Memorandum

To: Steam Electric ELG 2025 Deadline Extensions Rulemaking Record – EPA-HQ-OW-2009-0819

From: U.S. EPA

Date: December 17, 2025

Re: Overview of Costs and Benefits of Steam Electric ELG 2025 Deadline Extensions Final Rule

1   Introduction

This memorandum details estimates of the costs and benefits of the Final Rule for the *Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category – Deadline Extensions* to satisfy the requirements of Executive Order (E.O.) 12866: Regulatory Planning and Review (58 FR 51735, October 4, 1993), as amended by E.O. 13563: Improving Regulation and Regulatory Review (76 FR 3821, January 21, 2011).

Overall, from a 2024 Rule baseline, the EPA estimated that this final action would result in annualized cost savings of $61 million. Additionally, the static-model outputs derived in Table 1-1, in which the agency has reasonable confidence, show positive net benefits of the rule at both discount rates, while the highly uncertain dynamic model outputs derived in Table 1-2 show a mix, depending on the discount rate.

The baseline for this analysis is a business-as-usual scenario that represents the expected behavior of steam electric power plants and the electricity market in the absence of this final rule, including the existing compliance deadlines in the 2024 Rule. To estimate the incremental costs and benefits of this final rule, the EPA relied on existing estimates of costs and benefits developed as part of the 2024 Rule analysis documented in the *Benefit and Cost Analysis for the 2024 Supplemental Steam Electric Final Rule* (2024 Rule BCA; U.S. EPA, 2024a). Thus, the results presented below reflect only the effects of discounting specific streams of costs and benefits estimated in the 2024 Rule.[1] As discussed below and in the preamble, while the economic analysis for the 2024 Rule is a reasonable starting point for this analysis, events that have transpired since 2024 cast significant doubt on relying solely on that analysis here, especially for estimating costs and benefits.

Given a lack of data regarding when each facility would implement technologies and processes to comply with the effluent limitation guidelines (ELG), in estimating the social costs and benefits for certain compliance deadlines in the final rule, the EPA assumed a delay of five years relative to the implementation schedule analyzed for the 2024 Rule. However, as the final rule specifies that the limits based on zero-discharge are to be met "as soon as possible but no later than" December 31, 2034, it is possible that plants will comply sooner than estimated for this analysis. See section 2 of this memo for details of the costs and benefits.

The EPA also estimates small incremental costs (approximately $11,000, annualized) for paperwork requirements associated with requests for compliance transfer or alternative applicability dates. These incremental costs are detailed in section 3 and netted out of the cost savings summarized in Table 1-1.

At the time of the 2024 Rule, the EPA estimated baseline and regulatory costs and water quality benefits in a static model assuming constant inputs over the time horizon. The most significant constant input to

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[1] The EPA erred in the economic analysis memorandum for the proposed rule by extending all deadlines, rather than just those deadlines proposed to be extended.

the static model was wastewater flow rates of the relevant wastestreams. Flow rate generally affects both costs and water quality benefits proportionally, such that any change associated with flow rate over time as the electricity market evolves and adapts to the regulatory requirements would not be expected to impact the relative relationship between these costs and benefits. Similarly, uncertainties in future electricity market operations at affected units will proportionally affect the cost and water quality benefit estimate proportionally. However, this proportional relationship does not hold in the case where a unit ceases operation in response to the regulatory requirements.

In contrast, the EPA estimated baseline and regulatory air quality benefits dynamically based on expected changes in electricity market operations over time as modeled in the Integrated Planning Model (IPM).[2] As discussed further in the benefits section of this document, and in the final rule preamble, the EPA finds that there is uncertainty in the 2024 Rule analyses and, due to recent changes in electricity markets, significantly more uncertainty in the estimates of air pollution benefits, which were based on a dynamic model of the electricity market. As described below, this uncertainty has the potential to make the net benefits of this rule either positive or negative, but they would entail updated modeling of the electricity sector to assess. For this reason, the EPA is providing multiple presentations of net benefits to illustrate the potential impact that the uncertainties specific to the dynamic-model air quality benefits could represent and cautions readers not to ascribe significant weight to the total costs, benefits, and net benefits prior to any reanalysis the EPA may conduct as part of any future action.

Table 1-1 summarizes the estimated static-model costs, benefits, and net benefits of the final rule excluding the air quality impacts; the EPA has reasonable confidence in these estimates for the purposes of supporting this rule. Table 1-2 summarizes costs, benefits, and net benefits of the final rule including both the static-model water quality and dynamic-model air quality impacts.[3] Notably impacts attributable to the extension of certain deadlines in the 2024 Rule are only monetized to the extent that these impacts were monetized in the 2024 Rule.[4] Since the dynamic-model benefits from air quality changes were presented as a range in the 2024 Rule, Table 1-2 similarly presents benefits and net benefits as a range. Furthermore, the EPA is presenting all values at both a three percent and seven percent discount rate.

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[2] IPM is a comprehensive electricity market optimization model that can evaluate the impacts of regulatory actions affecting the power sector within the context of regional and national electricity markets. IPM generates least-cost resource dispatch decisions based on user-specified constraints such as environmental, demand, and other operational constraints. The model can be used to analyze a wide range of electric power market scenarios. For more information on IPM, see https://www.epa.gov/power-sector-modeling. For more details on the use of IPM for the 2024 Rule analysis, see section 5 of the 2024 Rule Regulatory Impact Analysis (2024 Rule RIA, U.S. EPA, 2024b).

[3] The EPA has occasionally presented partial net benefits separately, as was done here, when significant uncertainties as to a portion of those benefits is documented. For example, see U.S. EPA (2019).

[4] Additional benefits could not be quantified and/or monetized, including other avoided adverse health effects (cancer and non-cancer) from reduced exposure to pollutants discharged to receiving waters; improvements in T&E species habitat and potential effects on T&E species populations; changes in property value from water quality improvements; changes in ecosystem effects, visibility impairment, and human health effects from direct exposure to NO_2, SO_2, and hazardous air pollutants. See Table 2-3 for details.

Table 1-1: Summary of Static-Model Social Costs, Benefits, and Net Benefits at 3 Percent and 7 Percent Discount Rates (Million 2024$)

	Static-Model Costs	Monetized Static-Model Water-Related Benefits[a]	Net Monetized Static-Model Benefits
3% Discount Rate			
Present Value[b]	-$1,187.7	-$65.2	$1,122.5
Annualized[b]	-$60.6	-$3.3	$57.3
7% Discount Rate			
Present Value[b]	-$1,390.7	-$41.4	$1,349.3
Annualized[b]	-$112.1	-$3.3	$108.7

a. Include human health benefits from changes in pollutant exposure via drinking water and fish ingestion; nonmarket benefits from water quality changes; and changes in drinking water treatment and dredging costs.
b. Total present value and annualized value over the 30-year period of 2025-2054.

Table 1-2: Summary of Static-Model and Dynamic-Model Social Costs and Benefits at 3 Percent and 7 Percent Discount Rates (Million 2024$)

	Costs	Monetized Static-Model Benefits[a]	Monetized Dynamic-Model Air Quality Benefits[b] - Low	Monetized Dynamic-Model Air Quality Benefits[b] - High	Net Monetized Benefits - Low	Net Monetized Benefits - High
3% Discount Rate						
Present Value[c]	-$1,187.7	-$65.2	-$4,483.7	-$1,793.5	-$3,361.1	-$670.9
Annualized[c]	-$60.6	-$3.3	-$228.8	-$91.5	-$171.5	-$34.2
7% Discount Rate						
Present Value[c]	-$1,390.7	-$41.4	-$3,325.5	-$1,345.3	-$1,976.2	$4.0
Annualized[c]	-$112.1	-$3.3	-$268.0	-$108.4	-$159.3	$0.3

a. Include human health benefits from changes in pollutant exposure via drinking water and fish ingestion; nonmarket benefits from water quality changes; and changes in drinking water treatment and dredging costs.
b. Include human health benefits from changes in air pollutant exposure.
c. Total present value and annualized value over the 30-year period of 2025-2054.

Overall, the analysis shows that the final rule will result in cost savings (*i.e.,* negative costs) and forgone benefits (*i.e.,* negative benefits), however there is significant uncertainty as to the magnitude and direction of these impacts given recent changes affecting the electricity sector. See section 4 for a comparison of the cost savings and forgone benefits. The EPA determined that this rule is deregulatory for the purposes of Executive Order 14192 in that it results in negative costs on an annualized basis.

As can be deduced from Table 1-2, its monetized net benefits are primarily a function of the dynamic-model estimated air quality benefits. However, the EPA notes that there have been significant changes in market conditions and state and federal legislation affecting the power sector since the EPA conducted the 2024 Rule analysis. As stated in the preamble, an extension of the 2024 rule's latest deadlines is needed to ensure plants can continue operating to support grid reliability. Since the promulgation of the 2024 rule, Federal agencies, States, grid operators, and grid reliability experts have identified an impending energy crisis resulting from increased load and the premature retirement of critical steam electric and other baseload power plants. The changes include challenges and uncertainties in energy reliability and resource adequacy, given the increasing demand for electricity due to data center expansions and AI demand, manufacturing growth, and population increases. The U.S. will need infrastructure upgrades to meet this demand, particularly as new electric generation has increasingly relied upon more variable and weather-dependent resources. This rule will, in part, provide flexibility to a critical industry in advance of

imminent deadlines, which could otherwise force utilities to make premature and irrevocable decisions to begin the process of decommissioning without full consideration of rapidly evolving regional resource adequacy needs. See Section V. of the preamble for more details. These changes, which are expected to have material impacts on the profile of electricity generation in the baseline and relevant policy scenario, are expected to significantly affect the costs and benefits previously estimated for the 2024 Rule and used as the basis for analyzing this final rule. Therefore, there is a high degree of uncertainty regarding the costs and benefits presented based on the 2024 analysis given recent changes affecting the electricity sector. To the extent that recent changes in electricity markets make these previously estimated air quality benefits uncertain, the ultimate magnitude and direction of these benefits/forgone benefits are likely to drive the ultimate magnitude and direction of net benefits of the overall final rule.[5]

Table 1-1 shows positive net benefits of the rule at both discount rates, while Table 1-2 shows a mix, depending on the discount rate. The Agency has reasonable confidence in the estimates included in Table 1-1 (*i.e.*, dynamic-model results), but has significant doubts that the estimates included in Table 1-2 would be accurate given events since 2024 (in particular, the dynamic-model results).

2   Social Costs and Benefits of Deadline Extensions

Table 2-1 summarizes provisions of the final rule and their potential effects on costs and benefits.[6]

Table 2-1: Anticipated Effects of Rule Changes on Costs and Benefits

Rule Change	Analyzed Effect of Rule Change	Analysis Details
Extend the latest compliance dates for zero-discharge limitations applicable to discharges of FGD wastewater, BA transport water, and CRL. Allow indirect dischargers to achieve zero discharge on the same timelines as direct dischargers.	Delay capital and O&M costs for implementing technologies to meet zero-discharge limits by five years. Estimated the costs and benefits from shifting compliance into the future.	See section 2
Update the transfer provisions at 40 CFR 423.13(o) to allow facilities to switch between compliance alternatives (*i.e.*, switch between requirements for zero-discharge and requirements applicable to the subcategory of permanent cessation of coal combustion by 2034).	Requires facilities to notify EPA. Estimated the incremental costs for paperwork requirements.	See Section 3
Create authority in 40 CFR 423.18 for alternative applicability dates and paperwork submission dates, based on site-specific factors.	Requires facilities to notify EPA. Estimated the incremental costs for paperwork requirements.	See Section 3

As seen in the table above, outside the costs of paperwork requirements, the EPA did not monetize incremental costs and benefits resulting from decisions made under the site-specific provisions being finalized in section 423.18 today. These costs and benefits would be the result of the individual actions by the permitting authorities and, furthermore, may depend on the finalization of other rules.[7]

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[5] The EPA notes that although the 2020 Rule was a cost savings rule, it resulted in positive air quality benefits due to the specific locations in which air pollution was projected to increase versus decrease (see U.S. EPA, 2020).

[6] In the proposed rule, the EPA asked for comments regarding potential clarifications to existing reliability-related flexibilities. In the preamble to the final rule, the EPA clarified the existing flexibilities and concluded that no rule text changes were needed.

[7] On November 28, 2025, the EPA issued a proposed rule to amend the coal combustion residuals (CCR) regulations which, if finalized, would extend the alternative closure deadlines in 40 CFR 257.103(f)(2) by three years (90 FR 54611). The facilities that such an extension would potentially apply to overlap with the facilities that could

2.1 Social Costs

2.1.1 Approach

Building on the approach the EPA used at proposal (U.S. EPA, 2025b), the EPA estimated the changes in costs to society resulting from changes in compliance deadlines in the final rule based on the unit- and plant-level compliance costs previously developed for the 2024 Rule (see U.S. EPA, 2024a). For this final rule analysis, the EPA updated compliance costs to 2024 dollars and incorporated the most recent data from the Energy Information Administration (EIA) regarding the status of steam electric units. These updates reflect retirements and conversions that have occurred since the EPA conducted the analysis of the 2024 Rule.[8]

The baseline assumes implementation of the 2024 Rule. As such, EPA developed the social costs under the baseline using the same parameters as used in the analysis of the 2024 Rule, including the schedule according to which plants may implement technologies to meet the ELGs. Under that schedule, plants implement required technologies over five years (a full NPDES cycle) beginning as early as 2025, such that all plants comply with the 2024 Rule discharge standards by December 31, 2029.

The final rule extends by five years the "no later than" deadline for complying with zero-discharge limits for bottom ash (BA) transport water, flue gas desulfurization (FGD) wastewater, and managed combustion residual leachate (CRL). To model the effects of these changes, EPA conservatively assumed that each affected plant would implement technologies five years later than assumed in the baseline, *i.e.*, implementation starting in 2030 under this final rule and being completed by December 31, 2034. As the rule specifies that the limits are to be met "as soon as possible but no later than" it is possible that plants will comply sooner than estimated for this analysis, and according to a schedule that is similar to that for the baseline, in which case the cost savings (and forgone benefits in Section 2.2) would be less than estimated in this analysis. Thus, the analysis represents the largest effects on costs and benefits this rule would likely have.

The EPA is not extending the deadline for compliance with limits for subcategories such as those for units that cease coal combustion by 2034; these deadlines remain unchanged from the 2024 Rule baseline and the EPA modeled the associated technology costs as incurred according to the same implementation schedule as used in the analysis of the 2024 Rule.[9]

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potentially seek a site-specific alternative applicability date under the new provisions in section 423.18(d). To the extent that the EPA has not estimated costs or benefits of the provisions in section 423.18(d), the costs and benefits estimated in the CCR disposal proposed rule do not duplicate any costs or benefits here.

[8] The changes in the number of steam electric units affected by the ELGs since the 2024 Rule analysis, to date, were modest. According to the most recent EIA data, three steam electric units for which the EPA modeled compliance costs for the 2024 Rule have since retired. One unit was assigned managed CRL costs for chemical precipitation for the 2024 Rule analysis based on the expectation that the unit would retire in 2028. The two other units were assigned only legacy or unmanaged CRL costs in the 2024 Rule analysis.

[9] For this reason, there is no need for a second scenario as was analyzed at proposal, since the extension of compliance dates does not affect requirements for legacy wastewater or unmanaged CRL.

2.1.2 Estimated Cost Savings

Table 2-2 shows the resulting time profile of costs for the baseline and final rule, as well as the total present value (PV) and annualized value over the analysis period. The maximum technology implementation outlays are incurred over the first five years (2025-2029 in the baseline and 2030-2034 with the final rule) when steam electric power plants are expected to implement wastewater treatment technologies. Given that the last technology installation would occur in 2034, the EPA conducted its analysis through 2054, allowing for the full 20-year expected life of the technology. This is consistent with the analytical timeframe of the 2024 Rule which ended in 2049. The EPA calculated the changes in costs attributable to the final rule implementation delay by subtracting the baseline costs from the costs for the final rule scenario. As shown in Table 2-2, the compliance extension results in significant cost savings relative to the baseline in the first five years of the analysis when steam electric plants were projected to incur capital costs to install wastewater treatment technologies in the baseline, followed by net cost increases once the plants incur the delayed expenditures, followed by twenty years of minimal differences. The costs shown in 2025-2029 in the final rule scenario reflect costs to meet limits not subject to the compliance deadline extension.

Overall, at a three percent discount rate the compliance extension results in estimated annualized savings of $60.6 million. At a seven percent discount rate, the estimated annualized savings are $112.1 million.

Table 2-2: Summary of Social Costs at 3 Percent and 7 Percent Discount Rates

Year	Baseline Costs (million 2024$)	Final Rule Costs (million 2024$)[a]	Change in Costs Due to Final Rule (million 2024$)
2025	$1,291.6	$337.8	-$953.7
2026	$740.3	$221.2	-$519.2
2027	$1,099.0	$263.5	-$835.4
2028	$1,403.7	$623.6	-$780.1
2029	$756.4	$306.2	-$450.2
2030	$327.8	$1,109.3	$781.4
2031	$332.6	$662.6	$329.9
2032	$331.9	$983.5	$651.5
2033	$331.5	$920.5	$588.9
2034	$332.3	$581.1	$248.8
2035	$331.6	$331.6	$0.0
2036	$326.8	$326.8	$0.0
2037	$330.0	$329.2	-$0.7
2038	$328.7	$328.7	$0.0
2039	$328.2	$328.2	$0.0
2040	$329.0	$329.0	$0.0
2041	$328.3	$328.3	$0.0
2042	$326.7	$327.5	$0.7
2043	$329.3	$329.3	$0.0
2044	$756.6	$756.6	$0.0
2045	$354.5	$354.5	$0.0
2046	$355.3	$355.3	$0.0
2047	$355.2	$354.5	-$0.7
2048	$353.1	$353.1	$0.0
2049	$355.6	$355.6	$0.0
2050	$355.0	$355.0	$0.0
2051	$354.5	$354.5	$0.0
2052	$355.2	$356.0	$0.7
2053	$354.6	$354.6	$0.0
2054	$353.1	$353.1	$0.0

Year	Baseline Costs (million 2024$)	Final Rule Costs (million 2024$)[a]	Change in Costs Due to Final Rule (million 2024$)
	3% Discount	Present Value	-$1,187.9
	3% Discount	Annualized	-$60.6
	7% Discount	Present Value	-$1,390.8
	7% Discount	Annualized	-$112.1

a. The costs in 2025 to 2029 are not zero because some requirements are not delayed by this final rule; these include, for example, the costs for chemical precipitation for CRL and legacy wastewater, still required by 2028. See the preamble for more details.

There are several differences between estimates presented in Table 2-2 and the corresponding estimates developed at proposal. First, the costs developed at proposal erroneously reflected a delay in the implementation of all FGD, BA, and CRL limits, whereas the costs above reflect a delay in the implementation of the zero-discharge limits only, leaving the timing of other limits unchanged (*e.g.*, limits for subcategory of units that cease coal combustion by 2034). Second, whereas the proposed rule analysis estimated costs over an analysis period that extended to 2063 to match the spreadsheet cost model used for its Executive Order 14192 cost estimates, this final rule analysis uses a 30-year period, including the five years of implementation delay and the same 25-year period (2025 through 2049) that was used for the analysis of the 2024 Rule.[10]

2.1.3 Uncertainty in the Analysis of Cost Savings

As noted in Section 2.1.1, the final rule specifies that the limits based on zero-discharge are to be met "as soon as possible . . . but no later than" December 31, 2034. It is therefore possible that plants will comply sooner than estimated for this analysis. If so, the cost savings would be smaller than savings presented in the previous section. In fact, if *all* plants were to comply with the limits by the original December 31, 2029 deadline, the cost savings would be zero, but the EPA does not expect this to occur and in no case would there be positive costs associated with the additional flexibility.

In addition to uncertainty in the timing of technology implementation, changes in the profile of electricity generation may also create additional uncertainty. The 2024 Rule analysis reflects information available on expected unit retirements and conversions as of when the analysis was conducted. Thus, units that are expected to cease coal combustion by 2034 are not modeled as installing technologies for meeting zero-discharge limits but rather are modeled as retaining the 2020 Rule technologies or, in the case of managed CRL, installing chemical precipitation after retirement. Since the EPA conducted the 2024 Rule analysis, some plant owners have announced their intent to keep some of these units operating potentially past the 2034 deadline. In those cases, the analysis may understate the cost savings by continuing to assign technology costs for the subcategory rather than the higher costs of meeting zero-discharge in the baseline and estimating cost savings from delaying the expenditures under the final rule. To assess the extent to which changes in anticipated retirements may affect estimated cost savings, the EPA reviewed information available from EIA on projected retirements. The EPA identified only one electricity generating unit whose anticipated retirement year has been delayed beyond 2034 according to EIA, such that the unit should now be assigned compliance costs based on zero-discharge limits in the baseline for this final rule.

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[10] The EPA selected this analysis period for the 2024 Rule based on the years over which steam electric plants would install the wastewater treatment technologies (5 years), plus the life of the technology (20 years).

Plant owners may continue to reassess unit closures and conversions as projected electricity needs change in the coming years, but in the absence of data, it would be speculative for the EPA to quantify how these decisions will affect costs.

2.2 Forgone Benefits

2.2.1 Approach

Building on the approach the EPA used at proposal (U.S. EPA, 2025b), the EPA estimated the forgone benefits resulting from the implementation delay based on the time profile of benefits previously developed for the 2024 Rule and generally shifting that profile by five years for the final rule.[11] The EPA does not have a breakout of benefits at the unit or plant level and was therefore unable to adjust the timing of benefits selectively. The EPA recognizes that this approach overstates the forgone benefits attributable to the final rule since only deadlines for meeting zero-discharge limits are being extended. However, the EPA still believes the analysis provides some insight on forgone benefits.

The exception to this 5-year shift is the benefits associated with electricity market-based changes. Because the estimated human health benefits associated with changes in electricity generation and the associated air pollutant emissions are specific to the given year,[12] the EPA zeroed out the air quality benefits for 2025-2029 rather than shifting the time series of the benefits. Essentially, the EPA assumed that the human health benefits resulting from changes in air pollutant emissions would be the same for the final rule as modeled for the 2024 Rule in years 2030-2049.

The EPA used the benefits estimated for the 2024 Rule as the starting point for the final rule analysis following a review of changes to the universe of steam electric plants since the 2024 Rule analysis was conducted. This review revealed only small changes to the set of electric generating units in operation and with announced retirements over the period of analysis, which supports the EPA's assessment that the loading reductions and associated water-based benefits modeled for the 2024 still provide relevant insight on the potential impacts of delaying the implementation of ELGs. This is because, similar to the approach used to estimate the costs, the baseline for water quality benefits was estimated based on a static model assuming that the operations of affected facilities, especially baseline wastewater flow rates, would remain constant at historic levels. However, in the 2024 Rule analysis, the changes in air quality were estimated dynamically by modeling changes in in the expected operation of affected facilities and responses elsewhere on the electricity grid. As discussed in the introduction, there have been significant changes in market conditions and state and federal legislation affecting the power sector since the 2024 Rule analysis was conducted. These changes are expected to have a material impact on the profile of electricity generation in the baseline, and in turn may significantly impact how the affected facilities and other facilities in the electricity sector are expected to respond to the ELG requirements whose implementation is being delayed by this final rule. Therefore, there is uncertainty as to how well the modeling of expected air quality impacts from the 2024 Rule reflect the air quality impacts of this final

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[11] As discussed in the 2024 Rule BCA, the benefits presented in the 2024 Rule BCA were based on the BA wastewater, FGD transport water, and managed CRL wastestreams.

[12] The changes in air pollutant emissions depend on the profile of electricity generation and overall market conditions. The approach used to quantify the human health impacts of changes in air pollutant exposure and to monetize the resulting benefits also uses factors that are specific to each year. The models used to quantify and monetize other benefit categories are not as strongly dependent on year-explicit factors.

rule. Because of this uncertainty, the EPA presents the forgone electricity market-based air-related human health benefits separately from the other (water-related) estimated benefits of the final rule.

Table 2-3 summarizes the benefits that the EPA analyzed for the 2024 Rule and identifies categories of benefits that were quantified and monetized.

Table 2-3: Estimated Welfare Effects of Changes in Pollutant Discharges from Steam Electric Power Plants

Category	Effect of Regulatory Options	Quantified Benefits	Monetized Benefits	Benefits Analysis Methods
Human Health Benefits from Surface Water Quality Improvements				
Changes in human health effects (*e.g.*, bladder cancer) associated with halogenated DBP exposure via drinking water	Changes in exposure to halogenated DBPs in drinking water	✓	✓	VSL and COI
IQ losses to children ages 0 to 7	Changes in childhood exposure to lead from consumption of self-caught fish[a]	✓	✓	IQ point valuation
Need for specialized education	Changes in childhood exposure to lead from consumption of self-caught fish[a]	✓	✓	Qualitative discussion
Incidence of cardiovascular disease in adults	Changes in exposure to lead from consumption of self-caught fish[a]	✓	✓	VSL
IQ losses in infants	Changes in in-utero mercury exposure from maternal consumption of self-caught fish[a]	✓	✓	IQ point valuation
Incidence of skin cancer	Changes in exposure to arsenic from consumption of self-caught fish[a]	✓	✓	COI; Qualitative discussion
Other adverse health effects (cancer and non-cancer)	Changes in exposure to toxic pollutants (lead, cadmium, thallium, etc.) via fish consumption or drinking water	✓		Human health criteria exceedances; Exposure above non-cancer health thresholds; Qualitative discussion
Reduced adverse health effects (*e.g.*, rash and irritation from dermal exposure to toxins in HABs)	Changes in exposure to pollutants from recreational water uses			Qualitative discussion
Ecological Condition and Recreational Use Effects from Surface Water Quality Changes				
Aquatic and wildlife habitat[b]	Changes in ambient water quality in receiving reaches	✓	✓	Benefit transfer; Qualitative discussion
Water-based recreation[b]	Changes in swimming, fishing, boating, and near-water activities from water quality changes	✓	✓	Benefit transfer; Qualitative discussion
Aesthetics[b]	Changes in aesthetics from shifts in water clarity, color, odor, including nearby site amenities for residing, working, and traveling	✓	✓	Benefit transfer; Qualitative discussion
Non-use values[b]	Changes in existence, option, and bequest values from improved ecosystem health	✓	✓	Benefit transfer; Qualitative discussion
Protection of T&E species	Changes in T&E species habitat and potential effects on T&E species populations	✓		Habitat range intersecting with reaches with NRWQC exceedances; Qualitative discussion

Category	Effect of Regulatory Options	Quantified Benefits	Monetized Benefits	Benefits Analysis Methods
Sediment contamination	Changes in deposition of toxic pollutants to sediment			Qualitative discussion
Water Supply and Use				
Water treatment costs for drinking water	Changes in quality of source water used for drinking	✓	✓	Avoided cost of drinking water treatment; Qualitative discussion
Water treatment costs for irrigation and other agricultural uses	Changes in quality of source water used for irrigation and other agricultural uses			Qualitative discussion
Other Economic Effects				
Dredging costs	Changes in sedimentation and costs for maintaining navigational waterways and reservoir capacity	✓	✓	Avoided cost of dredging; Qualitative discussion
Commercial fisheries	Changes in fisheries yield and harvest quality due to aquatic habitat changes			Qualitative discussion
Tourism industries	Changes in participation in water-based recreation			Qualitative discussion
Property values	Changes in property values from changes in water quality			Qualitative discussion
Air Quality-Related Effects				
Air emissions of $PM_{2.5}$, NO_X and SO_2	Changes in mortality and morbidity from exposure to particulate matter ($PM_{2.5}$) emitted directly or linked to changes in NO_X and SO_2 emissions (precursors to $PM_{2.5}$ and ozone)	✓	✓	VSL and COI; Qualitative discussion
Air quality effects of coal stockpiles	Air quality effects of storing and handling coal at steam electric power plants			Qualitative discussion
Air emissions of NO_X and SO_2	Changes in ecosystem effects; visibility impairment; and human health effects from direct exposure to NO_2, SO_2, and hazardous air pollutants.			Qualitative discussion

a. Reductions in discharges of lead, mercury, and other toxic pollutants may reduce concentrations of these pollutants in open seas, thus reducing levels of pollutants in high-trophic-level fish harvested commercially. There are unquantified benefits associated with all of these end points for those who consume commercially harvested fish, but these benefits are very difficult to estimate.
b. These values are implicit in the total WTP for water quality improvements.
Abbreviations: VSL = value of statistical life; COI = cost of illness

Source: Adapted from U.S. EPA (2024a)

As the EPA had done at proposal (U.S. EPA, 2025b), the EPA recognized the need to make additional adjustments to values presented in the 2024 BCA to estimate the benefits of the final rule:[13]

- The EPA used values of an IQ point and of the range of human health effects derived using three percent and seven percent discount rates. These values were used to estimate the annualized benefits summarized in Appendix B of the 2024 Rule BCA, but the BCA only presented details

[13] At proposal, the EPA had also extended the period of analysis through 2063 to be consistent with the analysis of social costs. This introduced additional uncertainty since the EPA did not have existing estimate of air quality benefits of the 2024 final rule after 2049 and the EPA assumed that benefits would continue at the same level through the remainder of the analysis period. For the final rule, the EPA is using a period of analysis that is consistent with the existing model outputs.

of the time profile of the 2024 Rule benefits based on the value of an IQ point and electricity market-based air-related human health effects derived using a two percent discount.[14]

- The EPA omitted greenhouse gas emission benefits in this analysis. This follows Executive Order 14154 on "Unleashing American Energy" and the OMB-issued memo, M-25-27 (Executive Office of the President, 2025; U.S. Office of Management and Budget, 2025). As the EPA does not have a specific statutory requirement to include greenhouse gas emissions, this benefit category was not relevant to the current analysis. Had the EPA omitted greenhouse gas emission benefits in the 2024 Rule economic analysis, that analysis would have also projected significantly lower benefits for the 2024 Rule.

2.2.2 Estimated Forgone Benefits

Table 2-4 details the benefit estimates at three percent and seven percent discount rates, respectively. The table provides water- and air-related benefits separately, given the high level of uncertainty associated with the expected electricity market response to the 2024 Rule, which due to the nature of the analysis has a greater impact on the estimates of the air-related benefits. Detailed year-by-year benefit estimates are included at the end of this memo in section 6.

The EPA estimated a range of air-related human health benefits to reflect the uncertainty in the valuation of the effects of exposure to air pollutants. As was done in the 2024 Rule BCA, this range consists of two scenarios labeled as Low and High throughout this memo. See Section 8.3 in the 2024 Rule BCA for a description of the assumptions underlying the Low and High scenarios. For all other benefits (*i.e.*, water-related benefits), the EPA provides estimates for a single scenario based on the main analysis as presented in the 2024 Rule BCA.

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[14] EPA is continuing to investigate the dose-response relationship between the lead exposure to adults and the resulting cardiovascular disease. In this rule, dietary lead exposure was assumed via self-caught fish resulting from lead discharged by power plants to receiving waters. In other contexts, the exposure route may be different. EPA will continue to consider different modes of exposure as well as decreasing the uncertainties associated with the dose-response relationship.

Table 2-4: Summary of Benefits at 3 Percent and 7 Percent Discount Rates

	Monetized Static Model Water-Related Benefits[a]	Monetized Dynamic Model Air Quality Benefits[b] - Low	Monetized Dynamic Model Air Quality Benefits[b] - High	Monetized Static plus Dynamic Benefits - Low	Monetized Static plus Dynamic Benefits - High	Additional Unmonetized Benefits
3% Discount Rate						Other avoided adverse health effects (cancer and non-cancer) from reduced exposure to pollutants discharged to receiving waters; improvements in T&E species habitat and potential effects on T&E species populations; changes in property value from water quality improvements; changes in ecosystem effects, visibility impairment, and human health effects from direct exposure to NO2, SO2, and hazardous air pollutants. See Table 2-3 for details.
PV[c]	-$65.2	-$4,483.7	-$1,793.5	-$4,548.8	-$1,858.6	
Annualized[c]	-$3.3	-$228.8	-$91.5	-$232.1	-$94.8	
7% Discount Rate						
PV[c]	-$41.4	-$3,325.5	-$1,345.3	-$3,366.9	-$1,386.7	
Annualized[c]	-$3.3	-$268.0	-$108.4	-$271.3	-$111.7	

a. Include human health benefits from changes in pollutant exposure via drinking water and fish ingestion; nonmarket benefits from water quality changes; and changes in drinking water treatment and dredging costs.
b. Include human health benefits from changes in air pollutant exposure.
c. Total present value and annualized value over the 30-year period of 2025-2054.

2.2.3 Uncertainty in the Analysis of Forgone Benefits

Estimates generated using the approaches above are subject to several important sources of uncertainty. First, some of the forgone benefits for the final rule are associated with health effects from changes in air pollutant emissions. These effects were estimated in the 2024 Rule baseline and policy scenarios by modeling shifts in the overall profile of electricity generation and are therefore sensitive to market conditions and system constraints, including other regulations affecting the power sector. The EPA relied on the benefits that were estimated for the 2024 Rule because it did not have new modeling results that incorporate more recent market conditions. The electricity market model that was used to estimate the 2024 Rule benefits accounted for numerous rules that had been finalized at the time of that analysis, as well as state and federal legislation affecting the power sector, including the Inflation Reduction Act of 2022 (IRA). However, significant market and regulatory changes have occurred since the 2024 Rule analysis was conducted. Additionally, there may be other regulatory changes before the promulgation of this final rule, and these too are not accounted for in the available data. These changes introduce important uncertainties in the analysis of the costs and benefits of this rule, but due to differences in how the impacts are estimated, would (if they were accounted for in the analysis) have a greater impact on the electricity market-based air-related benefit estimates than the water quality benefits of this final rule. The baselines for the water quality benefits estimates, cost estimates, and air quality benefits estimates may also differ slightly due to the static/dynamic distinction, as the cost estimates and water quality estimates use the static estimate and the air benefits use a dynamic estimate, though the agency expects the impact on the resulting estimates may be small. The EPA will consider additional analysis, as appropriate, to incorporate market and regulatory changes in any subsequent rulemaking revising the ELGs.

In addition to the same uncertainty affecting the social costs regarding the timing of technology implementation across plants,[15] the analysis of forgone benefits under the final rule includes additional timing-related uncertainty. The analysis assumes that all benefits start five years later than in the baseline, but this overstates the forgone benefits attributable to the final rule since only deadlines for meeting zero discharge limits are being extended. The EPA does not have a breakout of benefits at the unit or plant level and is therefore unable to adjust the timing of benefits selectively. The EPA still believes the analysis provides some insight on forgone benefits.

As detailed in the 2024 Rule BCA, the analysis does not include additional forgone benefits that were not monetized for the 2024 Rule, including avoided adverse health effects (cancer and non-cancer) from reduced exposure to pollutants discharged to receiving waters; improvements in threatened and endangered (T&E) species habitat and potential effects on T&E species populations; changes in property value from water quality improvements; changes in ecosystem effects, visibility impairment, and human health effects from direct exposure to nitrogen oxides, sulfur dioxide, and hazardous air pollutants. See the 2024 Rule BCA for details (U.S. EPA, 2024a). There may be additional unquantified and unmonetized benefits associated with this rule that were not pertinent to the 2024 Rule. The EPA does not have the data to present these benefits in detail. These benefits are associated with generating units continuing to operate and the consequent reduced risk of electrical outages. Such outages, even if limited in scope or duration, can have profound impacts (*e.g.*, the health impacts of medical devices failing to operate; impacts to transportation, etc.), and the avoidance of those impacts are a benefit of this final rule.

3   Incremental Costs for Paperwork Burden

Two provisions in the final rule have the potential to create new paperwork burden and result in incremental costs for steam electric plants and permitting authorities.[16]

- Facilities that seek to switch between compliance alternatives under the updated transfer provisions at 40 CFR 423.13(o) (*i.e.*, switch between requirements for zero-discharge and requirements applicable to the subcategory of permanent cessation of coal combustion by 2034) will need to file a Notice of Planned Participation (NOPP). The NOPP must detail the reason the transfer is warranted, identify the specific provision under which the transfer will occur, and include a narrative demonstrating that each electric generating unit will be able to maintain compliance with the relevant provisions.

- Facilities that seek alternative applicability dates and paperwork submission dates based on site-specific factors under 40 CFR 423.18 will need to send an initial request letter to the permitting authority and send regular progress reports. The initial request requires developing and providing: (1) a narrative detailing the significant unexpected circumstances that warrant an alternative

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[15] As noted in Section 2.1.3, because rule specifies that the limits based on zero discharge are to be met "as soon as possible but no later than" December 31, 2034, it is possible that plants will comply sooner than estimated for this analysis. If so, the forgone benefits would be smaller than presented here. In fact, if all plants were to comply with the limits by the original December 31, 2029 deadline, the forgone benefits would be zero.

[16] This analysis focused on the new requirements introduced by this final rule. In the Information Collection Request (ICR), the EPA also estimated burden for other existing ELG reporting and recordkeeping requirements, including the posting of information to a public website under §423.19(c), the filing of a Notice of Planned Participation (NOPP) under §423.19(h), and the submittal of a certification statement for facilities subject to zero discharge pretreatment standard under §423.19(p).

applicability date, and (2) a proposed schedule of compliance, supported by detailed engineering dependency chart that clearly shows the milestones leading to compliance as soon as possible given the unexpected circumstances described in the letter, including contingencies for critical path steps. In the subsequent progress reports, the facilities must describe the tasks and sub-tasks completed towards each of the milestones listed in the initial request letter, any changes to the expected dates of milestones, and any contingencies from the initial request letter.

In both cases, the permitting authority will review the notification or request for completeness and accuracy.

In the Information Collection Request (ICR) that accompanied the proposed rule, the EPA estimated that 20 facilities may submit a request as described in section 423.19(l) under the updated transfer provisions at 40 CFR 423.13(o) and 20 facilities may submit a request as described in section 423.19(q) for alternative applicability dates and paperwork submission dates based on site-specific factors under 40 CFR 423.18. The EPA estimates that 10 permitting authorities may incur burden to review the requests. Table 3-1 summarizes the estimated burden hours and costs for these two provisions. See the ICR supporting statement for additional details (U.S. EPA, 2025a).

The EPA expects one-time costs to be incurred when a facility initially submits a request. For the purpose of this analysis, the EPA assumed that the requests will be submitted in 2030, before the final rule "no later than" compliance dates for meeting applicable zero-discharge limits. Any subsequent annual costs for requests under section 423.19(q) are estimated to be incurred only until the agreed-upon alternative applicability date. For the purpose of this analysis, the EPA assumed that facilities will need to submit annual reports for two years following the initial request, *i.e.*, in 2035 and 2036.

The analysis shows that the incremental paperwork requirements (approximately $11,000, annualized) are very small relative to the cost savings from extending the deadlines for meeting zero-discharge limits.

Table 3-1: Summary of Incremental Reporting and Paperwork Costs (2024$)

Activity	Entity	Frequency	Number of Facilities or Permit Authorities	Total Burden (Hours)	Total Costs (2024 dollars)
Request for transfer—423.19(l)	Facilities	One-Time	20	540	$57,401
Request for transfer—423.19(l)	Permitting Authorities	One-Time	10	70	$5,673
Request for alternative dates—423.19(q)	Facilities	One-Time	20	620	$66,617
Request for alternative dates—423.19(q)	Facilities	Annual	20	620	$66,617
Request for alternative dates—423.19(q)	Permitting Authorities	One-Time	10	120	$9,319
Request for alternative dates—423.19(q)	Permitting Authorities	Annual	10	120	$9,319
		Total, 2025-2054ᵃ	3%	Present Value	$211,554
		Total, 2025-2054ᵃ	3%	Annualized	$10,793
		Total, 2025-2054ᵃ	7%	Present Value	$140,459
		Total, 2025-2054ᵃ	7%	Annualized	$11,319

a. To calculate total costs in 2025-2054, the EPA assumed that on-time costs would be incurred in 2034, and annual costs in 2035 and 2036.

4   Comparison of Avoided Costs and Forgone Benefits

As discussed in the Introduction (Section 1) of this memo, the EPA estimated costs and water quality benefits using static model and time-invariant inputs while baseline and regulatory air quality benefits

were modeled dynamically in IPM. For this reason, the EPA is presenting static-model costs, benefits, and net benefits separately to illustrate the potential impact that the uncertainties specific to the air quality benefits could represent and cautions readers not to ascribe significant weight to the total costs, benefits, and net benefits prior to any reanalysis the Agency may conduct as part of any future action.

Table 4-1 provides the estimated costs, benefits, and net benefits, exclusive of the electricity market-based air-related benefits – estimates in which the EPA has reasonable confidence. Table 4-2 provides the same information, but inclusive of the electricity market-based air-related benefits – estimates in which the EPA is certain that the magnitude of forgone benefits are overestimated, resulting in artificially low net benefits estimates.

Table 4-1: Summary of Costs, Benefits and Net Monetized Benefits Based on Static-Model Water-Related Benefits Only

	Costs	Monetized Static Model Water-Related Benefits[a]	Net Monetized Benefits based on Static-Model Benefits Only
3% Discount Rate			
PV[b]	-$1,187.7	-$65.2	$1,122.5
Annualized[b]	-$60.6	-$3.3	$57.3
7% Discount Rate			
PV[b]	-$1,390.7	-$41.4	$1,349.3
Annualized[b]	-$112.1	-$3.3	$108.7

a. Include human health benefits from changes in pollutant exposure via drinking water and fish ingestion; nonmarket benefits from water quality changes; and changes in drinking water treatment and dredging costs. Omit monetized human health benefits from changes in air pollutant exposure.
b. Total present value and annualized value over the 30-year period of 2025-2054.

Table 4-2: Summary of Costs, Benefits and Net Monetized Benefits Based on Static-Model Water-Related Benefits and Dynamic-Model Air Quality Benefits

	Costs	Total Monetized Benefits - Low	Total Monetized Benefits - High	Net Monetized Benefits - Low	Net Monetized Benefits - High
3% Discount Rate					
PV[a]	-$1,187.7	-$4,548.8	-$1,858.6	-$3,361.1	-$670.9
Annualized[a]	-$60.6	-$232.1	-$94.8	-$171.5	-$34.2
7% Discount Rate					
PV[a]	-$1,390.7	-$3,366.9	-$1,386.7	-$1,976.2	$4.0
Annualized[a]	-$112.1	-$271.3	-$111.7	-$159.3	$0.3

a. Total present value and annualized value over the 30-year period of 2025-2054.

As can be seen in the results above, the magnitude and direction of the total monetized net benefits will primarily be determined by the magnitude and direction of the electricity market-based air quality benefits. Since steam electric plants are typically associated with air pollution, one might expect that rules with net costs would lead to a decrease in overall steam electric plant utilization and therefore would result in positive benefits. Similarly, one might expect that rules with net cost savings would lead to an increase in overall steam electric plant utilization and therefore would result in forgone benefits. However, when regulations have relative costs or cost savings that are small compared to overall operating costs, results can sometimes be counterintuitive. This can be seen in historical modeling for previous Steam Electric ELG rules. For example, in the 2020 Rule benefit-cost analysis, the EPA estimated that the changes in air quality benefits attributable to the cost savings of the 2020 Rule[17] would

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[17] Cost savings were estimated to be $127.1 million per year at a three percent discount rate and $153.4 million per year at a seven percent discount rate.

result in positive air quality benefits due to changes in NO_X, SO_2, and $PM_{2.5}$ emissions (U.S. EPA, 2020). While nationwide the EPA estimated increased air pollution, decreases in high population centers resulted in benefits that more than offset the disbenefits associated with air pollution increases seen in low population areas. As the current final rule has a similar magnitude of annual cost savings, it is entirely possible that modeling under current circumstances might result in positive air quality benefits. For this reason, the range of net benefits in the two tables above should be considered illustrative, and not necessarily representative of the actual net benefits of the final rule, nor of the net benefits that might be estimated were the EPA to revise all of its analyses to reflect the current change in the electricity markets. Instead, the EPA will do precisely what it stated it would do when it announced a two-phased reconsideration and will only update these analyses as appropriate in any subsequent action.

5   References

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6 Supporting Tables: Detailed Year-by-Year Benefit Estimates

The following tables provide the year-by-year estimates of the static-model and dynamic-model benefits summarized in section 2.2.2.

Table 6-1: Summary of Water-Related Static-Model Monetized Benefits at 3 Percent and 7 Percent Discount Rates

Year	Baseline Monetized Benefits (million 2023$)[a]	Final Rule Monetized Benefits (million 2023$)[a]	Difference Monetized Benefits (million 2023$)[a]	Monetized Benefits Change Due to Final Rule (million 2024$)[a]
2025	$3.2	$0.0	-$3.2	-$3.3
2026	$3.7	$0.0	-$3.7	-$3.8
2027	$4.1	$0.0	-$4.1	-$4.2
2028	$4.5	$0.0	-$4.5	-$4.6
2029	$4.8	$0.0	-$4.8	-$4.9
2030	$8.0	$3.2	-$4.8	-$4.9
2031	$8.8	$3.7	-$5.1	-$5.2
2032	$9.4	$4.1	-$5.3	-$5.5
2033	$10.1	$4.5	-$5.6	-$5.7
2034	$10.7	$4.8	-$5.9	-$6.0
2035	$11.2	$8.0	-$3.2	-$3.3
2036	$11.7	$8.8	-$2.9	-$3.0
2037	$12.1	$9.4	-$2.7	-$2.8
2038	$12.6	$10.1	-$2.5	-$2.6
2039	$13.1	$10.7	-$2.4	-$2.5
2040	$13.6	$11.2	-$2.3	-$2.4
2041	$14.0	$11.7	-$2.3	-$2.4
2042	$14.5	$12.1	-$2.4	-$2.4
2043	$14.9	$12.6	-$2.3	-$2.4
2044	$15.4	$13.1	-$2.3	-$2.4
2045	$15.9	$13.6	-$2.4	-$2.4
2046	$16.4	$14.0	-$2.4	-$2.4
2047	$16.8	$14.5	-$2.4	-$2.4
2048	$17.3	$14.9	-$2.3	-$2.4
2049	$17.7	$15.4	-$2.3	-$2.3
2050	$17.7	$15.9	-$1.7	-$1.8
2051	$17.7	$16.4	-$1.3	-$1.3
2052	$17.7	$16.8	-$0.8	-$0.9
2053	$17.7	$17.3	-$0.4	-$0.4
2054	$17.7	$17.7	$0.0	$0.0
		3% Discount	**PV**	**-$65.2**
		3% Discount	**Annualized**	**-$3.3**
		7% Discount	**PV**	**-$41.4**
		7% Discount	**Annualized**	**-$3.3**

a. The EPA used the GDP deflator to convert 2023$ to 2024$ (125.22/122.27 = 1.024)

Table 6-2: Summary of Electricity Market-Based Air-Related (Dynamic-Model) Monetized Benefits at 3 Percent Discount Rate

Year	Baseline Monetized Benefits (million 2023$) - High	Baseline Monetized Benefits (million 2023$) - Low	Final Rule Monetized Benefits (million 2023$) - High	Final Rule Monetized Benefits (million 2023$) - Low	Difference in Monetized Benefits (million 2023$) - High	Difference in Monetized Benefits (million 2023$) - Low	Change Due to Final Rule (million 2024$)[a] - High	Monetized Benefits Change Due to Final Rule (million 2024$)[a] - Low
2025	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2026	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2027	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2028	$1,000.0	$2,500.0	$0.0	$0.0	-$1,000.0	-$2,500.0	-$1,024.2	-$2,560.5
2029	$1,000.0	$2,500.0	$0.0	$0.0	-$1,000.0	-$2,500.0	-$1,024.2	-$2,560.5
2030	$380.0	$1,200.0	$380.0	$1,200.0	$0.0	$0.0	$0.0	$0.0
2031	$380.0	$1,200.0	$380.0	$1,200.0	$0.0	$0.0	$0.0	$0.0
2032	$1,600.0	$3,700.0	$1,600.0	$3,700.0	$0.0	$0.0	$0.0	$0.0
2033	$1,600.0	$3,700.0	$1,600.0	$3,700.0	$0.0	$0.0	$0.0	$0.0
2034	$1,600.0	$3,700.0	$1,600.0	$3,700.0	$0.0	$0.0	$0.0	$0.0
2035	$1,600.0	$3,700.0	$1,600.0	$3,700.0	$0.0	$0.0	$0.0	$0.0
2036	$1,600.0	$3,700.0	$1,600.0	$3,700.0	$0.0	$0.0	$0.0	$0.0
2037	$1,600.0	$3,700.0	$1,600.0	$3,700.0	$0.0	$0.0	$0.0	$0.0
2038	$480.0	$1,200.0	$480.0	$1,200.0	$0.0	$0.0	$0.0	$0.0
2039	$480.0	$1,200.0	$480.0	$1,200.0	$0.0	$0.0	$0.0	$0.0
2040	$480.0	$1,200.0	$480.0	$1,200.0	$0.0	$0.0	$0.0	$0.0
2041	$480.0	$1,200.0	$480.0	$1,200.0	$0.0	$0.0	$0.0	$0.0
2042	$150.0	$370.0	$150.0	$370.0	$0.0	$0.0	$0.0	$0.0
2043	$150.0	$370.0	$150.0	$370.0	$0.0	$0.0	$0.0	$0.0
2044	$150.0	$370.0	$150.0	$370.0	$0.0	$0.0	$0.0	$0.0
2045	$150.0	$370.0	$150.0	$370.0	$0.0	$0.0	$0.0	$0.0
2046	$150.0	$370.0	$150.0	$370.0	$0.0	$0.0	$0.0	$0.0
2047	$150.0	$370.0	$150.0	$370.0	$0.0	$0.0	$0.0	$0.0
2048	$130.0	$300.0	$130.0	$300.0	$0.0	$0.0	$0.0	$0.0
2049	$130.0	$300.0	$130.0	$300.0	$0.0	$0.0	$0.0	$0.0
2050	$130.0	$300.0	$130.0	$300.0	$0.0	$0.0	$0.0	$0.0
2051	$130.0	$300.0	$130.0	$300.0	$0.0	$0.0	$0.0	$0.0
2052	$130.0	$300.0	$130.0	$300.0	$0.0	$0.0	$0.0	$0.0
2053	$130.0	$300.0	$130.0	$300.0	$0.0	$0.0	$0.0	$0.0
2054	$130.0	$300.0	$130.0	$300.0	$0.0	$0.0	$0.0	$0.0
					3% Discount	PV	-$1,793.5	-$4,483.7
					3% Discount	Annualized	-$91.5	-$228.8

a. The EPA used the GDP deflator to convert 2023$ to 2024$ (125.22/122.27 = 1.024)

Table 6-3: Summary of Electricity Market-Based Air-Related (Dynamic-Model) Monetized Benefits at 7 Percent Discount Rate

Year	Baseline Monetized Benefits (million 2023$) - High	Baseline Monetized Benefits (million 2023$) - Low	Final Rule Monetized Benefits (million 2023$) - High	Final Rule Monetized Benefits (million 2023$) - Low	Difference in Monetized Benefits (million 2023$) - High	Difference in Monetized Benefits (million 2023$) - Low	Change Due to Final Rule (million 2024$)ᵃ - High	Monetized Benefits Change Due to Final Rule (million 2024$)ᵃ - Low
2025	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2026	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2027	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2028	$890.0	$2,200.0	$0.0	$0.0	-$890.0	-$2,200.0	-$911.5	-$2,253.2
2029	$890.0	$2,200.0	$0.0	$0.0	-$890.0	-$2,200.0	-$911.5	-$2,253.2
2030	$320.0	$1,000.0	$320.0	$1,000.0	$0.0	$0.0	$0.0	$0.0
2031	$320.0	$1,000.0	$320.0	$1,000.0	$0.0	$0.0	$0.0	$0.0
2032	$1,400.0	$3,300.0	$1,400.0	$3,300.0	$0.0	$0.0	$0.0	$0.0
2033	$1,400.0	$3,300.0	$1,400.0	$3,300.0	$0.0	$0.0	$0.0	$0.0
2034	$1,400.0	$3,300.0	$1,400.0	$3,300.0	$0.0	$0.0	$0.0	$0.0
2035	$1,400.0	$3,300.0	$1,400.0	$3,300.0	$0.0	$0.0	$0.0	$0.0
2036	$1,400.0	$3,300.0	$1,400.0	$3,300.0	$0.0	$0.0	$0.0	$0.0
2037	$1,400.0	$3,300.0	$1,400.0	$3,300.0	$0.0	$0.0	$0.0	$0.0
2038	$410.0	$1,100.0	$410.0	$1,100.0	$0.0	$0.0	$0.0	$0.0
2039	$410.0	$1,100.0	$410.0	$1,100.0	$0.0	$0.0	$0.0	$0.0
2040	$410.0	$1,100.0	$410.0	$1,100.0	$0.0	$0.0	$0.0	$0.0
2041	$410.0	$1,100.0	$410.0	$1,100.0	$0.0	$0.0	$0.0	$0.0
2042	$130.0	$330.0	$130.0	$330.0	$0.0	$0.0	$0.0	$0.0
2043	$130.0	$330.0	$130.0	$330.0	$0.0	$0.0	$0.0	$0.0
2044	$130.0	$330.0	$130.0	$330.0	$0.0	$0.0	$0.0	$0.0
2045	$130.0	$330.0	$130.0	$330.0	$0.0	$0.0	$0.0	$0.0
2046	$130.0	$330.0	$130.0	$330.0	$0.0	$0.0	$0.0	$0.0
2047	$130.0	$330.0	$130.0	$330.0	$0.0	$0.0	$0.0	$0.0
2048	$120.0	$260.0	$120.0	$260.0	$0.0	$0.0	$0.0	$0.0
2049	$120.0	$260.0	$120.0	$260.0	$0.0	$0.0	$0.0	$0.0
2050	$120.0	$260.0	$120.0	$260.0	$0.0	$0.0	$0.0	$0.0
2051	$120.0	$260.0	$120.0	$260.0	$0.0	$0.0	$0.0	$0.0
2052	$120.0	$260.0	$120.0	$260.0	$0.0	$0.0	$0.0	$0.0
2053	$120.0	$260.0	$120.0	$260.0	$0.0	$0.0	$0.0	$0.0
2054	$120.0	$260.0	$120.0	$260.0	$0.0	$0.0	$0.0	$0.0
					7% Discount	PV	-$1,345.3	-$3,325.5
					7% Discount	Annualized	-$108.4	-$268.0

a. The EPA used the GDP deflator to convert 2023$ to 2024$ (125.22/122.27 = 1.024)