

Reliability Mechanisms in the Carbon Rule

June 11, 2024

In May, the Environmental Protection Agency (EPA) finalized a 1,020-page Carbon Rule to reduce carbon dioxide (CO₂) emissions from certain fossil-fueled electric generating units.¹ The rule basically divides coal-fired generating units (coal fleet) into three groups: (1) units that commit to retire before 2032, (2) units that co-fire with 40 percent natural gas before 2030 and commit to retire before 2039, and (3) units that install carbon capture and storage technology (CCS) before 2032.

Currently, the coal fleet totals roughly 186,000 megawatts (MW), which is approximately 16% of total U.S. electric generating capacity. The rule is expected to force most, if not all, of the coal fleet to retire before 2032, even though grid operators, utilities, and others have expressed major concerns about the negative impact of forced coal retirements on the reliability of the electricity grid.² In contrast, EPA claims that the rule “will not interfere with system operators’ ability to continue providing reliable power.”³

EPA has made a number of changes since the rule was proposed last year that it says will prevent reliability problems. Some of the changes are not explicitly intended to address reliability, even though EPA says they might help indirectly. However, almost none of these changes will help coal units that commit to retire before 2032 because these units are not subject to the rule’s emission guidelines and performance standards; that is, they are not “affected” units under the rule.

The purpose of this paper is to briefly comment on the effectiveness of measures EPA has included in the rule to address reliability concerns. The most important takeaway from this paper is that –

With one exception, only coal units that commit to either co-fire with natural gas or install CCS can take advantage of the flexibilities and reliability mechanisms in the rule. Only one reliability mechanism (a 1-year compliance date extension) is available to the large number of coal units that are expected to retire before 2032 because of the rule. This limitation on the use of reliability mechanisms increases the prospect of resource adequacy problems, which is especially troubling because of the rapidly increasing demand for electricity. For example, NERC expects a 91,000 MW increase in peak winter electricity demand over the next 10 years, the same timeframe during which the Carbon Rule is expected to cause the retirement of substantial amounts of coal-fired generation.⁴

1. More Time for CCS

Putting aside that CCS has not been adequately demonstrated, the final rule now allows 2 more years (until the end of 2031) to install CCS and achieve a 90 percent reduction in CO₂ emissions. However, an additional 2 years will not mitigate reliability problems because very few, if any, coal units are likely to install CCS due to its exorbitant cost (which can be \$2 billion or more per unit) and the fact that it takes 10

years or longer to design, permit, and build a CCS facility. (Building pipelines for CO₂ transportation, identifying underground storage sites, and obtaining permits adds to the already considerable challenges to the widespread use of CCS.) For example, one CCS facility will have taken 14 years, twice the length of time the rule allows, to go from conceptualization in 2015 to projected commercial operation in 2029.⁵

2. Emissions Trading

Under the rule, states can adopt emissions trading, averaging, and unit-specific mass-based compliance. EPA claims that the use of these flexibility mechanisms “may provide some additional flexibility to states and affected [power plants] in achieving the required emission reductions.”⁶ However, none of these flexibility mechanisms for emissions trading, averaging, and mass-based compliance are available to units that are forced to opt for pre-2032 retirement.⁷ Therefore, the benefit of these flexibility mechanisms is minimal and their incorporation into state plans (which is optional) will do very little to mitigate reliability problems.

3. “Remaining Useful Life and Other Factors”

In theory, RULOF can be used by states to lower the stringency of performance standards or extend compliance deadlines, provided the state’s compliance plan includes a RULOF mechanism. (EPA must approve RULOF mechanisms and any revisions to performance standards or deadline extensions.) However, the RULOF mechanism is available only to coal units that either co-fire with natural gas or install CCS. As a result, states have no authority to use RULOF to extend the pre-2032 retirement deadline for other coal units.⁸ In addition, EPA has constrained state authority to use RULOF to revise compliance requirements: “The use of RULOF to deviate from an emission guideline is available only when there are fundamental differences between the circumstances of a particular facility and the information the EPA considered in determining the degree of emission limitation or the compliance schedule ... [T]he state must, to the extent necessary, evaluate the systems of emission reduction identified in the emission guidelines using the factors and evaluation metrics the EPA considered in assessing those systems.”⁹

4. Compliance Deadline Extension

States have the option of providing an extension of up to 1 year for units that have encountered unavoidable delays in installing controls. This relief is limited to no more than 1 year and is available only to coal-fired units that choose either the gas co-firing or CCS option. States cannot use this mechanism to extend the pre-2032 retirement deadline for other coal units. While providing an additional year for compliance could enhance grid reliability by keeping online a few units that might opt to co-fire or install CCS but encounter unforeseen delays, this extension will not remedy major reliability problems resulting from large amounts of coal-fired generation that are expected to shut down before 2032 because of the rule.

5. Short-Term Emergency Mechanism

EPA has also included in the rule a reliability mechanism for short-duration emergency events when a balancing authority is facing energy shortages and risk of load shedding such as during extreme weather or unexpected generation or transmission outages.

This relief is limited to Energy Emergency Alert Levels 2 or 3, as defined by NERC, and is available only to units that co-fire with natural gas or install CCS.¹⁰ It does not mitigate longer-term risks across broad geographic regions for extended time periods due to extensive coal retirements.

In the case of existing coal-fired power plants, the performance standards based on either CCS controls or gas co-firing would not apply during an energy emergency. Rather, each coal-fired unit would be subject to an alternate performance standard based on the unit's "baseline emission performance rate." The unit's baseline emission rate is determined based on the emissions rate achieved by the unit during a 5-year period prior to the issuance of the rule.

6. Longer-Term Mechanism

The rule establishes a mechanism to extend the mandatory retirement deadlines by no more than 1 year for coal units that (1) have committed to either retire before 2032 or co-fire with gas before 2039 or (2) have been granted a source-specific retirement date under RULOF.¹¹ The extension would apply only to coal-fired units that, "for unforeseen reasons, need to temporarily remain online to support reliability for a discrete amount of time beyond their planned date to cease operations."¹² (This 1-year extension for reliability is different from the 1-year extension for delayed controls in #4 above.)

If an extension longer than 6 months is necessary, EPA will grant the extension only after it consults with FERC regarding the need for the extension based on a review of the reliability risks. In addition, the rule limits extensions to only those circumstances in which retirement of the unit would result in a violation of a reliability standard approved by FERC or cause the loss of load expectation to exceed the level targeted by regional planners for that particular region.¹³ While EPA notes that retirement deadline extensions longer than 1 year could be provided through RULOF, states have the authority to use the RULOF variance to provide retirement extensions *only* for units that co-fire or install CCS. Coal units that commit to retire before 2032 would not be able to receive an additional extension under a RULOF variance. As with the other mechanisms and flexibilities in the rule, this mechanism also fails to address longer-term (i.e., longer than 1 year) reliability impacts that result from the retirement of a large number of coal-fired units.

This paper has highlighted concerns about the effectiveness of provisions in the Carbon Rule that EPA claims will ensure electric grid reliability. These concerns raise doubt about EPA's claim that the rule will not pose risks to the electric power grid.

For additional information about the nation's coal fleet and electric reliability, please visit www.Americaspower.org.

¹ *New Source Performance Standards for Greenhouse Gas Emissions from New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emissions Guidelines for Greenhouse Gas Emissions from Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule*, 89 Fed. Reg. 39,798 (May 9, 2024) (Final Rule).

² “PJM Statement on the Newly Issued EPA Greenhouse Gas and Related Regulations,” May 8, 2024. Southwest Power Pool “Statement on the Recent Greenhouse Gas Emissions Rule” and “EPA Rule Could Severely Impact Nation’s Efforts Toward Energy Production, Reliability,” both dated May 20, 2024.

³ Final Rule at 40,011.

⁴North American Electric Reliability Corporation “2023 Long-Term Reliability Assessment,” December 2023.

⁵ Minnkota Power Cooperative and its partners are constructing Project Tundra, a CCS facility at the Young Power Station in North Dakota. <https://www.projecttundrand.com/about>

⁶ Final Rule at 39,978-79.

⁷ EPA also imposes several other significant restrictions on the use of market-based compliance flexibilities by certain types of affected units. For example, the final Carbon Rule prohibits the use of emissions averaging or trading by affected units subject to alternative performance standards that are established through RULOF variances and affected natural gas- and oil-fired natural gas steam generating units.

⁸ The preamble to the Carbon Rule underscores the very limited scope and application of the RULOF variance. EPA statements in the preamble make it clear that the relief from the RULOF variance applies only to “affected units” subject to CO₂ performance standards.

⁹ Final Rule at 39,965.

¹⁰ EEA-2 and EEA-2 events are “defined by NERC Reliability Standard EOP-01102, which requires plans and sets procedures for reliability entities to help avert disruptions in electric service during emergency conditions.” See also https://www.nerc.com/pa/Stand/Reliability%20Standards/EOP-002-3_1.pdf

¹¹ “This mechanism [1-year extension] is for existing sources that have relied on a commitment to cease operating for purposes of these emission guidelines. Such reliance might occur in three circumstances: (1) units that plan to cease operation before January 1, 2032, and that are therefore exempt because they have elected to have enforceable cease operations dates in the state plan; (2) affected EGUs that choose to employ 40 percent natural gas co-firing by 2030 with a retirement date of no later than January 1, 2039; or (3) affected EGUs that have source-specific standards of performance based on remaining useful life, pursuant to the RULOF provisions outlined in section X.C.2 of this document.” Final Rule at 40018.

¹² Final Rule at 40,017.

¹³ Final Rule at 40,053. See also Final Rule at 40,018.