. Because emission rates can vary, it is important to consider average rates, which show a unit's ability to emit at 0.010 lb/MMBtu on a sustained basis. *See* Resp. to Comments 30-31 (noting that average rates account for unit variability); *cf.* Am. Power Mot. 9-17 (sidestepping this analysis); Rural Mot. 12-13 (same). The data showed that 263 units (or 89 percent) can

consistently achieve that level of control. 89 Fed. Reg. at 38530/3, 38533/3; *see id.* at 38522/1 (noting that Movant National Rural Electric Cooperative Association's estimate came close); 2024 Technical Memo 17 & Att. 2; *contra* Am. Power Mot. 15-16. Indeed, the median of the average rates was only 0.004 lb/MMBtu. 89 Fed. Reg. at 38522/1. Even among the 33 units (11 percent) that did not average 0.010 lb/MMBtu or less, more than half achieved that level at some point. *See* 2024 Technical Memo Att. 1 at 50-51 (column F).

Given that almost all regulated units could, with existing technology, consistently emit at or below 0.010 lb/MMBtu, EPA reasonably set the surrogate standard at that level. Of course, among units that averaged 0.010 lb/MMBtu or less, emissions at times exceeded that level. *See* Am. Power Mot. at 12-15 (spotlighting Coronado facility); Resp. to Comments 25 (noting that Coronado's rolling-average emissions were at or below 0.010 lb/MMBtu about 70 percent of the time). Those higher levels are unsurprising because they happened when the standard was still 0.030 lb/MMBtu. There was nothing special about 0.010 lb/MMBtu then, and one would not expect regulated units to try to keep their emissions below that level. *See* Resp. to Comments 36; 89 Fed. Reg. at 38510/1 n.3. So the sporadic higher levels do not alter either the fact that regulated units could, using existing controls, average 0.010 lb/MMBtu, or the conclusion that the 0.010 lb/MMBtu standard is feasible. *Contra* Am. Power Mot. 15-16.

EPA also explained why the standard's compliance costs are reasonable. 89 Fed. Reg. at 38533/1-34/1. First, even before EPA adopted the new standard, almost all coal-fired units had invested in the necessary emission controls to meet it. *Id.* at 38533/3. Had costs been unreasonable, those investments would not have happened. Second, compliance costs are only 0.03 percent of coal-fired units' revenue. *Id.* at 38533/2. Third, EPA accounted for factors that skewed its cost estimate: Two units at the Colstrip facility in Montana are the only coal-fired units in the country without modern emission controls. *Id.* at 38533/3. To meet the standard, those two would have to install better controls. *Id.* The cost of their upgrades accounts for over 40 percent of total annual costs. *Id.*[4] At the same time, of the 33 units that would incur compliance costs, 20 account for only 1 percent of total annual costs. *Id.* at 38533/3-34/1; *see* Resp. to Comments 31, 37; 2024 Technical Memo 15; *contra* Am. Power Mot. 11-12. So for most of the affected units, EPA's annual-cost estimates greatly overstate their actual costs.

Some Movants focus on the surrogate standard's cost-effectiveness (meaning the cost per ton or pound of pollution reduction). *E.g.*, States Mot. 10. That figure, they say, far exceeds what EPA had rejected for other air-toxics standards in industries as disparate as petroleum refining, iron-ore processing, and

[4] EPA assumed that Colstrip would install fabric filters. 2023 Technology Memo 9. Filter-bag vendors have "historically offered…guarantees [of emission rates] at 0.010 lb/MMBtu." Sargent & Lundy Report 2, 9; *contra* Talen Mot. 18.

portland-cement manufacturing. *Id.*; Westmoreland Mot. 10-12; *see* 89 Fed. Reg. at 38522/2-3. Yet what it reasonably costs to reduce a pound of pollutants in one industry may be unreasonable in a very different industry. 89 Fed. Reg. at 38523/3-24/3.[5] Cost-effectiveness is also just one metric that EPA considers alongside many others. *Id.* at 38523/3-24/1. Those other metrics here—the broad adoption of necessary controls, the modest cost-to-revenue ratio, and the skewed cost estimate toward one high-emitting facility—show that EPA reasonably imposed costs on a small group of coal-fired units so they can catch up to everyone else. *Id.* at 38530/3.

In calculating cost-effectiveness, EPA also properly declined to assume that most coal-fired units would retire soon. *Contra* Am. Power Mot. 22-26. Though Movants predict that EPA's recently finalized greenhouse-gas rule (a separate action not at issue here) would lead coal-fired units to retire in five years, *id.* at 23-24, nothing in that rule compels retirement. *See* Respondents' Opp. to Mots. to Stay Final Rule, *West Virginia v. EPA*, Case No. 24-1120 and consolidated cases

[5] There is no inconsistency in how EPA distinguished petroleum refineries from power plants. *Contra* Westmoreland Mot. 16. In the petroleum-refineries review, two high-performing sources used existing technologies. After considering the cost-effectiveness of tightening the applicable standard, EPA decided against setting a standard for the industry based on only two high performers. 80 Fed. Reg. 75178, 75201/1-2 (Dec. 1, 2015); 89 Fed. Reg. at 38524/1-2. By contrast, here almost the entire industry performed well. EPA did not claim, as Movants seem to imply, to use different approaches in estimating cost-effectiveness in the two rules. The difference follows from different context in the two industries.

(D.C. Cir. June 11, 2024), Argument § I.B. It instead requires states to develop plans that establish feasible technology-based greenhouse-gas emission standards for coal-fired power plants that do not intend to retire by January 1, 2032. *See* 89 Fed. Reg. 39798, 39840/2-902/3 (May 9, 2024).

To support their retirement argument, Movants cite proposed guidelines that address the Clean Air Act's regional-haze program. *See* Am. Power Mot. 23 (citing 66 Fed. Reg. 38108, 38126 (July 20, 2001)); 66 Fed. Reg. at 38108/1; 42 U.S.C. § 7491. Those guidelines do not apply to this air-toxics dispute. In any event, they do not require accounting for hypothetical retirement dates when calculating costs. *See* 66 Fed. Reg. at 38126/2 (basing "remaining useful life" assessment on closing date that "must be assured by a federally-enforceable restriction preventing further operation"); 40 C.F.R. Part 51, App. Y. § IV.D.4.k (final guidelines). So that document is not evidence of arbitrary action.

Nor did EPA err in calculating cost-effectiveness for Colstrip. *Contra* Talen Mot. 18. EPA estimated that fabric filters can slash Colstrip's emissions by 90 percent, to just above 0.002 lb/MMBtu. 2023 Technology Memo 10. That reduction amount was used to calculate cost-effectiveness. *Id.* at 9-10. Movants, however, act as if fabric filters can reduce Colstrip's emissions to 0.010 lb/MMBtu and no more. Talen Mot. 18. But fabric filters cannot be easily fine-tuned to reduce pollutants by a specified amount and stop there. So Movants' method, in

undercounting the amount of reduced pollution, distorts cost-effectiveness (and omits the compliance margin they urge elsewhere). *See* Am. Power Mot. 17-20; Rural Mot. 13. EPA also reasonably declined to assume that Colstrip would retire soon when Colstrip itself had not—and apparently still has not—decided to retire. *Contra* Talen Mot. 18-19; *see* Lebsack Decl.

Movants' other arguments are easily refuted. First, in the feasibility analysis, EPA properly considered units that use both coal and natural gas. *Contra* Rural Mot. 12-13. EPA's goal is to evaluate the performance of units that would be subject to the surrogate standard. That includes coal-fired units that also burn natural gas. *See* 2023 Technology Memo 5-6 (table 1). Indeed, one control strategy for coal-fired units is to use some natural gas. *Cf.* 89 Fed. Reg. at 38538/3 (explaining this in context of mercury standard). Because EPA considered emissions data from units that use emission controls, for consistency it was reasonable to consider emissions from coal-fired units that also use natural gas. *Id.*

Second, citing a report they commissioned, Movants decry EPA's supposed underestimate of control-retrofit costs by 50 percent and say that annual costs are $1.96 billion. *See* Rural Mot. at 13 (citing Cichanowicz Report at 21). In reality, the report estimated those costs for a standard of 0.006 lb/MMBtu—much lower than what EPA finalized. *See* Cichanowicz Report at 21 ("To meet the alternative PM rate of 0.006 lb/MMBtu, this study projects 50% more units (87 versus 65)

must be retrofit with fabric filters or implement enhanced O&M to an existing fabric filter, incurring an annual cost of $1.96 B").

Finally, the surrogate standard accounts for compliance margins. *Contra* Am. Power Mot. 17-20; Rural Mot. 13. Power plants often target emission levels below what standards require. 89 Fed. Reg. at 38521/3. Doing so creates a margin for error in case their equipment malfunctions or breaks down. *Id*. That margin is baked into the standard in two ways.

One is by setting the emission limit above what most coal-fired units were emitting on average. Recall that EPA considered average emission rates of 296 coal-fired units. 2024 Technical Memo 9. Averages account for operational variability and degradation of emission controls over time. Resp. to Comments 31. In this way, averages capture the kind of equipment problems and variabilities that regulated units must normally contend with. In fact, most of the 296 units in EPA's analysis averaged well below 0.010 lb/MMBtu: The median emission rate was only 0.004 lb/MMBtu, 60 percent below the new standard. 89 Fed. Reg. at 38522/1. This difference—between what most regulated units can do and what the standard requires them to do—serves as a built-in compliance margin that accounts for most causes of emission spikes.

The other place that the standard builds in a margin is on the compliance side. It assesses a given facility's compliance using 30-day rolling averages:

Compliance on any day is based on the facility's average emissions over the last 30 days when fuel was combusted. *See id.* at 38566/1. Rolling averages dampen isolated emission spikes. *Cf. id.* at 38544 (Figure 1) (illustrating this effect for mercury standards). That in turn gives regulated entities a flexibility that allows for normal hiccups in operations.

Movants are thus wrong that EPA ignored compliance margins. Am. Power Mot. 17-20. The surrogate standard accounts for those margins along the same lines that EPA did in Movants' examples, by factoring in variability and allowing compliance flexibility. *See id.* at 18.[6] And because the surrogate standard in effect has a built-in compliance margin, that margin's cost was necessarily part of EPA's cost analysis. *Contra id.* at 18-22; Rural Mot. 13; *see* 89 Fed. Reg. at 38522/1.[7]

b. Mercury standard.

The rule also lowered the mercury standard for lignite units from 4.0 lb/TBtu to 1.2 lb/TBtu, the limit that has applied to every other coal-fired unit since 2012. 89 Fed. Reg. at 38518/3. In the 2012 rule, EPA treated lignite units differently, but

[6] EPA declined to pick a specific compliance margin because power plants have different compliance strategies and thus different preferred compliance margins. *See* 89 Fed. Reg. at 38521/3; Am. Power Mot. 19-20. Movants are wrong that a specific compliance margin is mandated by an EPA memorandum about proper instrument calibration. *See* Am. Power Mot. 19 (citing PM CEMS Memo).

[7] EPA did a sensitivity analysis that considered a 20 percent compliance margin. 89 Fed. Reg. at 38521/3. But because that analysis would have not changed EPA's decision to tighten the surrogate standard, *id.*, Movants' emphasis of it misses the point. Am. Power Mot. 20-22.

not based on any unique property of lignite. Rather, limited data showed that lignite-fired units were not among the best performers. 89 Fed. Reg. at 38541/1-2. In the 2024 rule, however, EPA saw that cost-effective controls are available to lignite units. *Id.* at 38537/2-49/2. The record thus supports EPA's conclusion that the stricter standard is feasible and its costs reasonable for lignite units. *Id.* at 38541/3. Again, EPA acted reasonably.

Start with feasibility. EPA considered both commercially available mercury controls and emission levels that lignite units have actually achieved. As background, when coal burns, it releases mercury in the elemental state. Elemental mercury, however, cannot be captured by controls, be they fabric filters or electrostatic precipitators. To be captured, elemental mercury must first be oxidized, typically by halogens, a group of elements that includes chlorine and bromine. *See* 89 Fed. Reg. at 38539/1; 88 Fed. Reg. 24854, 24875/1 (Apr. 24, 2023). Chemical powders (usually made of carbon and called "sorbents") are then injected into coal-combustion flue gas, where they bind to the oxidized mercury, allowing it to be captured and removed. 89 Fed. Reg. at 38540/2. Controlling mercury from coal with low halogen content, like lignite, is thus harder.

Harder, but still feasible: Subbituminous coal's halogen content is comparable to lignite's, and subbituminous units have long been complying with the 1.2 lb/TBtu limit, often emitting at "considerably lower" levels. *Id.* at 38539/1-

2 (noting that high alkalinity in subbituminous and lignite coals exacerbates effects of low halogen content); *see id.* at 38543 (tables 5-6). They have done so by injecting additional halogens (via brominated sorbents) into flue gas. *Id.* at 38545/3. Subbituminous units' success shows it is feasible to capture mercury from low-halogen coal like lignite. *Id.* at 38539/1-2, 38545/3-46/1.

Other characteristics of lignite coal—higher sulfur content, and higher and variable mercury content—can also make it hard to control mercury emissions. *Id.* at 38541/1. But as with halogen content, these characteristics are also found in other types of coal. *Id.* at 38541/2. Some bituminous coals have sulfur levels comparable to that of lignite. *Id.* at 38543 (tables 5-6). But all bituminous units have been complying with the 1.2 lb/TBtu limit, thanks to a range of sulfur-resistant sorbents and other controls designed for high-sulfur environments. *Id.* at 38546/2-47/1; *see id.* at 38541/3 (noting the development of these sorbents).

And though some lignite coal can have high mercury content, not all lignite coal does. For example, North Dakota lignite has lower and less variable mercury content than Pennsylvania bituminous coal. *Id.* at 38543 (tables 5-6). But again, all bituminous units have been complying with the stricter standard for years.

To be sure, lignite has a unique set of characteristics. But each kind of coal has its own unique set of characteristics that, for one reason or another, makes it hard to control mercury emissions. *Id.* at 38549/1. Given the availability of

controls that other coal-fired units have successfully used to comply with the 1.2 lb/TBtu limit, EPA reasonably concluded that the standard is feasible for lignite units. *See* Rural Mot. 13-14 (ignoring EPA's analysis of available controls).

Lest there be any doubt about whether lignite units can achieve 1.2 lb/TBtu, *cf. id.*, the record shows that two such units at the Twin Oaks facility have already done so—even before that level became the standard. 89 Fed Reg. at 38540/1 (reporting emission levels of 0.63 to 1.1 lb/TBtu). And two lignite units at the Red Hills facility have come reasonably close. *See id.* (reporting emission levels of 1.73 to 1.75 lb/TBtu). Notably, Twin Oaks uses Texas lignite and Red Hills uses Mississippi lignite. *Id.* at 38539/3-40/1. And both Texas and Mississippi lignite have much higher mercury content than North Dakota lignite. *Id.* at 38543 (table 5). Yet Twin Oaks and Red Hills have managed to meet or come close to the new standard. In this way, EPA assessed feasibility by considering the toughest scenarios for controlling lignite's mercury emissions. *Contra* Rural Mot. 14-15.

Movants are wrong that Twin Oaks is an "outlier" that uses controls not "technically feasible" at other units. *Id.* at 14. For a start, Movants mix up different power plants with "Oak" in their names: They cite a comment contending that selective catalytic reduction, used by Oak Grove's lignite plant, would not work at facilities burning North Dakota lignite. *Id.* (citing Lignite Council Comment 8). Oak Grove, however, is not Twin Oaks. And Twin Oaks,

which meets the stricter standard, does not use selective catalytic reduction. *See* 89 Fed. Reg. at 38540/1 (noting that Twin Oaks uses selective *non*-catalytic reduction).

What Twin Oaks does use are sulfur controls and brominated sorbents—the most effective sorbents. *Id.* That sets it apart from many lignite units that are not using brominated or sulfur-resistant sorbents to control mercury, a fact that Movants disregard. *Id.* at 38540/2; Rural Mot. 14-15. Indeed, some lignite units could at times meet the 4.0 lb/TBtu standard without injecting any sorbents. 89 Fed. Reg. at 38540/2.[8] That further shows it is feasible for lignite units to meet the stricter standard: They need not install new controls; they simply need to use effective sorbents in the controls they already have. *See id.* at 38540/2. Doing so would also allow lignite units to inject sorbents at lower rates, something else that Movants disregard. Rural Mot. 15.[9]

This modest demand on lignite units is reflected in the cost estimate. Control costs are expected to be a "small fraction" of their revenue. 89 Fed. Reg. at 38549/1. And the standard's cost-effectiveness is $10,895 to $28,176 per

[8] These units could be burning lignite coal with low mercury levels or spraying oxidizing chemicals onto lignite before burning it.

[9] Even though Section 7412(d)(6) does not require EPA to identify more than one control technology, the agency did so, considering controls like brominated sorbents and chemicals designed for high-sulfur environments. *See* 89 Fed. Reg. at 38546/2-47/1; Resp. to Comments 84; *contra* Rural Mot. 13-14.

additional pound of mercury removed. *Id.* at 38548/2-3. That is comparable to and, if anything, less than the 2012 standard's cost (about $27,000 per pound). *Id.* at 38549/1 n.82.[10] At the same time, a disproportionate share of coal-fired units' mercury emissions comes from lignite units. *Id.* at 38549/1. Given all these factors, EPA properly concluded that costs are reasonable and the standard is achievable. *Id.* at 38547/2-49/2.

* * *

Movants' remaining contention is remarkable only for its brevity. Though Movants say that EPA failed to give a "reasoned explanation" of its feasibility conclusion and was put "on notice" that it is "flawed," they do not elaborate on what the supposed flaw was, proffering only a string cite of comments. States Mot. 11 & n.4. Such "obscure" briefing—"merely stating [an argument], in conclusory fashion and without visible support"—forfeited the argument. *Bd. of Regents of Univ. of Wash. v. EPA*, 86 F.3d 1214, 1221 (D.C. Cir. 1996); *see Davis v. Pension Benefit Guar. Corp.*, 734 F.3d 1161, 1166-67 (D.C. Cir. 2013) (disregarding argument made by incorporation, which skirts limits on brief length).

[10] Even if lignite units need to install new equipment, EPA estimated that costs would be relatively low. *See* 89 Fed. Reg. at 38549/1.

In the end, actual performance by regulated entities shows that the standards are feasible and will incur reasonable costs. Movants' contrary arguments, which ignore EPA's extensive analyses, are unlikely to succeed.

2. EPA properly did not rely on an analysis of benefits and costs, but reasonably considered them anyway.

Movants latch onto an analysis of monetized benefits and costs that EPA conducted to comply with Executive Order 12866. 89 Fed. Reg. at 38553/2. But in choosing the standards' stringency, EPA did not (and did not have to) use the monetized analysis done under the executive order. It relied instead on statutory factors. *Id.*; *see supra* Argument § I.A-B.1. Neither Section 7412(d)(6) nor legal precedent requires EPA to compare monetized benefits and costs in a technology review. *Cf. Michigan*, 576 U.S. at 759.

Meanwhile, in the analysis required by the executive order, EPA considered "all the costs and benefits" and concluded that the rule is a "worthwhile" exercise of its Section 7412(d)(6) authority.[11] 89 Fed. Reg. at 38553/3; *cf. Michigan*, 576 U.S. at 753 ("reasonable regulation ordinarily requires paying attention to the advantages and the disadvantages of agency decisions" (emphasis omitted)).

[11] To be clear, the relevant costs and benefits come from the delta between the 2012 rule and the 2024 rule. 89 Fed. Reg. at 38553/2-3. Their scope is thus narrower than what EPA considered in finding that it is appropriate and necessary to regulate coal- and oil-fired power plants, a finding that no one challenged and is not at issue here. 42 U.S.C. § 7412(n)(1)(A); 88 Fed Reg. at 13956/1.

Movants focus on the monetized part of this analysis as evidence of arbitrary conduct. *E.g.*, States Mot. 6, 8-10; Westmoreland Mot. 14; Talen 28(j) Letter 2. The complete analysis, however, shows that EPA acted reasonably.

In benefit-cost analyses, it is easy to see a proposed action's net benefits (or net costs) when everything can be monetized. But when many things cannot, the agency's task becomes much harder. Here, EPA could not monetize the rule's chief benefit—reduced emissions of air toxics. 89 Fed. Reg. at 38553/2, 38515/3-16/2. Good epidemiological data on air toxics often does not exist: Exposure to these pollutants is often highly concentrated, but in smaller populations than those exposed to non-hazardous air pollutants. The small population size means that studies lack enough statistical power to detect effects of exposure. *Id.* at 38511/2, 38515/3-16/2; *FCC v. Prometheus Radio Project*, 592 U.S. 414, 427 (2021) (noting that it is not unusual for agencies to "not have perfect empirical or statistical data"). Without good data, economists cannot monetize harms from exposure or benefits from avoiding those harms. By contrast, the rule's costs *were* monetized, along with some ancillary benefits like reduced emissions of non-hazardous air pollutants. *See* 89 Fed. Reg. at 38515/3-16/1, 38558 (table 10).

Movants emphasize that costs exceed *monetized* benefits, resulting in high "'negative net monetized benefit.'" States Mot. 8 (quoting 89 Fed. Reg. at 38511/1); *see* Rural Mot. 19; Westmoreland Mot. 7, 14; Talen 28(j) Letter 2; *cf.*

Talen Mot. 23; Midwest Ozone Mot. 9-11. Yet as this Court warned in another Clean Air Act context, "simply weighing the monetizable costs against the monetizable benefits—and thereby excluding the primary benefits for which Congress created the [p]rogram—will yield a misleading result." *Sinclair Wyo. Refin. Co. v. EPA*, 101 F.4th 871, 889 (D.C. Cir. 2024). EPA, for its part, cautioned that the monetized analysis is "ill-suited" to air-toxics regulation because key benefits cannot be monetized. 89 Fed. Reg. at 38511/1, 38553/2.

EPA did, however, consider *all* costs and benefits, including unmonetized ones. *Id.* at 38553/1-59/1.[12] "That those benefits are not easily monetizable does not mean they are less valuable." *Sinclair*, 101 F.4th at 889. But without context, simply comparing costs with unmonetized benefits was meaningless. So EPA did what most of us do when deciding whether it is worthwhile to buy something without monetizing its benefits, be it shopping for groceries, hiring a dogwalker, or planning a vacation: We look to indicia of reasonableness like market price, affordability, and the advantages of having the good or service.

Here, costs reflect the relevant market price. As EPA explained in its technology review, almost all regulated units already have paid for the necessary controls to meet the surrogate standard, and the mercury standard's cost is

[12] In its public-interest argument, one Movant notes in passing that EPA ignored certain upstream costs and benefits. Midwest Ozone Mot. 10. That argument is too obscure to be preserved. *See Univ. of Wash. v. EPA*, 86 F.3d at 1221.

comparable to that of the 2012 standard. *Supra* Argument § I.B.1. Those costs are also a small fraction of regulated entities' revenue. *Id.* Meanwhile, the new standards' chief benefit—less air-toxics emissions—is the point of Section 7412. Those standards, expected to cut mercury by 9,500 pounds and non-mercury metals by 49 tons, would reduce human exposure to toxic chemicals and thus risk. 89 Fed. Reg. at 38511 (table 1), 38556/3; *see* Reg. Impact Analysis at 4-5 (noting the "lack of quantifiable risks" from mercury emissions, but that reductions are expected to affect overall mercury levels in fish (and thus the people who eat them)); 89 Fed. Reg. at 38515/2 (noting mercury's neurotoxic effects on children). The standards can also "enhance ecosystem services and improve ecological outcomes." 89 Fed. Reg. at 38556/3.

Considering all the benefits and costs, EPA noted that the final rule is worthwhile, though the choice of standards was based on statutory factors, not the benefit-cost analysis. *Id.* at 38553/3. Even if the rule had to be based on such an analysis, this is the sort of policy judgment that Congress instructed courts to leave to agencies. *See Ctr. for Auto Safety v. Peck*, 751 F.2d 1336, 1342 (D.C. Cir. 1985). Movants, having overlooked the complete benefit-cost analysis, are unlikely to succeed here.

3. EPA reasonably concluded that the rule would not imperil grid reliability.

EPA looked to statutory factors to choose the standards' stringency. It then modeled the rule's potential effect on the power sector. Reg. Impact Analysis 3-1 to 3-28. Based on that modeling, EPA concluded that the rule is not expected to impair reliability of the nation's electricity grid. 89 Fed. Reg. at 38526/1-2. Fixating on the conclusion rather than the analysis, Movants miss the point.

To begin, EPA has expertise to assess the impacts of its regulations on grid reliability. *Contra* States Mot. 11-12 (citing *Texas v. EPA*, 829 F.3d 405, 432 (5th Cir. 2016)). After all, Congress entrusted EPA to set standards for sources like power plants. 42 U.S.C. § 7412(d)(2), (n)(1). And EPA has been successfully regulating the power sector for years without causing blackouts or soaring electricity prices. *See* 89 Fed. Reg. at 38519/3, 38526/2-3 (giving examples of past rules). Movants' contrary take would bar EPA from tightening standards for power plants unless it consults certain energy-regulatory authorities—a condition found nowhere in Section 7412. Anyway, EPA did consult "other Federal agencies, reliability experts, and grid operators" here. Resp. to Comments 156 (also noting ongoing consultation with the Department of Energy, under a joint memorandum of understanding, on grid-reliability issues); *contra* States Mot. 12.

To assess the rule's potential energy impact, EPA used a state-of-the-art, peer-reviewed model. *See* Reg. Impact Analysis 3-1 to 3-4 (noting that industry

also uses the model, which reflects information about the electricity market from utilities, industry experts, gas- and coal-market experts, financial institutions, and governments). The model projected that the rule would not lead any coal-fired capacity to retire. *Id.* at 3-18. On that basis, EPA concluded that the rule is not expected to affect grid reliability. 89 Fed. Reg. at 38526/1-2.[13]

This analysis discredits the bulk of Movants' grid arguments, which target EPA's conclusion about grid reliability. States Mot. 11-14. But Movants say little about the zero-retirement projection that undergirds that conclusion. Their only critique of the projection is that EPA allegedly underestimated retirements in the *2012* rule. *Id.* at 12-13; *cf.* Rural Mot. 25.

That critique is both irrelevant and wrong. It is irrelevant because an agency's failure to accurately predict the future does not make the underlying action—let alone a later action like the 2024 rule—unreasonable. *See Pub. Utils. Comm'n of State of Cal. v. FERC*, 24 F.3d 275, 281 (D.C. Cir. 1994) ("Predictions regarding the actions of regulated entities are precisely the type of policy judgments that courts routinely and quite correctly leave to administrative agencies."). And Movants' critique is wrong because although more coal-fired units retired than EPA had predicted in 2012, studies show that those retirements

[13] EPA also analyzed cumulative impacts of its recent power-plant rules, including this one, and concluded that they are unlikely to impair the power sector's ability to meet demand. *See* Resource Adequacy Memo; *contra* States Mot. 13-14.

were largely due to reduced demand for coal-fired electricity, driven by lower electricity demand and cheaper natural gas—coal's direct competitor. *See* 89 Fed. Reg. at 38526/1-27/1; 87 Fed. Reg. 7624, 7653/1-3 (Feb. 9, 2022). Of course, substituting natural gas for coal does not affect grid reliability.

And even though EPA projected that the rule would not cause retirements, it took commenters' grid concerns seriously. It explained that the kind of blackouts feared by commenters are unlikely to happen because power plants cannot unilaterally retire. Before they can shut down, power plants generally must undergo extensive processes imposed by state regulators and regional transmission organizations. 89 Fed. Reg. at 38526/2. These processes typically require analyses of the proposed retirement's impacts and identification of mitigation options. *Id.*; *see* Resp. to Comments 52-53 (noting that one of Colstrip's owners is in a regional program that addresses reliability planning). Sometimes, regulators offer temporary funding to keep the power plant open until longer-term measures are in place. 89 Fed. Reg. at 38526/2. And the Department of Energy, when facing an emergency electricity shortage, can issue orders allowing power plants to temporarily operate above their emission standards. *See id.* (citing 16 U.S.C. § 824a(c)).

Though Movants dismiss these failsafes as "unworkable," they do not explain why, either for Colstrip or more generally. Talen Mot. 13, 16-17; States

Mot. 20. An argument so skeletal is forfeited. *See Univ. of Wash.*, 86 F.3d at 1221; *Davis*, 734 F.3d at 1166-67. Besides, EPA did not rely on emergency resources in the rulemaking. It projected that the rule would not impair the grid. And it cited these resources in response to comments. 89 Fed. Reg. at 38526/1-2. Giving accurate responses is not arbitrary or capricious. *Contra* States Mot. 20.

C. The 2024 rule is not a pretext for regulating greenhouse gases.

EPA tightened the mercury standard and surrogate standard (for non-mercury metals) to reduce power plants' air-toxics emissions. The standards are not, as Movants imagine, a pretext for EPA to cut emissions of another pollutant—greenhouse gases—by "forc[ing] a nationwide transition away from coal." States Mot. 14.

Courts presume that, absent clear contrary evidence, agencies properly discharged their duties. *See United States v. Chem. Found.*, 272 U.S. 1, 14-15 (1926); *USPS v. Gregory*, 534 U.S. 1, 10 (2001). Movants offer no contrary evidence. Though they spin an elaborate tale of EPA's scheming, the record shows that it is nonsense. States Mot. at 14-16. EPA considered—and rejected—calls for even tougher standards. 89 Fed. Reg. at 38532 (table 4), 38538/1-2. It instead chose standards that are expected to result in zero coal-fired retirements. Reg. Impact Analysis 3-18. EPA cannot possibly be trying to shut down coal-fired units by not shutting them down at all.

Nor was the 2024 rule spurred by an "Executive Order *on climate change*." States Mot. 14; *see id.* at 3-4. That executive order, issued by President Biden in early 2021, broadly states his Administration's policy goals for protecting public health and the environment. 86 Fed. Reg. 7037, 7037 (Jan. 25, 2021). The goals cover more than just climate change and include "ensur[ing] access to clean air" and "limit[ing] exposure to dangerous chemicals." *Id.*

As for various statements by the White House and the Administrator that Movants assembled in service of their tale, States Mot. at 14-16, the Court cannot consider such extra-record material. *See* 42 U.S.C. § 7607(d)(7)(A) (defining scope of the record for judicial review); *CTS Corp. v. EPA*, 759 F.3d 52, 64 (D.C. Cir. 2014). Anyhow, nothing in those statements alters the conclusion that EPA's technology review complies with Section 7412.[14] *Cf. Dep't of Com. v. New York*,

[14] Movants also misread the extra-record material. Take the PowerPoint they cite as evidence of EPA's supposed intent to use different statutory authorities to "implement the Administration's climate agenda." States Mot. 15. In reality, the PowerPoint addresses all kinds of environmental problems created by power plants, and the statutes (like the Clean Air Act) that direct EPA to tackle them. *See* Chang Decl. Att. Likewise, the Administrator's PBS interview discussed power-plant regulations addressing not just climate concerns but also "waste and discharges in water" and "health-based pollution." Transcript, PBS interview with Michael S. Regan (June 30, 2022), *available at* https://www.pbs.org/newshour/show/epa-administrator-michael-regan-discusses-supreme-court-ruling-on-climate-change (last visited on July 20, 2024); States Mot. 15-16 & n.9.

588 U.S. 752, 781 (2019) ("a court may not reject an agency's stated reasons for acting simply because the agency might also have had other unstated reasons.").

D. Section 7412 directs EPA to regulate, not exempt, sources with obsolete controls that "could" retire.

Section 7412 aims to reduce air-toxics emissions through better technology. Yet Movants urge that the surrogate standard should not apply to Colstrip because it has obsolete controls and might retire at some point. *See, e.g.*, Talen Mot. 8, 10, 13-14; Westmoreland Mot. 12-15. That perverse view, if adopted, would upend the statutory scheme.

Technology reviews play a key role in Section 7412's technology-based regime. They allow EPA to tighten standards to keep up with technological advances. *See LEAN*, 955 F.3d at 1093. Deciding whether to tighten standards often means looking at what the best-performing sources are doing. Stricter standards, in turn, mean bringing stragglers in line with their peers. So of course technology reviews can impose costs on just a subset of regulated sources—but only because everyone else already paid those costs in the usual course of business. *See* Resp. to Comments 41; *e.g.*, Talen Mot. 10.

That was so here. Colstrip is the only U.S. coal-fired power plant without fabric filters or electrostatic precipitators, leaving it the highest emitter. Resp. to Comments 41. Indeed, Colstrip "struggled to meet the original 0.030 lb/MMBtu" standard and, in 2018, violated its permit by exceeding that level. 89 Fed. Reg. at

38531/2. Even so, Colstrip continues to use scrubbers that cannot reduce emissions to meet the 0.010 lb/MMBtu surrogate standard. Resp. to Comments 41, 52. In adopting a standard that almost all coal-fired units could already meet, EPA, in line with Section 7412, simply sought to bring Colstrip (and a small group of other laggards) to where the industry is as a whole. *Id.*

Movants think that Colstrip's choice—against industry trends—to use inferior controls ought to exempt it from the stricter standard. Because Colstrip would incur disproportionate costs to meet that standard, they say, it deserves a break. Talen Mot. 8, 10, 15-16; Westmoreland Mot. 7, 10, 14-15. Or, simply put, Movants want to reward those who hang on to outdated controls. The Court should reject their attempt to subvert Section 7412.

Similarly, EPA reasonably declined to exempt Colstrip on account of possible retirement.[15] The agency examined the potential interaction between the surrogate standard and the greenhouse-gas rule. *Contra* Talen Mot. 11-12. In that context, it considered whether to create a subcategory for units facing near-term retirements. Resp. to Comments 38; 89 Fed. Reg. at 38527/1-3. EPA reasonably declined because "only a few facilities" would be eligible for a near-term

[15] Though Movants blame EPA for "compelling" Colstrip to retire by 2031, the specter of retirement has long haunted that facility. Talen Mot. 11. Disagreement among Colstrip's owners about how and when to retire has led to years of litigation and even involvement by the Montana state legislature. Lebsack Decl. ¶¶ 25- 26.

retirement subcategory: Less than a quarter of coal-fired units had preexisting plans to retire between 2029 and 2032; only three could not comply with the stricter standard. 89 Fed. Reg. at 38527/3. Colstrip did not figure in this tally, having never said that it would retire. Lebsack Decl. ¶¶ 25-31; *see* Talen Mot. 13-14 (conflating Colstrip with units that announced retirement); Westmoreland Mot. 15 (faulting EPA for ignoring impact from hypothetical retirement). So a retirement subcategory would not have materially reduced overall compliance costs and would have had "little utility." 89 Fed. Reg. at 38527/3.

Nor was it a viable alternative to exempt units that, like Colstrip's, "could decide to retire" but have no publicly stated plans to do so. Talen Mot. 14 (emphasis omitted); *see id.* at 13. If EPA had done that, then every coal-fired unit would be exempted, for they will all retire at some point. *Cf.* Resp. to Comments 38 ("The Agency has not previously subcategorized based on retirements under [Section 7412], and do[es] not find it appropriate to do so at this time."). EPA reasonably declined to exempt potentially retiring units from its standards.

Ultimately, Section 7412 aims to continue to reduce air-toxics emissions through better technology. EPA tightened the surrogate standard to bring a few units up to par with the rest of the industry. It would defeat Section 7412's text and design to allow those units to keep using obsolete controls until whenever they decide to retire. Movants' contrary argument is unlikely to succeed.

II. Movants show no irreparable harm.

The only kind of injury that justifies the extraordinary remedy of a stay is an irreparable one. *Wis. Gas Co. v. FERC*, 758 F.2d 669, 674 (D.C. Cir. 1985) (per curiam). An irreparable injury "must be both certain and great." *Id.* It must have such "*imminence*" that there is a "clear and present need for equitable relief…." *Id*. (internal quotation marks omitted). Movants fall short of that high bar: They speculate about possible grid problems, and they offer no evidence of great, imminent harm.

A. Movants speculate about threats to the grid.

Rehashing their merits arguments, Movants say that the 2024 rule threatens grid reliability. *E.g.*, Rural Mot. 23-24; States Mot. 18-21; Talen Mot. 21-22; Midwest Ozone Group Mot. 7-8. EPA showed that the rule is not expected to cause any retirements. Reg. Impact Analysis 3-18. When Movants' claims of harm conflict with the record, the Court should focus on the record and consider the applicable arbitrary-and-capricious standard. 42 U.S.C. § 7607(d)(7)(A), (9). The Court is not well-positioned, especially at the stay stage, to weigh the credibility of Movants' extra-record declarations against EPA's record findings.

Nor do the declarations pass muster under *Wisconsin Gas*. They are long on possibilities but short on certainty, dwelling on the parade of horribles that could ensue if—*if*—coal-fired units were to retire. *E.g.*, Barkey Decl. ¶ 5; Cottrell Decl.

¶¶ 23-24; Friez Decl. ¶¶ 5, 7; Hines Decl. ¶ 23; Lane Decl. ¶¶ 11, 21, 23, 26; Lebsack Decl. ¶ 11.e-f; Nowakowski Decl. ¶ 7; Tschider Decl. ¶ 23. But the declarants do not specify whether and when that contingency would ever occur. So, as these examples show (with emphases added), they hedge:

- "*If* the Final Rule forces even more coal generation sources to shut down, …it will significantly impact grid reliability…." Vigesaa Decl. ¶ 20.
- "[Lignite Energy Council]'s members are actively trying to determine *if* they will be able to comply…and still remain commercially viable." Bohrer Decl. ¶ 18.
- "I am concerned that the reduced level of allowable fPM *could* lead coal-unit owners…to retire those units…." Rickerson Decl. ¶ 12.
- "The Final Rule *may* cause coal plants in the MISO and PJM grids to close." Huston Decl. ¶ 14.
- "The level of annualized costs to comply with the MATS Final Rule *may* be cost prohibitive and lead to a premature retirement of Colstrip." Lebsack Decl. ¶ 46.

Movants' briefing likewise resorts to *if*s, *could*s, and *may*s to argue harm. *E.g.*, States Mot. 1, 20; Talen Mot. 21. But as EPA explained, regulators have extensive processes and backstops and other measures to protect grid reliability. 89 Fed. Reg. at 38526/2. So there is no credible evidence that the rule will cause

power plants to abruptly shut down and imperil the grid. Movants thus flunk *Wisconsin Gas*'s certainty requirement. And the Fifth Circuit's analysis of different declarations in a different case cannot alter the conclusion that follows from *Wisconsin Gas*'s binding precedent. States Mot. 21-22 (citing *Texas*, 829 F.3d at 416, 434).

B. Movants offer no evidence that they will incur great costs imminently.

Despite their voluminous submissions, Movants fail to show that they will incur hefty costs during the judicial-review period. No one here disputes that some coal-fired units will have to spend money to comply with the standards, or that in some cases those costs may pass on to ratepayers in the form of higher electricity bills. The question on a stay motion is whether Movants have shown that their harm is so "great" and "imminen[t]" that the Court should suspend a duly promulgated regulation before full merits briefing. *Wis. Gas*, 758 F.2d at 674 (emphasis omitted); *cf. Ohio*, 144 S. Ct. at 2053 (recognizing that stay applicants would incur hundreds of millions of dollars in compliance costs "during the pendency of this litigation"). No such harm exists for either regulated Movants who own or operate coal-fired units, or non-regulated Movants like states and mining companies.

1. Regulated Movants.

Though the power companies declare that they must start compliance work right now, they offer neither evidence nor reason for the rush. Their threadbare, conclusory assertions are not "proof indicating that the harm is certain to occur in the near future." *Wis. Gas*, 758 F.2d at 674.

For one thing, the rule's compliance deadline is three years away. 89 Fed. Reg. at 38519/3. On top of that, power plants can apply—to their permitting authorities, many of whom are represented by Movants—for a one-year extension (until July 2028). *Id.* The record also shows that compliance work to meet the surrogate standard typically takes two years or less, and the mercury standard, under a year. *See* Sargent & Lundy Report 7; 2023 Andover Report 48-49. Yet Movants offer no evidence of why power plants need to work on compliance right away, or why the one-year extension is unavailable to them. *See, e.g.*, Bohrer Decl. ¶¶ 18, 22-23; Bridgeford Decl. ¶ 8; Courter Decl. ¶ 12; Lebsack Decl. ¶¶ 35-37; McCollam Decl. ¶¶ 34, 37; McLennan Decl. ¶¶ 37-38, 45, 52; Purvis Decl. ¶¶ 19, 22-23; Rural Mot. 20, 22, 24-25; States Mot. 18; Talen Mot. 20-21; *see also* Order, *Denka Performance Elastomer LLC v. EPA*, Case No. 24-1135 (D.C. Cir. July 17, 2024) (denying petition for reconsideration of order denying stay motion, because movant failed to show irreparable harm "given that it could but has not

requested from respondents an extension of the deadline to comply with the rule under review").[16]

The purported rush is all the more baffling when many power plants can show compliance using emissions averaging. That is, a qualifying facility can average emissions from its regulated units. *See* 40 C.F.R. § 63.10009; 89 Fed Reg. at 38521/3. So long as those units' average emission rate meets the standard, the entire facility is in compliance. Averaging, in short, allows some units to emit above the standard.[17]

Take the Spurlock facility, owned by Movant East Kentucky Power Cooperative. Though Mr. Purvis's declaration (at ¶¶ 13-15, 21-26, 33-34, 36) focuses on Spurlock Unit 3's high emissions, Spurlock's other units seem to emit at rates well below the surrogate standard. *See* 2024 Technical Memo Att. 2 at 71-79.[18] Yet Mr. Purvis never explains why Spurlock chooses not to average its units'

---

[16] Some Movants cite the rule's monitoring requirements as a cause of their alleged harm. *See* Tschider Decl. ¶ 20; Midwest Ozone Mot. 6-7 (mentioning costs of Continuous Emissions Monitoring Systems); Rural Mot. 20 (referring to "PM CEMS"). But Movants never attack the monitoring requirement on the merits, thus giving this Court no reason to stay it. So any harm from that requirement cannot factor in the stay analysis.

[17] The technology review did not account for emissions averaging as a compliance strategy. In this way, EPA overestimated compliance costs to the benefit of regulated entities.

[18] *See also* https://cfpub.epa.gov/webfire/reports/esearch.cfm (last visited July 22, 2024) (under Air Emission Reports, search facility under "Submitting Organization and/or Facility Name").

emissions. Publicly available data suggests that other Movants' facilities may also be eligible for emissions averaging. *See* n.18; Collam Decl. (Basin Electric); McLennan Decl. (Minnkota); Tschider Decl. (Rainbow).

Together, the three-year deadline, the one-year extension, and the availability of emissions averaging vitiate Movants' imminence claims.

2. Non-regulated Movants.

Though they submit declarations from power companies, Movants like states and mining companies are not regulated by the rule. So they cannot count any harm to the power companies as their own. *See Nken*, 556 U.S. at 426 (asking "whether *the applicant* will be irreparably injured" (emphasis added)). Instead, these Movants must prove their own great, imminent harm. They fail to do so.

First, Movants offer no evidence that pass-through compliance costs would result in any great electricity-rate increase to them. *See* States Mot. 17. EPA projected that rate increases would be minimal, between 0.1 to 0.5 percent—and in line with one declarant's estimate. Reg. Impact Analysis 3-25 to 27; *see* Fedorchak Decl. ¶ 26 (predicting "at least a 0.5 percent increase"); *contra* States Mot. 17. Other declarants admit that some ratepayers can switch providers to avoid higher rates. Tschider Decl. ¶ 29; Lebsack Decl. ¶¶ 14-15. And though Movants try to inflate the bill by counting what non-Movant ratepayers would have to pay, only harm to the stay applicant counts. States Mot. 17; *see, e.g.*, Lane Decl.

¶ 23 (stating that compliance "will cost West Virginia customers nearly $40 million in added rates"); Vigesaa Decl. ¶ 24 (counting all ratepayers across multiple states); *Nken*, 556 U.S. at 426; *cf. Alfred L. Snapp & Son, Inc. v. Puerto Rico ex rel. Barez*, 458 U.S. 592, 610 n.16 (1982) ("A State does not have standing as *parens patriae* to bring an action against the Federal Government.").

Second, though state-regulator declarants vaguely object to devoting resources to understand, implement, and mitigate the rule, those exertions do not count because they are based on speculation that the rule would imperil the grid. *See* Fedorchak Decl. ¶ 7; Lane Decl. ¶¶ 18, 30; States Mot. 17-18. Nor do the declarants explain why those tasks must happen now (or prove any costs). This silence is especially odd when many state regulators have a say in compliance timing because they can grant one-year extensions. Suffice to say, then, that their conclusory statements are not proof of irreparable harm.[19] *See Wis. Gas*, 758 F.2d at 674. That is also true of conclusory assertions of harm by Movant Midwest Ozone Group (at 5-7), which has neither identified its members nor explained how it has standing to seek a stay.

Finally and most fundamentally, non-regulated Movants tie various alleged harms to how power companies would respond to the standards. *E.g.*, Cottrell

[19] State Movants do not allege harm to their sovereign interests, let alone that those interests are "expressly recognize[d]" by the Clean Air Act. *Ohio*, 144 S. Ct. at 2053; States Mot. 17-22.

Decl. ¶ 23; Fedorchak Decl. ¶ 26; Friez Decl. ¶¶ 11-17; Raad Decl. ¶ 9; States Mot. 17; Westmoreland Mot. 19-20. But their piggybacking attempts fail because the power companies cannot show imminence. *See supra* Argument § II.B.1. So non-regulated Movants cannot either.

III. A stay would harm the public interest.

In Section 7412, Congress decided that less toxic air pollution is better, and that it is worthwhile to keep reducing pollution through improved technology—even when existing standards offer an ample margin of safety. To Congress, technological progress, not just our ability to assess risk, drives the regulation of air toxics. The 2024 rule delivers those benefits. Staying the rule would deny the public the benefits that Congress sought to confer. *See United States v. Oakland Cannabis Buyers' Co-op.*, 532 U.S. 483, 497 (2001) ("a court sitting in equity cannot ignore the judgment of Congress, deliberately expressed in legislation." (internal quotation marks omitted)).

Movants' refrain that earlier standards are safe enough ignores statutory design and congressional intent. Midwest Ozone Mot. 8-10; Rural Mot. 26; States Mot. 22-23. Their other arguments recycle debunked merits and harm arguments. Midwest Ozone Mot. 9-10; Rural Mot. 26; States Mot. 22; Talen Mot. 22-23; Westmoreland Mot. 21-22. Movants, in short, cannot show that a stay would serve public interest.

IV. Any stay should be narrowly tailored.

Movants are not entitled to a stay. But if the Court were to disagree, relief must be narrowly tailored. *See Gill v. Whitford*, 585 U.S. 48, 68 (2018). Movants' merits arguments target only the rule's surrogate standard for non-mercury metals and mercury standard for lignite units. They do not address the rule's other provisions, such as revisions to monitoring requirements. *See* 89 Fed. Reg. at 38509/3 (summarizing the rule's key provisions). Any stay thus should be limited to the two severable standards. *See id.* at 38518/3.

Likewise, were the Court to conclude that only some Movants meet their burden under *Nken*, a stay should pause the rule's application only as to the successful parties. For example, Talen's and Westmoreland's motions address only Colstrip, which burns subbituminous coal. Lebsack Decl. ¶ 8. Any stay based on their motions should apply only to Colstrip and certainly should not touch the mercury standard for lignite units. Similarly, any stay based on arguments about the mercury standard should not touch the surrogate standard.

CONCLUSION

For all their objections, Movants are out of step with the power-plant industry. The vast majority of coal-fired units can meet the standards. Only a small group needs to up its game by using better controls. And that—using better technology to reduce toxic air pollution—is what Congress amended Section 7412

to do. There is no error or emergency to justify the extraordinary relief Movants seek. The Court should deny the stay motions.

Submitted on July 22, 2024.

Todd Kim
Assistant Attorney General

/s/ Sue Chen
Sue Chen
Redding Cofer Cates
U.S. Department of Justice
Environment & Natural Resources Div.
Environmental Defense Section
P.O. Box 7611
Washington, D.C. 20044
202.305.0283
sue.chen@usdoj.gov

Of counsel
Matthew McNerney
U.S. Environmental Protection Agency
Office of General Counsel
Washington, D.C.

CERTIFICATES OF COMPLIANCE AND SERVICE

I certify that this document complies with Fed. R. App. P. 32(a)(5) and (6) because it uses 14-point Times New Roman, a proportionally spaced font.

I also certify that this document complies with the Court's July 1, 2024, Order because by Microsoft Word's count, it has 11,909 words, excluding the parts exempted under Fed. R. App. P. 32(f).

Finally, I certify that on July 22, 2024, I electronically filed this document with the Court's CM/ECF system, which will serve each party.

/s/ Sue Chen

ORAL ARGUMENT HELD DECEMBER 10, 2013
DECIDED APRIL 15, 2014

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

White Stallion Energy Center, LLC, et al.,	)	
Petitioners,	)	
v.	)	No. 12-1100
	)	(and consolidated cases)
United States Environmental Protection Agency,	)	
Respondent.	)	

EPA'S RESPONSE TO PETITIONERS' MOTIONS TO GOVERN FUTURE PROCEEDINGS

demonstration of reasonable progress under the CAA's regional haze program. *See* EPA Motion 17; State and Public Health Motion 18-20, and n.15 & 16. Given the ongoing nature of states' regulatory planning, vacatur would significantly complicate states' implementation of these programs. McCabe Decl. ¶ 30. Accordingly, vacatur would have significant disruptive consequences for public health and the environment that reach far beyond the Rule itself.

C. Remand Without Vacatur Would Not Significantly Harm Industry and Would Actually Avoid Disruption for Regulated Sources.

Finally, remand without vacatur—*i.e.*, maintaining the status quo for an additional six months—will not significantly harm industry and would actually avoid disruption for regulated sources. Neither Joint Petitioners nor Tri-State present any factual showing to demonstrate that the relatively small amount of monitoring, reporting, and recordkeeping costs that will be incurred over the next six months,[6] and unspecified operating costs, amount to significant disruptive consequences for industry of maintaining the status quo under the Rule. And tellingly, most industry petitioners did not file their own motions describing any undue burden that would result from maintaining the status quo. This is likely because most sources have

[6] Joint Petitioners cite EPA's estimated $158 million in annual costs. Half of that—six months worth—is $79 million, which is a small number when compared to the billions in quantifiable benefits that the Rule is estimated to obtain. Indeed, $79 million divided among the 600 plants affected by the Rule is only $130,000 per plant—a small amount for companies that report over a billion dollars in annual operating revenues. *See* McCabe Dec. ¶ 22; *see also* Tri-State Annual Report at 4, *available at* http://www.tristategt.org/Financials/documents/Tri-State-2014-1-annual-report.pdf (reporting an operating revenue of $1.4 billion for 2014).

already complied with the Rule or have taken steps towards complying, and therefore have already made the necessary capital investments to install controls and have incorporated compliance into their business strategies. *See* EPA Motion 19-20; McCabe Decl. ¶¶ 20, 31; *see also* Tri-State Motion 13 ("[T]hese capital investments have already been made and cannot be undone."). To the extent any sources have not done so, and whose continued operation is critical for maintaining reliability, such sources can seek administrative relief through EPA's Enforcement Response Policy. *See* EPA Motion 20. Thus, complying with the Rule for an additional six months will not unduly burden industry, and may in fact avoid the confusion and uncertainty associated with potentially unraveling or delaying contractual commitments and construction plans already made, only to have to reinstate those arrangements if EPA reaffirms the "appropriate and necessary" finding on remand. *See* McCabe Decl. ¶ 23; Industry Respondent-Intervenors Motion 13-18 (arguing that vacatur would have "severe" disruptive consequences for the electric generation sector).

Thus, remand without vacatur would prevent erosion of the significant public health and environmental benefits of the Rule and disruption to state implementation of other EPA programs, and provide regulatory certainty to industry without undue burden. Accordingly, because both *Allied-Signal* factors support remand without vacatur, the Court should grant EPA's and Respondent-Intervenors' motions.

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 12-1100 **September Term, 2015**

EPA-77FR9304

Filed On: December 15, 2015

White Stallion Energy Center, LLC,

Petitioner

v.

Environmental Protection Agency,

Respondent

American Academy of Pediatrics, et al.,
Intervenors

Consolidated with 12-1101, 12-1102, 12-1147, 12-1172, 12-1173, 12-1174, 12-1175, 12-1176, 12-1177, 12-1178, 12-1180, 12-1181, 12-1182, 12-1183, 12-1184, 12-1185, 12-1186, 12-1187, 12-1188, 12-1189, 12-1190, 12-1191, 12-1192, 12-1193, 12-1194, 12-1195, 12-1196

BEFORE: Garland, Chief Judge; Rogers and Kavanaugh, Circuit Judges

O R D E R

Upon consideration of the joint motion of Certain State and Industry petitioners to govern further proceedings, the motion of Tri-State Generation and Transmission Association Inc. to govern proceedings on remand from the U.S. Supreme Court and supplement thereto, the joint motion of the State, Local Government, and Public Health respondent-intervenors for remand without vacatur, the motion of respondent EPA to govern future proceedings, the motion of Industry respondent-intervenors to govern future proceedings, the response of EPA to petitioners' motions to govern future proceedings, the response of Certain State and Industry petitioners to motions to govern further proceedings of respondent and respondent-intervenors, the response of Tri-State Generation and Transmission Association Inc. to motions to govern and the supplement

United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 12-1100 **September Term, 2015**

thereto, the joint response of the State, Local Government, and Public Health respondent-intervenors to State and Certain Industry petitioners' motions to govern, the consolidated response of Industry respondent-intervenors to petitioners' motions to govern future proceedings, the response of the Utility Air Regulatory Group ("UARG") to federal respondent's motion to govern future proceedings, the joint reply brief of the State, Local Government, and Public Health respondent-intervenors, the reply brief of Certain State and Industry petitioners in support of their joint motion to govern further proceedings, the reply of Tri-State Generation and Transmission Association Inc. and the supplement thereto, the reply of EPA in support of its motion to govern future proceedings, the reply of Industry respondent-intervenors in support of their motion to govern future proceedings, and the oral arguments of counsel, it is

ORDERED that the proceeding be remanded to EPA without vacatur of the Mercury and Air Toxics Standards final rule. *See Allied-Signal, Inc. v. Nuclear Regulatory Commission*, 988 F.2d 146, 150-51 (D.C. Cir. 1993). In so doing, we note that EPA has represented that it is on track to issue a final finding under 42 U.S.C. § 7412(n)(1)(A) by April 15, 2016.

Pursuant to D.C. Cir. Rule 36, this disposition will not be published. The Clerk is directed to withhold the issuance of the mandate herein until seven days after resolution of any timely petition for rehearing or petition for rehearing en banc. *See* Fed. R. App. P. 41(b); D.C. Cir. Rule 41.

Per Curiam

FOR THE COURT:
Mark J. Langer, Clerk

BY: /s/
Ken Meadows
Deputy Clerk

IN THE SUPREME COURT OF THE UNITED STATES

MICHIGAN, ET AL., Petitioners : No. 14-46

v.

ENVIRONMENTAL PROTECTION AGENCY, ET AL.;

AND

UTILITY AIR REGULATORY GROUP, Petitioner : No. 14-47

v.

ENVIRONMENTAL PROTECTION AGENCY, ET AL.;

AND

NATIONAL MINING ASSOCIATION, Petitioner : No. 14-49

v.

ENVIRONMENTAL PROTECTION AGENCY, ET AL.;

Washington, D.C.

Wednesday, March 25, 2015

The above-entitled matter came on for oral argument before the Supreme Court of the United States at 10:14 a.m.

APPEARANCES:

AARON D. LINDSTROM, ESQ., Solicitor General, Lansing, Mich.; on behalf of State Petitioners.

F. WILLIAM BROWNELL, ESQ., Washington, D.C.; on behalf of industry Petitioners and Respondents in support.

GEN. DONALD B. VERRILLI, JR., ESQ., Solicitor General, Department of Justice, Washington, D.C.; on behalf of Federal Respondents.

PAUL M. SMITH, ESQ., Washington, D.C.; on behalf of industry Respondents.

but we're -- you know, we're going to categorize the listing. They didn't say that.

GENERAL VERRILLI: I understand your point about the focus or non-focus on subcategories. But the point that we're just listing, we say that over and over again in our brief. And in fact, the Petitioners concede, and this is at page 5 and 6 of the UARG reply brief, that if this is just about listing, then, of course, costs are irrelevant. But it is just about listing. That is the way the statute works.

CHIEF JUSTICE ROBERTS: You had responded to the fairly dramatic disparity your friends on the other say, the 6 million benefits, 9.6 million cost. You respond with a different calculation that looks to -- I call them collateral --

GENERAL VERRILLI: Co-benefits.

CHIEF JUSTICE ROBERTS: -- the ancillary -- co-benefits. And then the -- the argument is raised that that's -- that's not quite proper because you're using your -- your -- the HAP regulation to get at the criteria pollutants that you otherwise would have to go through a much more difficult process to regulate.

In other words, you can't regulate the criteria pollutants through the HAP program, so you get, okay, here we've got this tiny bit of mercury, and so

we're going to regulate, and that's how we're going to get additional regulation of the criteria pollutants. And so it's sort of an end run around the restrictions that would otherwise make -- give you less control over the regulation.

What -- what's your response to that?

GENERAL VERRILLI: Let me address that. It's -- there's several points, and I actually need to make all of them, I think, to -- to make this clear.

The first point is that that's not an argument that any party has raised. One amicus brief raised it, one -- and it was averted to a bit more oral argument --

CHIEF JUSTICE ROBERTS: Well, my chambers found it, but --

(Laughter.)

CHIEF JUSTICE ROBERTS: Yes.

GENERAL VERRILLI: And -- and here's the problem with the argument: The problem with the argument is that -- it -- it has two problems. One is that once EPA concludes that a source emits a hazardous pollutant, and here EPA has concluded that these sources emit mercury at levels that are unsafe. I don't think Petitioners dispute that. And by the unambiguous terms of Section 7412(d), EPA is under an obligation to