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MEMORDANDUM

Date: June 28, 2019

To: Environmental Committee
New Generation Committee
Generation and Fuels Committee

From: Carolyn Slaughter, Director of Environmental Policy

Subject: Summary and Analysis of EPA's Final Affordable Clean Energy Rule, Repeal of the Clean Power Plan, and Amendments to Section 111(d) Implementing Regulations

I. Executive Summary

This memorandum summarizes and analyzes the U.S. Environmental Protection Agency's (EPA or Agency) final rulemaking package known as the Affordable Clean Energy Rule (ACE Rule or Rule), signed by the EPA Administrator on June 19, 2019.[1] As of the date of this memorandum, the Rule has not yet been published in the *Federal Register*. We expect the Rule to be published in mid- to-late July. The ACE Rule consists of three separate regulatory actions:

1) The repeal of EPA's 2015 Clean Power Plan (CPP);

2) The promulgation of a new set of emission guidelines for regulation of greenhouse gas (GHG) emissions from existing coal-fired electric generating units (EGUs) under section 111(d) of the Clean Air Act (CAA" or Act); and

3) The promulgation of amended section 111(d) implementing regulations governing submission and review of state plans under these and future emission guidelines.

EPA did not finalize its proposed reforms to the New Source Review (NSR) "emissions increase" test for major modifications, opting instead to take final action on that issue in a separate final action at a later date.[2]

In this final action, EPA repeals the CPP based on its revised legal interpretation that the "best system of emission reduction" (BSER), on which a section 111 standard of performance is based, must be limited to measures that can be applied to or at an individual source in the regulated source category. Based on that revised interpretation, the Agency has identified heat rate improvement (HRI) measures as the BSER for limiting GHG emissions from existing coal-fired

[1] https://www.epa.gov/sites/production/files/2019-06/documents/frn_ace_2060-at67_final_rule_20190618disc.pdf.
[2] Rule at 5.

EGUs and promulgated emission guidelines reflecting that BSER. States must develop and submit state plans establishing standards of performance for individual existing coal-fired EGUs that are based on a unit-by-unit analysis of the availability and impact of specific HRI measures. The ACE Rule recognizes states' broad discretion to account for remaining useful life and other factors the state finds relevant in establishing unit-specific performance standards.

States may not allow sources to comply with these standards, through emissions averaging or trading programs, or through reduced utilization.

The actions EPA has taken in the ACE Rule address fundamental legal issues and have important implications for owners of sources regulated under the CAA, both because of the Rule's direct effects on regulation of coal-fired EGUs and the precedent it establishes for future regulation of GHG emissions from other source categories under section 111(d). Notably, while the CPP established emission guidelines for existing natural gas combined cycle combustion turbines, those sources are not addressed in the ACE Rule—leaving the door open for a future administration to fill that gap. If upheld, EPA's action in this Rule would bind future EPA rulemakings under section 111(d) to an "inside-the-fenceline" interpretation of measures that may be considered as BSER and would establish a precedent for source-specific standard setting. It would also constrain future emission guidelines from allowing states to provide flexible options for compliance with those standards, such as emissions averaging or trading.

This memorandum will first provide a summary of key issues presented in the ACE Rule and changes from the proposed version. Each of the three separate rulemaking actions is then discussed in detail.

II. Summary of Key Issues and Changes

Summarized below are important issues presented in the final ACE Rule and changes from the Proposal.[3]

- EPA repeals the CPP based on its revised conclusion that CAA section 111 limits the scope of measures that may constitute the BSER to "those systems that can be put into operation at a building, structure, facility, or installation" that is subject to regulation under that section. EPA's position is that the Act's text unambiguously commands this interpretation as a matter of *Chevron* step 1.[4] EPA does not argue in the alternative that if section 111 is ambiguous, EPA's reading is a reasonable interpretation entitled to deference under *Chevron* step 2.

[3] 83 Fed. Reg. 44,746 (Aug. 31, 2018) (Proposal).

[4] *Chevron U.S.A., Inc. v. Natural Res. Def. Council*, 467 U.S. 837, 842-43 (1984). In Chevron, the Supreme Court set forth a legal test as to when the court should defer to the agency's answer or interpretation, holding that such judicial deference is appropriate where the agency's answer was not unreasonable, so long as the Congress had not spoken directly to the precise issue at question. The scope of the Chevron deference doctrine is that when a legislative delegation to an administrative agency on a particular issue or question is not explicit but rather implicit, a court may not substitute its own interpretation of the statute for a reasonable interpretation made by the administrative agency.

- The ACE Rule applies only to existing coal-fired EGUs that meet certain design and operational criteria. In a change from the Proposal, the Rule explicitly excludes oil- and natural gas-fired EGUs, as well as all stationary combustion turbines. The Rule also allows for coal-fired EGUs to avoid becoming subject to state plans by taking enforceable permit limits on their output.

- The Rule clarifies the respective roles of EPA and the states in the section 111(d) regulatory process for existing sources. EPA identifies the BSER for the source category or subcategory and issues an emission guideline providing the degree of emission reduction achievable through application of that BSER. States are then responsible for developing standards of performance that reflect application of the BSER to the individual sources within their boundaries. States have discretion to account for remaining useful life and other factors they deem relevant in establishing standards for those sources.

- EPA identifies the application of HRI to the designated facility as the BSER for existing coal-fired EGUs. This BSER is expressed as a set of six "candidate technologies" representing the HRI measures that are the most impactful and are broadly available at reasonable cost.

- The Rule provides minimal additional guidance on how states are expected to apply the BSER to develop source-specific standards of performance and leaves most decisions up to state discretion. EPA specifies the expected range of HRI potential, and costs associated with each of the candidate technologies and instructs states to use these values as a starting point for state plan development.

- EPA provides an expanded discussion of the appropriate role of remaining useful life and other factors in establishing standards of performance, including a non-exclusive list of factors that may be relevant to consider and a discussion of ways that a state may account for EGUs that plan to retire soon or have already implemented some or all of the candidate technologies.

- EPA recognizes that if it does not ultimately finalize the NSR reforms discussed in the Proposal, the high costs of potentially triggering NSR may lead states to reject some of the candidate technologies as the basis for standards of performance.

- EPA signals its support for states exercising their discretion to develop standards of performance that account for variable carbon dioxide (CO_2) emissions performance at individual EGUs in creative ways. This could include adopting multiple standards of performance for an EGU that apply during different load ranges, or promulgating a standard based on a set of constant conditions and requiring the source to periodically demonstrate compliance through a performance test conducted at the specified conditions.

- The Rule forecloses states from offering certain flexible compliance options, including compliance via: (1) emissions averaging or trading (even within a single facility); (2)

reduced utilization; and (3) co-firing biomass at the EGU. EPA interprets section 111 to only allow sources to show compliance with a standard of performance through measures that are within the scope of what may be considered BSER.

III. Clean Power Plan Repeal

In 2017, EPA proposed to repeal the CPP.[5] Stakeholders anticipated that the Proposed Repeal would be finalized simultaneously with the ACE Rule. As with the Proposed Repeal, EPA's final decision in the ACE Rule is based on the Agency's finding that EPA fundamentally misconstrued, in the CPP, the scope of measures that may constitute the BSER, and thus was promulgated in excess of EPA's statutory authority.[6] Although EPA has vigorously defended the CPP's broad approach to identifying BSER in the pending litigation over that rule, here the Agency notes that it has "inherent authority to reconsider, repeal, or revise past decisions to the extent permitted by law so long as the Agency provides a reasoned explanation," including "in response to … a change in administrations."[7]

EPA concludes that the CPP must be repealed because "CAA section 111 unambiguously limits the BSER to those systems that can be put into operation *at* a building, structure, facility, or installation" that is subject to regulation under that section.[8] Conversely, the BSER "cannot be premised on a system of emission reduction that is implementable only through the combined activities of sources or non-sources," such as generation shifting.[9]

The Agency reaches this statutory interpretation under "step 1" of the *Chevron* analysis.[10] In other words, EPA takes the position that the statutory text itself is unambiguous and not subject to any other interpretation. [11]EPA does not present the alternative *Chevron* "step 2" argument that, even if section 111 is ambiguous and could be interpreted to allow for the kind of measures that formed the BSER for the CPP, EPA's more limited reading here is reasonable and entitled to deference.

By relying on a *Chevron* step 1 approach, the ACE Rule (if upheld) will more effectively tie the hands of a future administration than if EPA had claimed the statute is ambiguous. In order to uphold EPA's repeal of the CPP, a court will have to find that the Act unambiguously forecloses the identification of measures as BSER that cannot be applied at the individual regulated source. Such a finding would prevent subsequent administrations from returning to an approach to section 111 that is premised on BSER measures that go beyond the regulated source, either in a follow-on replacement to the ACE Rule or in emission guidelines addressed to other sources of GHG emissions, such as combustion turbines.

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[5] 82 Fed. Reg. 48,035 (October 16, 2017) (Proposed Repeal).
[6] Rule at 13.
[7] *Id.* (citing *Clean Air Council v. Pruitt*, 862 F.3d 1, 8-9 (D.C. Cir. 2017)).
[8] *Id.* at 18.
[9] *Id.*
[10] *Chevron U.S.A. Inc. v. NRDC, Inc*., 467 U.S. 837 (1984).
[11] See Rule at 18 (stating "the plain language of CAA section 111 does not authorize" generation shifting as BSER); Id. at 47 ("Congress spoke directly in *Chevron* step one terms to the question of whether the BSER may contain measures other than those that can be put into operation at a particular source: it may not.").

EPA's argument focuses primarily on the term "application" as used in section 111(a)(1), and EPA says that term was impermissibly conflated with "implementation" in the CPP.[12] In defining "standard of performance," "Congress expressly limited the universe of systems of emission reduction from which the EPA may choose the BSER to those systems whose 'application' to an 'existing source' will yield an 'achievable' 'degree of emission limitation.'" [13] According to the Agency, the term "application" requires both a direct object and an indirect object—i.e., one must apply something (the BSER) to something else (the existing source for which a standard is being promulgated).[14] Thus, the focus on measures that can be applied to an individual source is an inherent part of the definition of "standard of performance."

EPA also cites the context, legislative history, and implementation of CAA section 111 to support its interpretation. It notes that Congress explicitly tied section 111 standards of performance to best available control technology (BACT) requirements, which itself must be "limited to control options that can be applied to the source itself." [15] Examining the bills that ultimately became CAA section 111 in 1970, EPA concludes that "both the Senate and House bills contemplated only control measures that would lead to better design, construction, operation, and maintenance of an individual source." [16] EPA also notes that in every section 111 rulemaking prior to the CPP, the Agency "applied technologies, techniques, processes, practices, or design modifications directly to individual sources" to represent the BSER.[17] Even in the Clean Air Mercury Rule, which included a cap-and-trade mechanism, the rule was "based on control technology available in the relevant timeframe." [18]

By contrast, "generation shifting" (where lower emitting sources are dispatched before higher emitting sources) is inconsistent with these limits on EPA's authority to determine BSER. The CPP took the position that generation shifting was acceptable because "the system must be limited to measures that can be implemented—'appl[ied]'—by the sources themselves," equating the distinct concept of "implementation" with "application."[19]

While a source owner may be able to participate in implementing generation shifting, it cannot "apply" generation shifting to the regulated source itself.[20] Likewise, EPA finds that the CPP's claim that the broad dictionary definition of the term "system" justifies reliance on generation shifting as BSER is an unreasonable reading of the Act because it lacks a limiting principle and would open an "infinitude" of regulatory measures that could be used to impact a source's order of dispatch, such as minimum wage requirements or production caps.[21] Finally, allowing EPA to

[12] *Id.* at 16.
[13] *Id.*
[14] *Id.* at 17.
[15] *Id.* at 21.
[16] *Id.* at 24.
[17] *Id.* at 26.
[18] *Id.* at 26 n.66.
[19] *Id.* at 28 (quoting 80 Fed. Reg. 64,662, 64,720 (Oct. 23, 2015)).
[20] *Id.* at 30.
[21] *Id.* at 31-34; see Cal. Indep. Sys. Operator Corp. v. FERC, 372 F.3d 395, 401 (D.C. Cir. 2004) (rejecting Federal Energy Regulatory Commission ("FERC") claim of authority to reform utility's governing structure that was premised on authority over "practice[s] … affecting [a] rate").

utilize generation shifting as BSER encroaches on authorities entrusted by the Federal Power Act to FERC and the states. [22]

EPA also concedes in the final ACE Rule, that its position in the CPP was prohibited by the "clear statement" doctrine—the legal principle that courts "expect Congress to speak clearly if it wishes to assign to an agency decisions of vast 'economic and political significance.'" [23]The CPP met the criteria of a "major rule" triggering the clear statement doctrine, both in its impact and in its claim to Agency power to "order the wholesale restructuring of any industrial sector."[24] Because section 111 does not include a clear statement supporting the use of generation shifting or similar measures as the BSER, "it is not reasonable to find in this statutory scheme Congressional intent to endow the Agency with discretion of this breadth to regulate a fundamental sector of the economy." [25]

Finally, EPA rejects the use of "reduced utilization" of the source as a potential basis for the BSER. [26] The Agency concludes that in addition to section 111(a)(1), a "standard of performance" must also satisfy the definition in section 302(l), which mandates "a requirement of continuous emission reduction." [27] The requirement for "continuous emission reduction" is not met by "intermittent control strategies, such as … reductions in plant output." [28] (internal quotation and emphasis omitted). Likewise, EPA must give effect to the term "performance" in "standard of performance." [29] Reduced utilization only calls for "nonperformance" and "does not involve improvements to a source's emissions during 'performance.'"[30]

EPA notes that its repeal of the CPP is a distinct final action that is separate and severable from its promulgation of the ACE Rule and its new Subpart Ba implementing regulations for section 111(d). [31] If either of those actions is found unlawful on judicial review, EPA intends for its repeal of the CPP to stand on its own.

IV. ACE Rule Emissions Guidelines

A. Effective Date

The ACE Rule takes effect 60 days after publication in the *Federal Register*.[32]

[22] Rule at 38-42.
[23] *Id*. at 35 (quoting *Utility Air Regulatory Group v. EPA*, 573 U.S. 302, 324 (2014)).
[24] *Id*. at 36-37.
[25] *Id*. at 37.
[26] *Id*. at 42.
[27] *Id*. at 43.
[28] *Id*. at 45
[29] *Id*. at 46.
[30] *Id*.
[31] *Id*. 47.
[32] *Id*. at 2.

B. EPA's Legal Authority to Regulate EGUs

In order to regulate existing sources under section 111(d), EPA must first: (1) determine that the source category "causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare"; and (2) promulgate standards of performance for new sources in the category.[33] EPA claims it previously made this threshold finding in promulgating its Subpart TTTT new source performance standards (NSPS) for new coal-fired EGUs and stationary combustion turbines.[34,35]Although that NSPS is itself under reconsideration, it remains in effect and EPA concludes in the here that it "continues to provide the requisite predicate for applicability of CAA section 111(d)" for purposes of promulgating the ACE Rule.[36,37] EPA also states that the 2009 endangerment finding for GHG emissions from mobile sources is not at issue in this Rule.[38]

The ACE Rule does not address arguments regarding the "Section 112 Exclusion." The section 112 Exclusion is an argument that sources that are subject to regulation under section 112(the provision governing regulation of the hazardous air pollutants) cannot be regulated under section 111(d). Because EGUs subject to regulation in the ACE Rule are subject to the Mercury and Air Toxic Standards under section 112, an argument exists that regulation of these same sources under section 111(d) is unlawful.

C. Affected Sources

In a notable change from the Proposal, EPA clarifies that the ACE Rule addresses only the regulation of existing coal-fired EGUs.[39] The Proposal was clear that the ACE Rule would not address regulation of existing combustion turbines under section 111(d) because EPA lacked sufficient information to identify the BSER for those sources, and the final Rule maintains that position. [40] The Proposal's regulatory text would have required state plans to address existing oil- and gas-fired EGUs, however, even though EPA did not propose to identify the BSER for those sources. The Rule responds by clarifying that "oil- or natural gas-fired utility boilers … are not designated facilities for purposes of this action."[41] Accordingly, the "designated facilities" that state plans must address are "steam generating units" that were constructed on or before January 8, 2014, and meet specific criteria.[42] A "steam generating unit" is a "furnace, boiler, or other device used for combusting fuel and producing steam (nuclear steam generators are not included) plus any integrated equipment that provides electricity or useful thermal output to the

[33] See CAA § 111(b)(1)(A), (d)(1).
[34] There is a dispute in the litigation over the section 111(b) NSPS rule over whether that finding was properly made that may be resolved in connection with EPA's reconsideration of that rule. In any event, the argument is procedural in nature; several industry parties argued that while the procedure was improper that there was no reason why the finding could not be made.
[35] 80 Fed. Reg. 64,510 (Oct. 23, 2015).
[36] 83 Fed. Reg. 65,424 (Dec. 20, 2018),
[37] *Id*. at 51.
[38] *Id*. at 9 n.5.
[39] *Id*. at 52.
[40] *Id*. at 52-53.
[41] Rule at 52.
[42] Id. at 228, 40 C.F.R. §60.5775a.

affected facility or auxiliary equipment." [43] An existing steam generating unit is a "designated facility" if it:

1) Is capable of selling greater than 25 MW of electricity;

2) Has a base load rating (i.e., design heat input capacity) greater than 260 GJ/hr (250 MMBtu/hr) heat input of fossil fuel; and

3) Is an electric utility steam generating unit that burns coal for more than 10.0 percent of the average annual heat input during the three previous calendar years. [44]

EPA also to provide a mechanism by which an existing coal-fired EGU can avoid becoming subject to a state plan by taking permit limits on its output. In the Proposal, EPA proposed to exclude any unit that "is, and always has been, subject to a federally enforceable permit limiting annual net-electric sales to one-third or less of its potential electric output, or 219,000 MWh or less."[45] Utility industry groups requested that EPA remove the requirement that the unit "always has been" subject to such a limit on its output. The Agency made that change in the final Rule.

The following sources are explicitly excluded from the scope of the ACE Rule:[46]

1) A new or reconstructed EGU subject to Subpart TTTT;[47]

2) A steam generating unit that is subject to a federally enforceable permit limiting annual net-electric sales to one-third or less of its potential electric output, or 219,000 MWh or less;

3) A stationary combustion turbine that meets the definition of a simple cycle stationary combustion turbine, a combined cycle stationary combustion turbine, or a combined heat and power combustion turbine;

4) An Integrated Gasification Combined Cycle (IGCC) unit;

5) A non-fossil unit (i.e., a unit that has the capability of combusting 50 percent or more non-fossil fuel) that has always limited the use of fossil fuels to 10 percent or less of the annual capacity factor or is subject to a federally enforceable permit limiting fossil fuel use to 10 percent or less of the annual capacity factor;

6) A combined heat and power EGU that has always limited, or is subject to a federally enforceable permit limiting, annual net-electric sales to a utility distribution system to no more than the greater of either 219,000 MWh or the product of the design efficiency and the potential electric output;

[43] Id. at 237, 40 C.F.R. § 60.5805a.
[44] *Id*. at 228, 40 C.F.R. § 60.5775a(b).
[45] 83 Fed. Reg. at 44,810, Proposed 40 C.F.R. § 60.5780a(a)(2).
[46] *Id*.at 40 C.F.R. § 60.5780a.
[47] Under section 111 of the CAA, a "modified" unit is considered "new."

7) An EGU serving a generator along with other steam generating units, IGCCs, or stationary combustion turbines where the effective generation capacity (determined based on a prorated output of the base load rating of each unit) is 25 MW or less;

8) An EGU that is a municipal waste combustor unit subject to Subpart Eb;

9) An EGU that is a commercial or industrial solid waste incineration unit subject to Subpart CCCC; or

10) A steam generating unit that fires more than 50 percent non-fossil fuels.

D. Roles of EPA and States

The Rule clarifies the Agency's interpretation of the respective roles of EPA and the states in the section 111(d) regulatory process for existing sources. Under the CAA, EPA is responsible for determining the BSER for a category or subcategory of existing sources.[48] Both section 111(b) and section 111(d) rely on the same definition of "standard of performance," which assigns "the Administrator" the role of determining the BSER.[49] EPA's identification of the BSER must be "based on what is 'adequately demonstrated' and broadly achievable for a source category across the country."[50] The Agency recognizes in this Rule that section 111 "does not require the 'greatest degree of emission control' or 'mandate that the EPA set standards at the maximum degree of pollution control technologically achievable.'" [51]

EPA also states that it has a responsibility under section 111(d) to "identify the degree of emission reduction that it determines to be achievable through the application of the BSER."[52] In the Proposal, EPA took the position that the CAA only requires it to provide information on the degree of emission limitation achievable.[53] But commenters argued that EPA needed to provide more guidance on developing standards of performance, and that identifying the degree of emission limitation achievable is "inextricably linked with the determination of the BSER."[54] Accordingly, in the final ACE Rule, EPA has identified the "degree of emission limitation achievable through the application of the BSER (i.e., the level of stringency)" for use in state plan development.[55]

While EPA is responsible for identifying the BSER, the Rule makes clear that states are "primarily responsible for regulating existing sources." [56] Under section 111(d), "each state—which will be more familiar with the operational and design characteristics of actually existing sources within their borders—is responsible for developing source-specific standards reflecting

[48] Rule at 55.
[49] *Id*. (citing CAA § 111(a)(1)).
[50] *Id*. at 58.
[51] Rule at 56 n.152 (quoting *Sierra Club v. Costle*, 657 F.2d 298, 330 (D.C. Cir. 1981)).
[52] *Id*. at 67.
[53] 83 Fed. Reg. at 44,757.
[54] *Id*. at 67.
[55] *Id*.
[56] *Id*. at 58.

application of the BSER." Id. In developing a standard for a particular source, EPA must permit the state to consider the source's remaining useful life and other factors.[57] Accordingly, while EPA describes the degree of emission reduction generally achievable through application of the BSER, states are expected only to use this information as "guidance" and "may ultimately establish standards of performance … that reflect a value … that falls outside of these ranges." [58]

E. Best System of Emission Reduction for Existing Coal-Fired EGUs

EPA's determination of the BSER for existing coal-fired EGUs does not differ significantly from the Proposal. For some systems that were not identified as the BSER, the Agency's rationale for rejecting them has changed or been given more detail. EPA has determined that the BSER for reducing CO_2 emissions from existing coal-fired EGUs is the application of HRI, in the form of a set of specific technologies and operating and maintenance practices (the "candidate technologies") that can be applied at and to designated facilities.[59]

1. Basis for BSER Determination

EPA concluded that HRI measures can be applied to all existing coal-fired EGUs and are adequately demonstrated.[60] EPA recognized, however, that the fleet of existing coal-fired EGUs is highly diverse and that the potential for HRI may vary considerably at the unit level.[61] In particular, some units may not be able to apply certain HRI measures or may have already done so.[62] At the same time, while there are a large number of potential HRI measures available, many have limited applicability or are capable of providing only negligible HRI.[63] Accordingly, EPA chose to represent the BSER by identifying a list of the six HRI measures "deemed to be 'most impactful' because they can be applied broadly and are expected to provide significant HRI without limitations due to geography, fuel type," and other factors.[64] EPA took this approach in part because it would be "overly burdensome" to require a state developing its plan to "evaluate the applicability to each of its sources of the entire list of potential HRI options—including those with limited applicability and with negligible benefits." [65]

The final Rule's list of candidate technologies does not differ from the Proposal. Those candidate technologies are listed in Table 1 of the Rule reproduced below.[66]

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[57] *Id*. at 59.
[58] *Id*. at 67-68.
[59] *Id*. at 49.
[60] *Id*. at 60.
[61] *Id*.
[62] *Id*.
[63] *Id*. at 62.
[64] *Id*.
[65] *Id*.
[66] *Id*. 64.

Table 1. Summary of Most Impactful HRI Measures and Range of their HRI Potential (%) by EGU Size

	< 200 MW		200 - 500 MW		> 500 MW	
HRI Measure	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Neural Network/Intelligent Sootblowers	0.5	1.4	0.3	1.0	0.3	0.9
Boiler Feed Pumps	0.2	0.5	0.2	0.5	0.2	0.5
Air Heater & Duct Leakage Control	0.1	0.4	0.1	0.4	0.1	0.4
Variable Frequency Drives	0.2	0.9	0.2	1.0	0.2	1.0
Blade Path Upgrade (Steam Turbine)	0.9	2.7	1.0	2.9	1.0	2.9
Redesign/Replace Economizer	0.5	0.9	0.5	1.0	0.5	1.0
Improved Operating and Maintenance (O&M) Practices	Can range from 0 to > 2.0 % depending on the unit's historical O&M practices.					

The Agency agreed with commenters that "it is not possible to adopt uniform, nationally applicable standards" based on application of HRI measures because each unit's heat rate and potential for improvement is driven by a unique combination of factors, many of which are outside the source's control.[67] Instead, the ACE Rule requires states to develop standards of performance for each existing source "from a unit-level evaluation of the application of the BSER and consideration of other factors at the unit level." [68]

As noted above, EPA now takes the position that it must specify the "degree of emission reduction achievable through application of the BSER (i.e., the level of stringency) associated with the candidate technologies." [69] EPA does this by "providing ranges of expected reductions associated with each of the technologies," listed in Table 1.[70] The Agency believes it is appropriate to provide ranges of values rather than a single number because of the source-specific availability and impact of the particular BSER chosen here.[71] Further, EPA emphasizes that the ranges provided in Table 1 are only a starting point for the state plan development process and that states "will be expected to conduct unit-specific evaluations of HRI potential, technical feasibility, and applicability for each of the BSER candidate technologies." [72]

EPA finds that the costs of HRI measures support designating them as the BSER because they improve the efficiency (and thus lower the operating costs) of the units to which they are applied.[73] EPA emphasizes that "the reasonableness of the imposed cost is not determined by whether there is an economic payback within a predefined time period." [74] But the fact that EGUs may recoup some of the costs of HRI measures through fuel savings supports a finding that the costs are reasonable.[75] EPA also concludes that implementation of HRI measures as the

[67] *Id.* at 60-61.
[68] *Id.* at 61.
[69] *Id.* at 67.
[70] *Id.*
[71] *Id.* at 68.
[72] *Id.* at 67-68.
[73] *Id.* at 79.
[74] *Id.* at 80.
[75] *Id.*

BSER would "achieve reasonable reductions in CO_2 emissions from designated facilities in light of the limited cost-effective and technically feasible emissions control opportunities." [76]

States are expected to consider costs in establishing unit-specific standards of performance based on application of the candidate technologies.[77] The state may find that a particular HRI measure is applicable to the designated facility, but its costs are not reasonable in light of unit-specific factors, such as the source's planned time frame for retirement or the fact that the source has already implemented that measure recently.[78] EPA suggests that one appropriate way for a state to weigh the costs of applying the candidate technologies to a designated facility is by assessing "cost-effectiveness," i.e., the cost relative to the amount of pollutant removed.[79] EPA warns, however, that this does not mean an HRI measure must meet some economic criterion (such as paying for itself through reduced fuel costs) in order to be applied in developing a standard of performance for a source.[80]

EPA provides information on the range of costs associated with each of the candidate technologies in Table 2, reproduced below.[81]

Table 2. - Summary of Cost ($2016/kW) of HRI Measures

	< 200 MW		200 - 500 MW		> 500 MW	
HRI Measure	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Neural Network/Intelligent Sootblowers	4.7	4.7	2.5	2.5	1.4	1.4
Boiler Feed Pumps	1.4	2.0	1.1	1.3	0.9	1.0
Air Heater & Duct Leakage Control	3.6	4.7	2.5	2.7	2.1	2.4
Variable Frequency Drives	9.1	11.9	7.2	9.4	6.6	7.9
Blade Path Upgrade (Steam Turbine)	11.2	66.9	8.9	44.6	6.2	31.0
Redesign/Replace Economizer	13.1	18.7	10.5	12.7	10.0	11.2
Improved O&M Practices	Minimal capital cost					

In the final Rule, EPA responds directly to significant comments on specific candidate technologies. EPA acknowledges comments filed by industry groups arguing that the candidate technologies list should not include HRI measures that impact only net heat rate rather than gross heat rate. The Agency disagrees, stating that these measures—specifically, upgrading boiler feed pumps and implementing variable frequency drives (VFDs)— should not be removed because they "improve the efficiency and reduce emissions from the plant by reducing the auxiliary power load, allowing for more of the produced power to be placed on the grid." [82] EPA notes that if a state decides to establish standards of performance based on gross output, it must determine

[76] *Id.* at 84.
[77] *Id.* at 81.
[78] *Id.*
[79] *Id.*
[80] *Id.* at 83.
[81] *Id.* at 82.
[82] Id. at 71.

how to account for emission reductions from application of candidate technologies that only affect net output. [83]

With respect to the other candidate technologies, EPA acknowledges comments from certain utility industry groups stating that use of neural networks and intelligent sootblowers are not necessarily additive and that it may often be appropriate to implement only one or the other. [84] The Agency recognizes that use of VFDs will have limited HRI potential for EGUs operating as base load units, but counters that many coal-fired EGUs are expected to cycle more frequently considering the changing nature of the power sector. [85] States should consider these future trends in utilization when assessing the appropriateness of including VFDs in a unit's standard.

EPA also recognizes that some of the candidate technologies—particularly the blade path upgrade and economizer redesign or replacement—have historically been the target of NSR enforcement efforts.[86] The Agency acknowledges commenters' concern that absent reforms to the NSR program, requiring EGUs to undertake these measures by incorporating them into a standard of performance could expose them to the need to undergo costly NSR permitting and install BACT controls. In recognition of this fact, EPA admits that if it does not ultimately finalize the proposed hourly emissions increase test for NSR applicability included in the Proposal, states "may be relatively more likely to determine in light of the resulting requirements for analysis, permitting, and capital investments that th[ese] candidate technolog[ies are] not economically feasible." [87]

Finally, EPA responds to concerns that the possibility of a "rebound effect"—in which efficiency improvements at a designated facility make it more economical to operate and result in a net increase of CO_2 emissions—may disqualify HRI measures as the BSER for coal-fired EGUs.[88] EPA rejects these concerns, noting that "Congress expressly acknowledged that [section 111] standards of performance were to be expressed as an emissions rate."[89] Thus, the purpose of these standards is to "improve[e] a source's emissions *rate* performance at the unit-level," not to achieve some desired level of absolute emission reductions.[90] In addition, EPA notes that its modeling of the ACE Rule's impacts demonstrates that the Rule will result in overall CO_2 reductions from the source category, even if individual designated facilities may experience some increase in CO_2 emissions.[91] To the extent a state determines source-specific factors for an individual facility raise concerns about a significant rebound effect, the state can consider that issue in establishing the source's standard of performance.[92]

[83] *Id.at* 71.
[84] *Id*. at 70.
[85] *Id*.
[86] *Id*. at 75.
[87] *Id*.
[88] *Id*. at 84.
[89] *Id*. at 86.
[90] *Id*.
[91] *Id*.
[92] *Id*. at 87.

2. Measures Rejected as BSER

EPA's discussion of measures that it did not identify as the BSER focuses on two general types of CO_2 reduction measures: co-firing alternative fuels and carbon capture and storage (CCS). In some cases, EPA, in the final Rule, relies on a different rationale or more record support for rejecting a measure as BSER than it did in the Proposal.

EPA first discusses measures that involve combusting natural gas at an existing coal-fired EGU. The first option discussed is "**repowering**" a coal-fired EGU by replacing it with one or more stationary combustion turbines while using the existing steam turbine as part of a combined cycle configuration.[93] In the Proposal, EPA rejected this measure without detailed analysis because requiring a coal-fired EGU to "repower" would "redefine the source."[94] EPA proposed to find that, in light of the statutory link between section 111 and BACT, the Prevention of Significant Deterioration program's prohibition on using the BACT standard-setting process to "redefine the source" being regulated extends to standard-setting under section 111.[95] But in this final Rule, EPA "is not concluding whether or not the 'redefining the source' concept can or should be applied in the context of the NSPS program." [96]

Instead, EPA rejects repowering as the BSER because it is not a system of emission reduction that can be applied to or at the regulated source. Repowering an existing coal-fired EGU would replace it with a new, different type of source—specifically, a stationary combustion turbine subject to the Subpart TTTT NSPS for GHG emissions.[97] The BSER for an existing source "simply cannot be the creation of a *new* source that is regulated under separate authority." [98]

EPA also rejects **co-firing natural gas** at the existing coal-fired EGU as BSER based on cost, availability, and energy requirements.[99] The Agency recognizes, as many commenters argued, that many coal-fired EGUs combust some quantity of natural gas.[100] EPA concludes, however, that commenters "conflated operational co-firing (i.e., co-firing coal and natural gas to generate electricity) with startup co-firing (i.e., only using natural gas to heat up a utility boiler or to maintain temperature during standby periods)." [101] Thus, while 35 percent of coal-fired EGUs combusted some natural gas in 2017, almost all of these did so only as a secondary fuel for limited purposes.[102] For the few that co-fired natural gas for more than 5 percent of their heat input, the units' average annual capacity factor was only 24 percent, suggesting these units are not economical or dispatched frequently. [103]

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[93] Rule at 88.
[94] 83 Fed. Reg. at 44,753.
[95] *Id*.
[96] Rule at 89 n.191.
[97] *Id*. at 88-89.
[98] *Id*. at 89.
[99] *Id*. at 90-93.
[100] *Id*. at 90.
[101] *Id*.
[102] *Id*. at 91.
[103] *Id*.

Combustion of natural gas in place of coal to reduce CO_2 emissions is expensive in terms of cost per ton of pollutant reduced.[104] Moreover, the data EPA examined suggest sufficient natural gas is not available nationwide for application as BSER, and that there are not easy paths to expand it at reasonable costs.[105] The majority of coal-fired EGUs use distillate oil as a secondary fuel instead of natural gas despite distillate oil being significantly more expensive.[106] For plants that would require additional or new pipeline capacity, the capital cost of a new pipeline lateral is approximately $1 million per mile.[107] Finally, in considering the broader energy impacts of natural gas co-firing as BSER, the Agency concludes that combustion in a coal-fired EGU is not the "best or most efficient use of natural gas," which would be better allocated to combined cycle combustion turbines. [108]

While some commenters argued that natural gas co-firing should be included in the list of "candidate technologies" and considered for potential application in source-by-source standard-setting analyses, the Rule rejects that approach.[109] EPA correctly notes that co-firing natural gas is not an HRI measure because it can actually negatively impact a unit's heat rate and even force a unit to de-rate to maintain steam temperatures within design limits.[110] Therefore, it cannot be part of the BSER the Agency has identified here. EPA does allow, however, that "natural gas co-firing might be appropriate for certain sources as a compliance option" with state plan standards of performance. [111]

For similar reasons, EPA rejects **refueling** (i.e., combusting 100 percent natural gas at the EGU) as the BSER.[112] As with repowering, EPA had determined in the Proposal that refueling cannot be the BSER for coal-fired EGUs because it would redefine the source.[113] In the final Rule, EPA rejects refueling for the same reasons it rejected natural gas co-firing at lower levels.[114]

EPA also dismisses **co-firing with biomass** as the BSER but relies on a different rationale from the Proposal. In the Proposal, EPA found that cost and limited availability precluded biomass co-firing from qualifying as the BSER.[115] EPA retains this as an alternative reason for rejecting biomass co-firing, stating that "biomass fuel use opportunities are dependent upon many regional considerations and limitations—namely fuel supply proximity, reliability and cost—that prevent its adoption as BSER on a national level."[116]

But the Agency's primary rationale is that co-firing biomass does not qualify as a system of emission reduction, based on EPA's revised interpretation of its authority under section 111.[117]

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[104] *Id*. at 92.
[105] *Id*. at 91-92.
[106] *Id*. at 92.
[107] *Id*.
[108] *Id*. at 93.
[109] *Id*. at 93-94.
[110] *Id*. at 94.
[111] *Id*.
[112] *Id*.
[113] 83 Fed. Reg. at 44,753.
[114] Rule at 95.
[115] 83 Fed. Reg. at 44,766.
[116] Rule at 100.
[117] *Id*. at 99.

EPA notes that combusting biomass at a coal-fired EGU results in a higher rate of CO_2 emissions from the unit's stack.[118] The recognition of CO_2 reductions from biomass combustion "relies on accounting for activities not applied at and largely not under the control of that source, including consideration of offsite terrestrial carbon effects during biomass fuel growth, which are not a measure of emissions performance at the level of the individual designated facility."[119] Because combusting biomass does not itself reduce a coal-fired EGU's emissions, it cannot be the BSER. Importantly, EPA's determination that biomass co-firing is not a system of emission reduction also means that sources cannot use this measure to comply with section 111(d) standards of performance.

Finally, the Rule rejects both **full and partial CCS** as the BSER for existing coal-fired EGUs.[120] In the Proposal, EPA largely relied on the previous administration's decision in the CPP to reject CCS as unreasonably costly, and solicited additional relevant information developed since the CPP's promulgation.[121] In this final Rule, EPA provides a more detailed rationale for not identifying CCS as the BSER.

The Agency states that the BSER for a source category must be "based on what is adequately demonstrated and broadly achievable across the country." [122] But EPA's rejection of CCS is not directly premised on the lack of adequate sequestration sites across the country—instead, it focuses on the fact that the *cost* of implementing CCS is unreasonable in many parts of the country.[123] Based on a thorough discussion of "the high capital costs of purchasing and installing CCS technology and the high costs of operating it, including high parasitic load requirements," EPA concludes the cost of CCS is "exorbitant" for all but a few sources. [124]

EPA distinguishes the Boundary Dam and Petra Nova facilities, the only two large-scale applications of CCS at coal-fired EGUs to date.[125] EPA notes that both of those projects relied on significant governmental subsidies and access to nearby opportunities for resale of captured CO_2 for enhanced oil recovery (EOR) in order to make their projects commercially viable. [126] These advantages likely would not be broadly available for other existing coal-fired EGUs. In particular, the 45Q tax credits for use and storage of captured CO_2 are available only for projects that begin construction before January 1, 2024 (which may be too soon for CCS projects undertaken for compliance with the ACE Rule) and are available only for 12 years.[127] In addition, the Agency notes that opportunities for EOR are not available for EGUs in many parts of the country.[128]

[118] *Id*.
[119] *Id*.
[120] *Id*. at 101.
[121] 83 Fed. Reg. at 44,762.
[122] *Id*. at 103.
[123] *Id*. at 103-06.
[124] *Id*. at 104, 106.
[125] *Id*. at 107.
[126] *Id*.
[127] *Id*. at 107-08.
[128] *Id*. at 108-09.

As with natural gas co-firing, however, EPA allows that state plans may authorize the use of CCS for compliance with standards of performance promulgated under the ACE Rule.

F. State Development of Standards of Performance

The Rule recognizes states' broad flexibility in establishing standards for existing sources but highlights two fundamental requirements for that process.[129] The state "must demonstrate [1] the application of the BSER in establishing a standard of performance, and [2] if the state chooses, the consideration of remaining useful life and other factors in applying a standard of performance to a designated facility."[130] EPA envisions that in practice, state plan development will follow one of the two approaches, although neither is an actual requirement of the regulatory text.

Specifically, a state could proceed in "two sequential steps" that bifurcate application of the BSER and consideration of remaining useful life into distinct processes.[131] Alternatively, the state could combine consideration of these factors into a "hybridized" approach.[132] Either approach is acceptable, provided the plan submission "demonstrates application of the BSER in determining each standard of performance (i.e., evaluation of applicability of each and all candidate technologies to each designated facility)." [133]

If the state follows a **sequential process**, it will first apply the BSER (in the form of the six "candidate technologies") to the designated facility's emission performance to calculate the resulting emission rate.[134] It is up to the state to determine the most appropriate methodology to make this calculation.[135] As an example, EPA offers that the state can start with a facility's average emission rate and adjust it to reflect application of each candidate technology.[136] After applying the BSER measures in the first step, the state can then adjust the calculated rate by considering the source's remaining useful life and other source-specific factors, providing a rationale for why and how it considered those factors to discount the technology from the calculation. [137]

If the state takes a **hybridized approach**, it may consider remaining useful life and other relevant factors as part of the process of applying the BSER measures to a source.[138] EPA suggests this approach could be appropriate where "it may be readily apparent" that some candidate technologies are not reasonable to apply to a particular source as part of the BSER, such as where the source has already applied that measure.[139] A hybridized approach is appropriate provided the state's submission to EPA demonstrates that the excluded candidate technologies were considered in the state's analysis for the source (so that it is clear the standard

[129] *Id.* at 111.
[130] *Id.*
[131] *Id.*
[132] *Id.* at 112.
[133] *Id.*
[134] *Id.* at 111.
[135] *Id.* at 112.
[136] *Id.*
[137] *Id.*
[138] *Id.*
[139] *Id.* at 113.

results from application of BSER) and provides a rationale for why and how remaining useful life and other factors were considered to discount a candidate technology.[140]

1. Application of the BSER to a Designated Facility

The state must evaluate the applicability of each candidate technology for each designated facility within the state. [141] EPA expects the state to establish standards of performance based on the "considerations most appropriate to individual sources or groups of sources."[142] These considerations will include "historical emission rates," the "effect of potential HRIs" as informed by the information EPA provided in Table 1 on each of the candidate technologies, "changes in operation of the units," and "other factors the state believes are relevant."[143] The Agency notes the resulting standard of performance should reflect application of the BSER to the source's "emission performance," which may be an average emission rate over the previous 3 years, a projected rate under specific future conditions, or some other performance baseline.[144]

In applying the BSER to individual sources, EPA says that states should use the ranges of improvements provided in the Rule's Table 1 summary of the potential HRI for each candidate technology.[145] The Agency also states, however, that the standard calculated for a specific designated facility "may ultimately reflect a degree of emission limitation … outside of the EPA's ranges because of consideration of source-specific factors." [146] The HRI potential ranges in Table 1 reflect typical values for an EGU operating under "normal conditions," but they can give way to source-specific conditions.[147]

To demonstrate the application of the BSER to individual designated facilities, each state plan submission must identify: (1) the value of the HRI associated with each candidate technology represented in the facility's standard of performance; (2) the calculation or methodology used to derive that value; and (3) any relevant explanation of the calculation that will help EPA assess whether the state plan is satisfactory.[148] If the HRI value falls outside the range EPA provided, the state must explain why that is the case based on application of the technology to the particular source. [149]

In the final Rule, EPA recognizes the concerns that many commenters raised regarding the inherent variability in coal-fired EGUs' CO_2 emissions performance and the difficulty of complying with an emissions limit where the regulated emissions may vary based on factors outside the source's control.[150] Commenters noted that different operating conditions can change a unit's emission rate by more than the emission limitation achieved through application of the

[140] *Id.*
[141] *Id.* at 114.
[142] *Id.*
[143] *Id.* at 114-15.
[144] *Id.* at 111.
[145] *Id.* at 116.
[146] *Id.*
[147] *Id.*
[148] *Id.* at 117.
[149] *Id.*
[150] *Id.* at 118.

BSER, meaning a source could fall out of compliance due to operating conditions even if it applies all of the candidate technologies, and that the source may not control when it goes to load and cycling.[151] For variability in performance between units, EPA concludes that the ACE Rule's source-by-source approach to establishing standards of performance adequately accounts for unit-specific characteristics.[152] States also may consider "anticipated future design and/or operating plans—such as plans to operate as baseload or load following electricity generators"—when establishing standards of performance. [153]

For variability in emissions performance at an individual coal-fired EGU, EPA endorses the use of creative approaches for states to develop standards that are achievable despite this variability. The Agency suggests that a state could "establish standards of performance for an individual EGU that vary (i.e., differ) as factors underlying emission performance vary." [154] For example, a state could establish multiple standards of performance for an individual coal-fired EGU that apply the BSER to different load segments.[155] As another example, EPA suggests that a state could set a standard of performance based on "a standard set of conditions," such as load and operational conditions, and require that compliance with the standard be demonstrated annually (or at some other increment of time) at those same conditions.[156] In the interim, the source would demonstrate ongoing compliance through continuous maintenance and operation of the applicable BSER candidate technologies.[157]

2. Consideration of Remaining Useful Life

EPA notes that under section 111(d), consideration of a source's remaining useful life is within a state's discretion, and it would be reasonable and consistent with the CAA for a state to decline to do so.[158] Where a state does rely on a source's remaining useful life or other factors in setting a standard of performance, because that reliance is optional, the "burden is on the state in its plan to demonstrate and justify how they were taken into account." [159]

In the final Rule, EPA provides a non-exclusive list of "other factors" that may be relevant and are within a state's discretion to consider in developing standards of performance. These include specific factors called out in the implementing regulations for section 111(d) as revised in this rulemaking, which are:

- Unreasonable cost of control resulting from plant age, location, or basic process design;
- Physical impossibility of installing necessary control equipment; or
- Other factors specific to the facility (or class of facilities) that make application of a less stringent standard or final compliance time significantly more reasonable.[160]

[151] *Id.* at 118-19.
[152] *Id.* at 119-20.
[153] *Id.* at 120.
[154] *Id.* at 120.
[155] *Id.*
[156] *Id.* at 120-21.
[157] *Id.* at 121.
[158] *Id.* at 124.
[159] *Id.* at 127.
[160] *Id.* at 125 (citing 40 C.F.R. § 60.24a(e)).

EPA lists some other factors that should be relevant, including: "timing considerations like expected life of the source, payback period for investments, the timing of regulatory requirements, and other source-specific criteria"; "space or other physical barriers to implementing certain HRIs at specific units"; or the fact that "some HRI options are either not applicable or have already been implemented at certain units." [161]

EPA notes that consideration of remaining useful life and other factors under section 111(d) is overall a reflection of costs and the ways in which a specific source's costs or economic impacts from controlling emissions are different from those of a typical unit.[162] In considering whether an individual coal-fired EGU's costs warrant an adjustment to its standard of performance under the remaining useful life provision, EPA suggests that states rely on the cost ranges provided in Table 2 of the Rule, which can "serve as an indicator for states to determine whether it is cost-reasonable for [a particular] candidate technology to be installed."[163] The Agency cautions, however, that these cost ranges are "not intended to be presumptive" and "should not be used [to represent a specific facility's costs] without a justified analysis by the state." [164]

For a coal-fired EGU with a retirement date in the "near future," EPA suggests that a state could account for remaining useful life by establishing a standard of performance that reflects only the "appli[cation] of the less costly BSER technologies," or by establishing a "business as usual" standard if the EGU's remaining useful life is so short that imposing any costs on it would be unreasonable.[165] Elsewhere in the Rule, EPA makes clear that if a state relies on remaining useful life in this manner, it must specify a firm retirement date for the source.[166]

Likewise, where an EGU has already applied one of the candidate technologies, EPA believes this is a "prime example of an 'other factor'" contemplated by section 111(d).[167] The Agency "anticipates this to be a part of many state plans" and states that it "would not be reasonable" to require that the EGU reapply that candidate technology.[168] Similarly, given that certain of the candidate technologies "are not necessarily additive," the state may determine installing a particular candidate technology is not reasonable in light of the diminishing HRI potential available where application of another measure has already captured that improvement. [169]

Finally, at this phase of standard-setting, a state may consider the possibility that application of a specific candidate technology could trigger NSR requirements.[170] Because EPA has finalized the ACE Rule without finalizing the parallel NSR reforms included in the Proposal, applying BSER measures such as a blade path upgrade or economizer redesign or replacement could expose sources to litigation claims that they have triggered NSR. Accordingly, "states may take into

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[161] *Id.*
[162] *Id.* at 126.
[163] *Id.* at 127.
[164] *Id.*
[165] *Id.*
[166] *Id.* at 143-44.
[167] *Id.* at 128.
[168] *Id.*
[169] Id. at 128.
[170] *Id.* at 130.

account costs associated with NSR as a source-specific factor in considering whether these two technologies are reasonable." [171]

G. Form of the Standards of Performance

All state standards of performance promulgated pursuant to the ACE Rule must take the form of an allowable emission rate, expressed in terms of mass of CO_2 emitted per unit of energy (i.e., pounds of CO_2 per MWh).[172] EPA prohibits adoption of mass-based standards of performance that limit a source's total amount of CO_2 emitted over a specific period. EPA states that an output-based emission rate "corresponds to the EPA's BSER determination for these emission guidelines." [173] The Agency also argues that requiring all standards promulgated under this Rule to take the same form promotes continuity among states and power companies, prevents ambiguity, promotes simplicity and ease of administration, and avoids undue burden on the states and regulated parties. [174]

EPA rejects mass-based standards on the basis that they "would undermine the EPA's BSER" by incentivizing coal-fired EGUs to meet their compliance obligations by reduced utilization or retirement rather than implementation of the BSER. [175]

The Rule does not require that states' standards of performance be based on either gross or net heat rate.[176] Instead, that choice is left to the discretion of the state. The candidate technologies list includes measures that only impact a source's net heat rate, however, and, if implemented, would not affect its emission rate in terms of gross output. Therefore, if a state "chooses to set standards in the form of *gross* energy output, it will be up to the state to determine and demonstrate how to account for emission reductions that are achieved through measures that only affect the net energy output." [177]

H. Compliance Timelines

EPA finds in the Rule that it is appropriate for states to establish tailored compliance deadlines for the individual coal-fired EGUs subject to their state plans, given the source-specific nature of these particular emission guidelines and the anticipated variation between the standards that will be promulgated.[178] The Agency warns that compliance timelines should be "consistent with the application of the BSER" and "ensure that the compliance timeline does not undermine the BSER determination made by the EPA," but does not clearly state how the compliance timeline could undermine the BSER determination or what measures are necessary to avoid that outcome.[179]

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[171] Rule at 130.
[172] *Id.* at 130; *id.* at 225, 40 C.F.R. § 60.5755a(a)(1).
[173] *Id.* at 130.
[174] *Id.* at 131.
[175] *Id.*
[176] *Id.*
[177] *Id.* at 129.
[178] *Id.* at 121.
[179] *Id.* at 122.

EPA notes that "[m]ost programs under CAA section 111 do not have compliance timelines longer than a year" and says that for most states it "anticipates initial compliance to be achieved by sources within twenty-four months of the state plan submittal." [180] A state may provide a compliance schedule for a source that extends longer than 24 months from plan submittal, however, provided it includes legally enforceable increments of progress and provides an adequate justification in its state plan submission for why that approach is warranted.[181]

The Agency acknowledges that some commenters expressed concern about tying the time for compliance with state plan requirements to the date of state plan submittal to EPA, given that in some cases this approach could require a source to comply with state plan requirements before EPA is required to approve that plan.[182] EPA emphasizes that state plan requirements are not federally enforceable until approved by the Agency.[183] To the extent the state plan's requirements are enforceable as a matter of state law in the interim, EPA encourages states to consider the anticipated timing of EPA review and the time sources may need to comply in establishing an appropriate compliance schedule.[184]

I. Flexible Compliance Mechanisms

EPA, in the Proposal, offered only limited potential opportunities for existing sources to comply with standards of performance using measures other than implementation of the BSER candidate technologies. In addition to allowing for compliance through use of CCS or co-firing natural gas or biomass, the Proposal would have allowed source owners to average the CO_2 emissions rate of designated facilities located at the same plant but would not have allowed for broader averaging or trading of emissions.[185] In this final Rule, EPA has narrowed those options even further by completely eliminating plantwide averaging and co-firing biomass as compliance options.

The Agency specifies two criteria for acceptable compliance measures in a state plan: they must be (1) capable of being applied to and at the source, and (2) measurable at the source using data, emissions monitoring equipment or other methods to demonstrate compliance, such that they can be easily monitored, reported, and verified at a unit. [186] EPA justifies the first criterion based on its "legal and practical concerns" about allowing compliance through measures that would not qualify as a "system of emission reduction" under the legal interpretation advanced in this Rule.[187] But these "legal and practical concerns" are not spelled out in detail. EPA simply states that:

> [b]ecause state plans must establish standards of performance—which by definition "reflect[] … the application of the [BSER]"—implementation and enforcement of such

[180] Rule at 122.
[181] *Id*.
[182] *Id*.
[183] *Id*.
[184] *Id*. at 123.
[185] 83 Fed. Reg. at 44,767-68.
[186] Rule at 133.
[187] *Id*.

> standards *should correspond with the approach used to set the standard in the first place.*[188]

According to EPA, allowing the scope of measures used to implement a standard to exceed the measures used to set the standard "would result in asymmetrical regulation" in which "a state's implementation measures result in a more or less stringent standard" than results from application of the BSER. [189]

Having established these limitations, EPA states that averaging CO_2 emissions across existing coal-fired EGUs at a single plant is inconsistent with how EPA has defined the limits of its authority to determine the BSER for a source category. EPA cites *ASARCO Inc. v. EPA*, 578 F.2d 319 (D.C. Cir. 1978), in which the U.S. Court of Appeals for the District of Columbia Circuit found that the Agency could not allow use of the "bubble concept" to determine whether an existing source had been modified for purposes of section 111 because it used one definition of "stationary source" for determining if a source has been modified and another for determining if one has been constructed.[190] Because the ACE Rule defines the individual existing coal-fired EGU as the "designated facility" subject to regulation (and not the entire plant), EPA says that "state plans cannot accommodate any 'bubbling' of EGUs for compliance with these emission guidelines."[191]

EPA determined that broader trading and averaging among EGUs is also impermissible because it "would not necessarily require any emission reductions from designated facilities and may not actually reflect application of the BSER."[192] According to the Agency, implementation and enforcement of section 111(d) standards "should be based on improving the emissions performance of sources to which a standard of performance applies." [193] EPA is concerned that averaging and trading would allow the state to establish standards that do not reflect application of the BSER—for example, they may allow for a single source to generate enough compliance instruments by shutting down that other sources in the state could meet their standards without any emission reductions.[194] EPA does not address, however, stakeholders comments discussing ways in which an averaging program could be designed to avoid this outcome.

The Agency draws a distinction between its interpretation of its authority to allow averaging and trading under section 111(d) and its authority to implement trading under other programs, including the "Good Neighbor provision" of section 110(a)(2)(D)(i)(I).[195] According to EPA, section 110(a)(2)(A) (which applies to the Good Neighbor provision) explicitly allows the use of "marketable permits and auctions of emission rights," whereas no such authorization exists for section 111(d). EPA rejects arguments that section 111(d)'s cross-reference to section 110 authorizes the use of trading or averaging, stating that the cross-reference means only that states

[188] Rule at 133.
[189] *Id*.
[190] Rule at 136-37. ASARCO, 578 F.2d at 328.
[191] Rule at 137.
[192] *Id*. at 138.
[193] *Id*.
[194] *Id*. at 138-39.
[195] *Id.* at 138 n.252.

should follow a similar procedure to section 110 in submitting their state plans, not that state plans may include similar implementation mechanisms. [196]

Finally, EPA notes that even if trading or averaging were permissible compliance mechanisms for a section 111(d) standard of performance, nothing in section 111(d) *requires* EPA to allow those measures for implementation.[197] Thus, EPA appears to be making an alternative argument that even if it has misinterpreted its statutory authority, regulated parties cannot force it to allow for compliance through averaging and trading via legal challenges.

Aside from trading and averaging, the Agency also rejects reduced utilization as a compliance mechanism because "it would likely not lead to an improved emission rate" and would therefore not reflect the degree of emission limitation achievable through application of the BSER.[198] Likewise, as discussed above, EPA takes the position in the final Rule that co-firing biomass at the EGU is not an acceptable compliance mechanism because it "does not reduce emissions of CO_2 emitted from that source." [199]

J. Monitoring, Recordkeeping, and Reporting Requirements

As in the Proposal, EPA, in the final Rule, gives very little guidance as to what specific monitoring, recordkeeping, and reporting requirements must be included in state plans. EPA simply requires that states "include appropriate monitoring, reporting, and recordkeeping requirements to ensure that state plans adequately provide for the implementation and enforcement of standards of performance." [200] The Rule encourages states to rely on existing systems to monitor and report relevant data, particularly 40 C.F.R. part 75, and provides that a state plan may meet its obligation to provide for adequate monitoring, reporting, and recordkeeping by "specifying that sources must report emission and electricity generation data according to part 75."[201] If the state decides to rely on an alternative monitoring, recordkeeping, and reporting program, it must meet specific program elements described in § 60.5785a(a)(2). EPA does not respond to stakeholders comments regarding the need for additional monitoring to comply with net output-based standards on an individual EGU level.

K. State Plan Development and Submittal

The final ACE Rule requires states to submit their state plans to EPA within 3 years of the Rule's publication, i.e., by summer 2022. To determine whether the plan is satisfactory, EPA requires the state to document and demonstrate the process and underlying data used to establish the plan's standards of performance and the methods employed to implement and enforce the standards. [202] State plans must be codified by the state first.[203] In order for a state plan to be deemed complete, it must contain "[e]vidence that the state has adopted the plan in the state code

[196] *Id*. at 139.
[197] *Id*.
[198] *Id*. at 134.
[199] *Id*. at 141.
[200] *Id*. at 145.
[201] *Id*. at 145; *id*. at 229, 40 C.F.R. § 60.5785a(a)(1).
[202] *Id*. at 142.
[203] Section 60.27a(g)(2)(ii); (See *Id*. at 215).

or body of regulations….That evidence must include the state of adoption or final issuance as well as the effective date of the plan, if different from the adoption /issuance date." However, it should be noted, that the effective date of the plan could be in the future.

The state plan submission must detail the approach and methods used to apply the BSER to individual designated facilities and establish standards of performance.[204] This information must be provided in enough detail for EPA to reproduce the state's calculations.[205] Where a state determines that an HRI measure is not feasible to apply at a particular EGU, the plan must provide a rationale and supporting data.[206]

State plans must also identify the existing coal-fired EGUs within their borders that meet the Rule's applicability requirements and provide the emissions and operational data relied upon to apply the BSER to those sources.[207] These data must include an inventory of the CO_2 emissions data and EGU operational data for the most recent calendar year in which data are available at the time of state plan development and/or submission. [208] If the state relied on remaining useful life to establish an EGU's standard of performance, the plan submission must also specify a future date certain for the source's retirement.[209] Notably, if that retirement date becomes infeasible for the sources, states have the ability to revise their state plans.[210]

The state must provide detailed documentation showing application of its methodology to the data provided. [211] This must include documentation of the compliance mechanisms that will be relied upon for plan implementation. [212]

A state plan submission must address complex issues that will arise involving the interplay of multiple EGUs at a plant. For example, where multiple EGUs share a common stack, the state should provide a methodology to assign monitoring data from the stack to the individual EGUs. [213] Likewise, for HRI measures that affect and improve the performance of multiple EGUs at a plant, the state should explain how the HRI from those measures are apportioned among individual EGUs for purposes of standard-setting. [214]

The Rule also addresses the issue of whether EPA can approve (and make federally enforceable) state plan requirements that are more stringent than what is required under section 111(d).[215] The Agency states that comments it received "contend[ing] the EPA does not have the authority to approve more stringent state plans … have merit." [216] It also rejected its previous position from the CPP that the Supreme Court's opinion in *Union Electric Co. v. EPA*, 427 U.S. 246 (1976),

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[204] *Id.* at 143.
[205] *Id.*
[206] *Id.*
[207] *Id.*
[208] *Id. at 143.*
[209] *Id.*
[210] *Id.* at 144.
[211] *Id.*
[212] *Id.*
[213] *Id.*
[214] *Id.*
[215] *Id.* at 146-51.
[216] *Id.* at 147.

requires EPA to approve a state plan that is more stringent than the BSER requires.[217] EPA distinguishes *Union Electric* on the basis that it only involved the specific requirements of section 110, which are structurally different from those of section 111(d). [218]

EPA ultimately decided, however, that it should not "prejudge" the outcome of its review of any state plan submission that might include more stringent provisions than required.[219] Whether EPA may approve a state plan with more stringent requirements is "addressed properly in the context of evaluating an individual state plan." That said, EPA clearly takes the position that it will not approve state plan requirements that do not comport with its reading of the statute and its corresponding limits on what measures may constitute the BSER.[220] In other words, EPA will not approve state plan requirements that apply to entities other than existing coal-fired EGUs that meet the Rule's applicability criteria, or that rely on implementation measures that "do not result in emission reductions from an individual designated facility, such as the use of biomass or emissions trading."[221]

L. Impacts of Final ACE Rule

EPA's analysis of the final Rule's impact differs somewhat from that included in the Proposal. There, EPA examined the Proposal's impacts in relation to both a baseline that included implementation of the CPP and a scenario in which the CPP is repealed without promulgation of replacement emission guidelines.[222] Here, EPA compared an "illustrative" ACE Rule policy scenario against a baseline that does not include implementation of the CPP. [223] EPA believes this is a more appropriate baseline because action under the ACE Rule occurs only after the repeal of the CPP. [224] Further, EPA concludes in this analysis that based on its updated modeling, implementation of the CPP would most likely not result in any change in emissions—and therefore no cost or changes in health benefits—as compared to a scenario in which it is not implemented.[225]

EPA concludes in the final Rule that the ACE Rule's impacts are "modest and do not diverge dramatically from baseline expectations."[226] They are especially small in comparison to "recent market-driven changes that have occurred in the power sector." [227] The largest CO_2 reductions occur in 2025, with diminishing benefits observed in later years.[228] The Rule is projected to marginally reduce sulfur dioxide and nitrogen oxide emissions as well. [229] EPA's projected emissions changes under the ACE Rule are provided in Table 3 below.

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[217] *Id.* at 147 n.256 & 148.
[218] *Id.* at 148.
[219] *Id.* at 148-49.
[220] *Id.* at 150.
[221] *Id.*
[222] 83 Fed. Reg. at 44,783.
[223] Rule at 152.
[224] *Id.* at 154.
[225] *Id.*
[226] *Id.* at 153.
[227] *Id.*
[228] *Id* at 153.
[229] *Id.*

Table 3. Projected CO_2, SO_2, and NO_X Electricity Sector Emission Impacts for the Illustrative Policy Scenario, Relative to the Baseline (2025, 2030, and 2035)

	CO_2 (million short tons)	SO_2 (thousand short tons)	NO_X (thousand short tons)
2025	(12)	(4.1)	(7.3)
2030	(11)	(5.7)	(7.1)
2035	(9.3)	(6.4)	(6.0)

Note: All estimates in this table are rounded to two significant figures.

The Rule is projected to have relatively minor and varied impacts on energy markets, such as a 0.1 percent increase in retail electricity prices in 2025 and a 1.1 percent decrease in coal production for power sector use.[230] Compliance costs are also relatively minor in relation to other recent major EPA rulemakings, with maximum annual compliance costs under the illustrative policy scenario occurring in 2025 at $290 million and declining to $25 million in 2035. [231]

EPA calculated the benefits of CO_2 reductions with a focus on "direct impacts of climate change that are anticipated to occur within U.S. borders," using a measure of the domestic social cost of carbon. [232] The projected domestic climate benefits from 2025 to 2035 range from $72 to $81 million (3 percent discount rate) and from $13 to 14 million (7 percent discount rate). [233]

To examine the co-benefits of reducing other pollutants, EPA examined the monetized value of avoided deaths attributable to $PM_{2.5}$ and ozone. The Agency evaluated these benefits using several different alternative concentration cut-points and concentration-response parameters reflecting different threshold effect levels for $PM_{2.5}$-related benefits, including by assuming: (1) no threshold effect level; (2) health effects limited to exposures above the lowest measured levels; and (3) health effects limited to exposures above the primary national ambient air quality standard (NAAQS).[234] These co-benefit calculations are provided in Table 6. [235]Assuming no threshold effect level, the total monetized benefits between 2025 and 2035 range from $47 million to $1.4 billion. [236]Although there were large variations in the estimated premature deaths occurring above the lowest measured level in each scenario, overall less than 1 percent of estimated avoided premature deaths occur in 2025 above the annual mean $PM_{2.5}$ NAAQS of 12 $\mu g/m^3$. [237]

V. Amendments to Section 111(d) Implementing Regulations

This final Rule includes several amendments to EPA's implementing regulations for section 111(d), which EPA has codified as a new Subpart Ba.[238] These revised implementing regulations

[230] Rule at 155.
[231] *Id*. at 156.
[232] *Id*. at 157.
[233] *Id*. at 160 Tbl. 7.
[234] *Id at 159.*
[235] *Id*. at 158.
[236] *Id*.
[237] *Id*. at 159.
[238] *Id*. at 161.

will apply generally to new emission guidelines and state plan submissions on a prospective basis. [239] Table 8 of the Rule summarizes all the changes that EPA has finalized in Subpart Ba.[240] The most significant amendments are: changes in the timeline for state plan development, submission, and review; the updated requirement for enforceable increments in progress for certain standards of performance; and the provision of greater state flexibility to account for remaining useful life and other factors in standard-setting.

Section 111(d) directs EPA to establish a procedure "similar to" that in section 110 for submittal of state plans.[241] The previous Subpart B implementing regulations were promulgated in 1975, however, and were not updated to reflect changes in both section 110 and section 111(d) in 1977 and 1990.[242] In particular, the Subpart B timeline for state plan submittal and review by EPA reflect the section 110 timelines from the 1970 version of the CAA.[243] Here, EPA finds these timelines are inadequate to allow for state development of standards of performance and EPA review of those plans. [244]Under Subpart Ba:

- State plans must be submitted to EPA within 3 years after notice of the availability of the final emission guidelines;
- EPA must determine whether the state plan meets its completeness criteria within 6 months after the date by which the state is required to submit the plan;
- EPA will determine whether the state plan is satisfactory within 12 months after determining that the plan is complete; and
- EPA will promulgate a federal plan within 2 years after determining a state did not submit a complete plan or disapproving a state plan as unsatisfactory.[245]

Considering the longer time provided to EPA for evaluating a state plan submission, Subpart Ba also extends the permissible compliance timelines for standards of performance in state plans. Because EPA now has up to 18 months from the date a state plan is due to act on state plans, EPA determined that states should be able to provide compliance timelines of up to 24 months without requiring sources to meet enforceable increments of progress.[246]

With respect to remaining useful life and other factors, the current Subpart B language providing state authority to grant "variances" for designated facilities in some circumstances did not reflect the CAA's language on remaining useful life. Those provisions created a distinction between health-based and welfare-based pollutants that is not made in the statute and only allowed states to grant "variances" under the EPA's discretion.[247] In this Rule, the new Subpart Ba provisions remove the distinction between health- and welfare-based pollutants and the associated requirements that turned on this distinction.[248] They also recognize that section 111(d) allows

[239] Rule at 163.
[240] *Id*. at 166.
[241] CAA § 111(d)(1).
[242] *Id*. at 161.
[243] *Id.*
[244] *Id*. 176.
[245] *Id* at 176-77, 181.
[246] *Id*. at 178.
[247] *Id*. at 185.
[248] *Id*. at 186.

states to consider remaining useful life and other factors and does not subject that authority to EPA's discretion.[249] The new provisions list certain "other factors" that a state may consider in developing standards of performance, but explicitly state that this list is not exclusive.[250]

Finally, in this final Rule, EPA rejects some of its proposed changes to the definition of "emission guidelines" in Subpart Ba.[251] As discussed above, EPA had proposed to find that section 111(d) requires the Agency only to provide information on the degree of emission reduction achievable through application of the BSER.[252] In the final Rule, however, EPA agrees with commenters that identifying BSER without providing an accompanying degree of emission limitation achievable through application of that BSER is "an incomplete identification of the system of emission reduction itself, as it is the manner and degree of application of a system that often determines the quantity and cost of the emission reductions achieved, as well as any implications for energy requirements."[253] Accordingly, the final Subpart Ba requirements define "emission guideline" to require that EPA provide the degree of emission limitation achievable through application of the BSER.[254]

[249] Rule at 186.
[250] *Id*.
[251] *Id*. at 172.
[252] *Id*. at 171.
[253] *Id*. at 171-72.
[254] *Id*. at 172.