

**Comments of the Natural Resources
Defense Council on EPA's Proposed
Repeal of Carbon Pollution Emission
Guidelines for Existing Stationary Sources:
Electric Utility Generating Units**

Docket No. EPA-HQ-OAR-2017-0355

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The Natural Resources Defense Council (NRDC) submits the following comments on EPA's *Proposed Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units*, 82 Fed. Reg. 48,035 (Oct. 16, 2017). NRDC has also submitted joint comments on this proposal with other environmental and public health organizations.

NRDC is a national nonprofit environmental organization representing more than three million members and online activists. NRDC uses law, science, and the support of its members to ensure a safe and healthy environment for all living things. One of NRDC's top priorities is to reduce emissions of the air pollutants that are causing climate change.

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I. Introduction

The Clean Power Plan is a critical step toward reducing the threat of climate change to our communities by placing sensible limits on emissions of dangerous carbon pollution from our nation’s existing power plants.¹ NRDC has long supported the Clean Power Plan,² and we oppose EPA Administrator Scott Pruitt’s ongoing efforts to dismantle the Plan and replace it with weak limits on power plant carbon pollution, if anything at all.

Power plants are the nation’s largest stationary source of the carbon pollution that contributes to climate change, putting public health and welfare at risk in the United States and worldwide. Climate change is already having major impacts across the country: recent wildfires have raged across the western states, hurricanes have pummeled the east and gulf coasts, and extreme heat has baked the south.³ These and other harmful effects of a changing climate are growing increasingly severe. Climate change will affect all Americans but it will disproportionately affect children, the elderly, communities of color, low-income communities, and indigenous populations both in the United States and worldwide.⁴

We need to take action now to dramatically reduce climate-changing pollution, including emissions of carbon pollution from the power sector. Instead, Administrator Pruitt has proposed an outright repeal of the Clean Power Plan,⁵ and initiated an Advance Notice of Proposed Rulemaking (ANPR) proceeding to consider whether to issue a replacement for the Clean Power Plan at all.⁶ NRDC strongly opposes the repeal of the Clean Power Plan or adoption of a

¹ Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,662 (Oct. 23, 2015).

² See, e.g., NRDC Comments on Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (Dec. 1, 2014), Docket No. EPA-HQ-OAR-2013-0602-26818; NRDC Comments on Federal Plan Requirements for Greenhouse Gas Emissions from Electric Utility Generating Units (Jan. 21, 2016), Docket No. EPA-HQ-OAR-2015-0199-0863.

³ U.S. Global Change Research Program, Climate Change Impacts in the United States: The Third National Climate Assessment (2014), <https://nca2014.globalchange.gov/report>; U.S. Global Change Research Program, Climate Science Special Report: Fourth National Climate Assessment (2017), https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf.

⁴ Joint Comments of Environmental and Public Health Organizations Regarding the Proposed Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units – Comments Specific to Climate Change (submitted Apr. 26, 2018 to Docket No. EPA-HQ-OAR-2017-0355).

⁵ Proposed Rule: Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Source: Electric Utility Generating Units, 82 Fed. Reg. 48,035 (Oct. 16, 2017) (hereinafter “Repeal Proposal”).

⁶ Advance Notice of Proposed Rulemaking: State Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units, 82 Fed. Reg. 61,507 (Dec. 28, 2017).

replacement standard that does not achieve significant carbon pollution reductions in line with what the industry has already demonstrated is readily attainable.

In these comments we first explain in Part II that Administrator Pruitt’s Repeal Proposal does not justify the repeal of the Clean Power Plan because it fails to demonstrate that the Clean Power Plan is either unambiguously precluded or an impermissible interpretation of the Clean Air Act. In Part III we describe why, to the extent Administrator Pruitt is arguing that the Clean Power Plan interpretation is not his preferred interpretation of ambiguous statutory language, the Repeal Proposal fails to explain both how his proposed interpretation comports with the relevant statutory factors and why the Clean Power Plan is inferior when measured against these factors. In Appendices A, B, and C, we provide more detailed discussions of ongoing trends in the power sector, electric reliability and power sector job impacts, and utility compliance under previous Clean Air Act standards. Finally, we note that these comments incorporate the comments and exhibits submitted by Joint Environmental Commenters.⁷

NRDC strongly urges Administrator Pruitt to withdraw this Repeal Proposal and the ANPR, and instead focus EPA’s efforts on implementing and strengthening the Clean Power Plan.

II. The Repeal Proposal fails to show that the Clean Power Plan is based on a prohibited construction of the Clean Air Act.

The Repeal Proposal does not justify the repeal of the Clean Power Plan. To begin, the proposal does not even clearly specify the Administrator’s legal argument – it does not say (1) whether it is Administrator Pruitt’s position that the statute *unambiguously precludes* the Clean Power Plan interpretation, (2) whether he believes the Clean Power Plan interpretation is an *impermissible interpretation* of ambiguous statutory language, or (3) whether he believes the Clean Power Plan interpretation is permissible but *not his preferred interpretation on policy grounds*. The proposal fails to justify any of these possible arguments.

To the contrary, the relevant terms of Sections 111(a)(1) and 111(d) are broad enough to encompass a wide range of measures to reduce emissions from sources, including those employed by the Clean Power Plan.

Under Section 111(d), EPA issues a guideline pursuant to which states may submit plans that “establish standards of performance for any existing source.”⁸ Such standards of performance must “reflect[] the degree of emission limitation achievable through the application of the *best system of emission reduction*” (“BSER”) that “the Administrator determines has been adequately

⁷ Joint Comments of Health, Environmental, and Conservation Groups on EPA’s Proposed Rule: Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (submitted Apr. 26, 2018 to Docket No. EPA-HQ-OAR-2017-0355).

⁸ 42 U.S.C. § 7411(d).

demonstrated.”⁹ EPA’s determination of the “best” available system must take into account costs and energy requirements, among other things.¹⁰

For existing sources of pollutants like carbon dioxide, Section 111(d) and EPA’s long-standing regulations provide for the agency to issue an emission guideline setting forth the Administrator’s determination of the emission standard that reflects the reductions achievable by that best system. States then have the opportunity to submit a plan, which EPA must approve as “satisfactory” if it achieves those reductions and meets the other criteria in the guideline. And EPA must implement a federal plan that applies the emission standard to existing sources if a state does not submit an approvable plan.

Administrator Pruitt proposes to adopt a purportedly new interpretation of Section 111(a)(1), asserting that the “best system of emission reduction” is:

limited to emission reduction measures that can be *applied to or at* an individual stationary source. That is, such measures must be based on a physical or operation change to a building, structure, facility, or installation at that source, rather than measures that the source's owner or operator *can implement on behalf of* the source at another location.¹¹

The proposal states that this interpretation:

is also guided by CAA section 111(d)’s direction that standards be established ‘*for any existing source*’ (emphasis added) and not for other sources or entities.... [I]f standards must be set for individual sources, it is reasonable to expect that such standards would be predicated on measures that can be applied to or at those same individual sources.¹²

The proposal asserts that this is the “best construction” of the statute,¹³ and the “most appropriate reading of the statute in light of the text, its legislative history, prior practice under CAA section 111, statutory context, and in consideration of broader policy implications.”¹⁴ The proposal states that “[u]nder the interpretation proposed in this notice, the CPP exceeds the EPA’s statutory authority and would be repealed.”¹⁵

⁹ 42 U.S.C. § 7411(a)(1) (emphasis added).

¹⁰ 42 U.S.C. § 7411(a)(1).

¹¹ 82 Fed. Reg. at 48,039.

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.* at 48,038.

¹⁵ *Id.* at 48,036.

The Administrator cannot demonstrate that the statute unambiguously precludes the Clean Power Plan or that the Plan represents an impermissible construction of the statute.¹⁶ Contrary to his claims, the Clean Power Plan fits comfortably within the ordinary meaning of “best system of emission reduction” and plainly sets emission limits “for” and “applicable to” each source.

A. What the Clean Power Plan actually requires.

Analysis of the Administrator’s arguments must start with an accurate description of what the Clean Power Plan actually requires from affected sources. The repeal proposal wrongly states that the Clean Power Plan relies on “measures that the source’s owner or operator *can implement on behalf of* the source at another location.”¹⁷ This is incorrect. The Plan does *not* require any source’s owner or operator to implement measures at another location.

The Plan’s “chief regulatory requirement” consists of two national emission performance rates—one for fossil steam plants (primarily coal units) and one for combined cycle natural gas plants—expressed in pounds of CO₂ emissions per megawatt-hour of generation, and phased in gradually between 2022 and 2030.¹⁸ As set forth in 40 C.F.R. § 60.5790(c), each affected source may meet its applicable emissions performance rate (1) by reducing its actual emission rate, (2) by reducing its “adjusted” emission rate through the use of emission rate credits, or (3) by a combination of these measures.¹⁹

The Clean Power Plan provides that credits may be created by increasing electric generation from specified low- and zero-emitting resources.²⁰ As the rulemaking record thoroughly demonstrated, electric generating resources are interconnected through the electric grid and are managed to balance electricity supply and demand in real time.²¹ When generation from one source increases, generation from another necessarily declines. Specifically, when low- and zero-emitting generation resources ramp up, generation from the set of affected sources as a whole necessarily declines, and this necessarily reduces CO₂ emissions in predictable, quantifiable

¹⁶ *Chevron, U.S.A. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837, 842-43 (1984) (“If the intent of Congress is clear . . . the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress,” but where the statute is “silent or ambiguous with respect to the specific issue,” courts defer to agency interpretation “based on a permissible construction of the statute.”); *see also Peter Pan Bus Lines, Inc. v. Federal Motor Carrier Safety Admin.*, 471 F.3d 1350, 1354 (D.C. Cir. 2006) (“deference to an agency’s interpretation of a statute is not appropriate when the agency wrongly believes that such interpretation is compelled by Congress”) (quoting *PDK Laboratories, Inc. v. DEA*, 362 F.3d 786, 798 (D.C. Cir. 2004)).

¹⁷ 82 Fed. Reg. at 48,039.

¹⁸ 80 Fed. Reg. at 64,811-12.

¹⁹ 40 C.F.R. § 60.5790(c); 80 Fed. Reg. at 64,949.

²⁰ *See, e.g.*, 80 Fed. Reg. at 64,709.

²¹ *See, e.g.*, 80 Fed. Reg. at 64,691-93; 64,725-26; 64,728-29.

amounts. The Rule establishes specific formulas, supported by the record, for how many credits are created by increasing generation from low- and zero-emitting resources.²²

EPA determined that each affected source can meet its applicable emission rate by improving its heat rate, by applying credits derived from increased low- or zero-emitting generation, or by a combination of the two.²³ Fully consistent with Section 111(a)(1), EPA determined that these measures constituted a “system of emission reduction” – indeed, the “*best* system of emission reduction” – for existing coal- and gas-fired electricity generation sources. And with enormous record support, EPA determined that the emission rates specified for coal- and gas-fired generating units are achievable by application of this best system of emission reduction, taking into account cost and the other relevant factors enumerated in Section 111(a)(1).

B. The Clean Power Plan does not require any owner/operator to undertake any activity at another source.

This definition of “best system of emission reduction” does not require the owner or operator of any affected source to undertake any activity at another generation source in order to comply with its applicable emission rate limit.

To be sure, doing so is an *option*: an entity that owns or operates a portfolio of generation resources may *choose* to shift generation to lower emitting sources within its portfolio to create credits. An entity that owns or operates an affected source may *choose* to invest in increasing generation by non-emitting resources in order to create credits.

But no such owner/operator is *required* to do either of these things. As is the case with numerous other Clean Air Act rules that permit the use of credits for reductions that occur at other sources, each owner/operator can comply with its source’s emission rate limit by physically reducing the emissions of its source or by purchasing credits in the marketplace – credits created by the actions of unrelated generators – and using them to adjust its emission rate. No owner/operator is required to manage the behavior or operations of any source other than its own.

C. The Clean Power Plan’s emission rate limits are “for” and “applicable to” the individual affected facility.

For the same reasons, there is no basis for the repeal proposal’s claim that the Clean Power Plan conflicts with the statutory requirement that emission standards be “for” and “applicable to” the individual affected source. These terms indicate only that state plans must establish standards of

²² 80 Fed. Reg. at 64,904-07.

²³ 80 Fed. Reg. at 64,667.

performance for each affected source. That is exactly what the Clean Power Plan requires.²⁴ The fact that emission guideline provides for emission rate standards that allow an affected source to demonstrate compliance by using credits to adjust its emission rate does not make those standards any less “applicable to” or “for” that source. As we discuss in detail in Joint Comments these terms do not render the Clean Power Plan BSER impermissible.²⁵

The phrases “application of” or “applicable to” are used throughout the Clean Air Act in reference to a wide variety of measures, processes, systems, technologies, and controls—including averaging and trading approaches.

For example, emission standards for motor vehicles under Section 202(a) are to “reflect the greatest degree of emission reduction achievable through the *application of* technology which the Administrator determines will be available for the model year to which such standards apply.”²⁶ Vehicle manufacturers must meet these CO₂ standards on a fleet-wide average basis, and can generate credits for over-compliance which can be banked or traded.²⁷

In addition, the Acid Rain Program establishes a market-based emission trading program for SO₂ emissions from fossil fuel-fired power plants, as discussed in Part II.E., *infra*. Clean Air Act Section 404 provides that “it shall be unlawful for any affected unit . . . to emit sulfur dioxide in excess of the tonnage limitation . . . unless (A) the emissions reduction requirements *applicable to* such unit have been achieved” and permitting the “applicable” requirement to be “achieved” by obtaining “allowances to emit allowances to emit not less than the unit’s total annual emissions.”²⁸ In other words, these provisions explicitly contemplate an emission limit “applicable to” an individual affected source that can be met through the purchase of allowances generated by actions taken elsewhere.

D. The legislative history of the Clean Air Act does not support the limitations imposed by the proposed interpretation.

The legislative history of Clean Air Act Section 111 shows that Congress declined to enact terms more restrictive than “best system of emission reduction,” and instead intended to provide EPA with discretion to identify strategies for reducing air pollution from existing sources. The terms “standard of performance” and “best system of emission reduction,” are based on concepts

²⁴ See 40 C.F.R. § 60.5775 (state plans must include emission standards “with respect to each affected EGU”).

²⁵ Joint Comments of Health, Environmental, and Conservation Groups on EPA’s Proposed Rule: Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (submitted Apr. 26, 2018 to Docket No. EPA-HQ-OAR-2017-0355).

²⁶ 42 U.S.C. § 7521(a)(3)(A)(i) (emphasis added).

²⁷ 77 Fed. Reg. 62,624, 62,628 (Oct. 15, 2012).

²⁸ 42 U.S.C. § 7651c(a)(1) (emphasis added).

broader than source-specific technological controls.²⁹ Administrator Pruitt’s proposed interpretation is contrary to Congressional intent to give EPA broad latitude to determine the “best system of emission reduction” based on the unique characteristics of each individual source category and pollutant being regulated.

As adopted in 1970, Section 111(d) required states to submit plans that established “emission standards” for certain existing sources; the 1970 Amendments neither defined the term “emission standards” with regard to Section 111 nor restricted the bases which EPA would determine those standards.³⁰ Under the 1970 Amendments, Section 111(b) required EPA to establish “standards of performance” for new sources, and defined that term as based on the “best system of emission reduction” that is “adequately demonstrated” – nearly identical to the current definition.³¹

In the 1977 Clean Air Act Amendments Congress made significant changes to Section 111. Section 111(a)(1) was revised to require *new* sources “to meet emission standards based on the reductions achievable through the use of the ‘best technological system of continuous emission reduction.’”³² Section 111(d)(1) was amended to require states to adopt “standards of performance” based on the “best system of continuous emission reduction” and to further require consideration of “nonair quality health and environmental impact and energy requirements.”³³ Congress clarified that “standards in the Section 111(d) state plan would be based on the best available means (not necessarily technological) for categories of existing sources to reduce emissions” to distinguish the broader basis for existing source standards from the narrower requirements for new source standards.³⁴

In 1990, Congress restored the definition of “standard of performance” to the definition agreed to in the 1970 Amendments, but retained the requirement to consider environmental impacts and energy requirements as added in 1977.³⁵ Most notably for existing sources, this change meant that BSER need not be “continuous.” Congress retained the definition of “technological system of continuous emission reduction,” which continues to be used for *new* sources under other

²⁹ 80 Fed. Reg. at 64,763-65 (discussing how the 1970, 1977, and 1990 Clean Air Act legislative history “reinforces the breadth and flexibility of the phrase ‘system of emission reduction,’ particularly as it applies to existing sources under CAA section 111(d)”).

³⁰ See Clean Air Act Amendments of 1970, Pub. L. No. 91-604 § 4(a), 84 Stat. 1676, 1683-84; see also 80 Fed. Reg. at 64,763.

³¹ *Id.*

³² Clean Air Act Amendments of 1977, Pub. L. No. 95-95 § 109(c), 91 Stat. 685, 700.

³³ *Id.* at 699-700.

³⁴ H.R. Rep. No. 95-294 (May 12, 1977), reprinted in 1977 Clean Air Act Legis. Hist. at 2662; Sen. Muskie, S. Consideration of the H.R. Conf. Rep. No. 95-564 (Aug. 4, 1977), reprinted in 1977 Clean Air Act Legis. Hist. at 353.

³⁵ Clean Air Act Amendments of 1990, Pub. L. No. 101-549 § 403, 104 Stat. 2399, 2631.

subsections of Section 111, but this narrower definition is not and has not been used to limit the emission reduction measures EPA may consider for *existing* sources.³⁶

Decades of legislative history support a broad reading of the statutory terms “standard of performance” and “best system of emission reduction.” Nowhere in the legislative history is there support for the restrictions Administrator Pruitt seeks to impose.

E. Neither prior agency practice nor statutory context supports the limitations imposed by the proposed interpretation.

The repeal proposal claims that the Clean Power Plan departed from EPA’s prior regulatory practice, and that the proposal would return the agency to its historical interpretation of Section 111.³⁷ But regulatory precedent does not limit EPA to Administrator Pruitt’s proposed interpretation, and in fact EPA has in the past employed a variety of emissions trading measures as part of a system of emission reduction under that section. Indeed, EPA has for decades used trading systems in emission reduction standards applicable to individual sources under multiple Clean Air Act provisions (including Section 111(d)), particularly for the electric power industry.³⁸

Section 111(d) Guidelines: In the Clean Air Mercury Rule (CAMR), EPA established performance standards for mercury emissions from existing coal-fired power plants under Section 111(d).³⁹ CAMR employed an emissions trading approach, which the rule’s preamble affirmed is a “system of emission reduction” authorized by Section 111.⁴⁰ Likewise, emission guidelines for municipal waste combustors, which EPA issued jointly under Section 111(d) and 129, provide for affected sources to average their emissions of nitrogen oxides but require greater reductions from those combustors that engage in averaging.⁴¹

Interstate Pollution Transport Rules: For example, for more than twenty years EPA has employed emissions trading systems to implement the “good neighbor provision” of Section 110(a)(2)(D),⁴² which prohibits stationary sources in upwind states from emitting pollution that

³⁶ See 42 U.S.C. §§ 7411(a)(7), (h), (j).

³⁷ 82 Fed. Reg. at 48,041.

³⁸ Richard L. Revesz, Denise A. Grab, and Jack Lienke, Familiar Territory: A Survey of Legal Precedents for the Clean Power Plan, 46 ENVTL. L. REP. 10,190 (2016).

³⁹ Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units, 70 Fed. Reg. 28,606 (May 18, 2005) (vacated on unrelated grounds in *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008)).

⁴⁰ *Id.* at 28,616.

⁴¹ 60 Fed. Reg. 65,387, 65,402 (Dec. 19, 1995).

⁴² *Id.* Sec. 7410(a)(2)(D)(i)(I).

affects the ability of downwind states to meet National Ambient Air Quality Standards. EPA’s Cross-State Air Pollution Rule (CSAPR) established an emissions trading system with state-wide budgets for NO_x and SO₂ based on the reductions achievable through “increased dispatch of lower-emitting generation,” fuel-switching, and other compliance options.⁴³ The Supreme Court upheld CSAPR against an industry challenge as a “permissible, workable, and equitable interpretation” of Section 110.⁴⁴ Similarly, the 1998 NO_x SIP Call set state budgets based on power sector modeling of a multi-state emissions trading system designed to achieve an average emission rate, taking into account changes in dispatch and other measures available to reduce overall power sector NO_x emissions.⁴⁵ Both of these major power sector rulemakings—upheld by the courts—established state-wide emission budgets based on aggregate power industry-wide emission reductions, while allowing each power plant to use credits or allowances to comply with its individual emissions limit.⁴⁶

Regional Haze: To limit pollution that inhibits visibility in national parks, the Clean Air Act requires certain sources of emissions to “procure, install, and operate...the best available retrofit technology” (BART).⁴⁷ This language suggests that Congress intended EPA to set technology-based, source-specific emission limitations to improve visibility. This provision stands in contrast to the broad language of Section 111, which requires establishment of standards of performance that reflect the “best system of emission reduction.”⁴⁸ Despite the technology-focused definition of BART, EPA’s Regional Haze Rule and subsequent regulatory revisions allowed states to develop “an emissions trading program or other alternative measure rather than to require sources subject to BART to install, operate, and maintain BART. Such an emissions trading program or other alternative measure must achieve greater reasonable progress than would be achieved through the installation and operation of BART.”⁴⁹ Both EPA’s authority to establish alternatives to BART in the regional haze program and the specific alternative emissions trading program have been upheld by the D.C. Circuit.⁵⁰

⁴³ Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals, 76 Fed. Reg. 48,208, 48,252 (Aug. 8, 2011).

⁴⁴ *EPA v. EME Homer City Generation, L.P.*, 134 S. Ct. 1584, 1610 (2014).

⁴⁵ See 63 Fed. Reg. 57,356, 57,400-401 (Oct. 27, 1998).

⁴⁶ See Legal Memorandum at 95-102; 80 Fed. Reg. at 64,778.

⁴⁷ 42 U.S.C. § 7491(b)(2)(A).

⁴⁸ 42 U.S.C. § 7411(a)(1).

⁴⁹ 71 Fed. Reg. 60,612 (Oct. 13, 2006); 40 C.F.R. § 51.308(e)(2).

⁵⁰ *Center for Energy and Economic Development v. EPA*, 398 F.3d 653, 660 (D.C. Cir. 2005) (finding reasonable the EPA’s interpretation of Section 169(a)(2) as requiring BART only as necessary to make reasonable progress); *Utility Air Regulatory Group v. EPA*, 471 F.3d 1333 (D.C. Cir. 2006) (finding reasonable EPA’s two-pronged test for determining whether an alternative program achieves greater reasonable progress).

Title IV Acid Rain Program: The Acid Rain Program established by Title IV of the Clean Air Act creates a market-based emission trading program for SO₂ emissions from fossil fuel-fired power plants.⁵¹ Congress specifically provided that one purpose of Title IV is to “encourage energy conservation, use of renewable and clean alternative technologies, and pollution prevention as a long-range strategy . . . for reducing air pollution and other adverse impacts of energy production and use.”⁵² Title IV thus takes advantage of the unique interconnected nature of the electric grid and its capacity for achieving significant emission reductions at a low cost through the use of trading and the substitution of lower-emitting generation for higher-emitting generation. Title IV makes clear that Congress considered the measures employed by the Clean Power to be appropriate and cost-effective methods for reducing emissions from fossil fuel-fired power plants.

The repeal proposal points to EPA’s section 111(d) guidelines issued over the last 40 years that have not included emission trading mechanisms in the definition of “best system of emission reduction” for specific industries. It is true that EPA has not employed emissions crediting or trading systems for all industries regulated under Section 111(d). But this reflects the nature of the sources and pollutants regulated, not a prior legal interpretation of Section 111(d). Those standards typically regulate pollutants that, unlike globally-dispersed CO₂, are distributed over a limited radius and cause health and environmental impacts in the vicinity of their sources. And those standards typically regulate sources in industries that lack the essential characteristics of electric power generation sources, which are interconnected by the grid and operated interdependently on a moment by moment basis. There is a powerful record to support EPA’s different treatment of the electric power industry in the Clean Power Plan. For this reason, the repeal proposal fails to show that EPA’s prior Section 111(d) practice undermines the Clean Power Plan’s legal basis.

In short, there is a clear and well-supported basis for EPA’s defining the “best system of emission reduction” as it has in the Clean Power Plan to reduce emissions from the electric power industry. And the Agency has a long history of using market-based approaches to achieve emissions reductions from individual sources in this industry at low cost. The repeal proposal has not shown that EPA’s prior regulatory practice under Section 111(d) or other parts of the Clean Air Act undermines the Agency’s authority to use these regulatory approaches in the Clean Power Plan.

⁵¹ 42 U.S.C. §§ 7651-7651o.

⁵² 42 U.S.C. § 7651(b).

F. None of the Repeal Proposal’s other legal arguments undermine the Clean Power Plan interpretation or support the proposed new interpretation.

1. “Clear statement rule”

The Administrator asks for comment on whether the so-called “clear statement rule” supports invalidating the Clean Power Plan.⁵³ The proposal invokes *Utility Air Regulatory Group v. EPA*, 134 S. Ct. 2427, 2444 (2014) (“UARG”), for the proposition that “clear congressional authorization” is required for a statutory construction that effects “an enormous and transformative expansion” of an agency’s authority.⁵⁴

UARG is inapplicable here. In that case, the Supreme Court found that EPA had adopted an interpretation of the term “major stationary source” in Section 169 that expanded the scope of the prevention of significant deterioration permitting requirements far beyond the universe of large industrial sources that Congress plainly intended to regulate, to encompass millions of smaller sources that Congress did not so intend. This was why the Court faulted EPA for “claim[ing] to discover in a long-extant statute an unheralded power to regulate a significant portion of the American economy.”⁵⁵ The Court upheld, however, the requirement in Section 165 that large new and modified sources, such as power plants, apply the “best available control technology” to all regulated air pollutants, including CO₂ and other greenhouse gases. That, the Court found, worked no “transformative” expansion of EPA’s authority.

There is no basis for applying *UARG*’s holding here because the Clean Power Plan regulates sources that are plainly subject to Section 111(d), does so with requirements that are plainly applicable to each regulated source, and uses market-based tools that the Court itself has sanctioned. As the Supreme Court found in *Am. Elec. Power v. Connecticut*, Congress “designated an expert agency, here, EPA, as best suited to serve as primary regulator of greenhouse gas emissions” under Section 111(d) of the Act and “delegated to EPA the decision whether and how to regulate carbon-dioxide emissions from power plants” under that authority.⁵⁶ The clarity of Section 111(d)’s mandate to reduce power plant CO₂ emissions was central to the Court’s determination that EPA’s regulatory authority preempts a claim for injunctive relief under federal common law.⁵⁷ And in *EPA v. E.M.E. Homer City Generation*, the Court found the

⁵³ 82 Fed. Reg. at 48,042

⁵⁴ *Utility Air Regulatory Group v. EPA*, 134 S. Ct. 2427, 2444 (2014) (“UARG”).

⁵⁵ *UARG*, 134 S. Ct. at 2444.

⁵⁶ *American Electric Power Co. v. Connecticut*, 131 S. Ct. 2527, 2538-39 (2011) (“AEP”); compare *King v. Burwell*, 135 S. Ct. 2480, 2489 (2015) (finding it “especially unlikely” that Congress intended to delegate interpretation of Affordable Care Act health-care reform provision to the IRS, which has “no expertise” in health-care policy).

⁵⁷ *AEP*, 131 S. Ct. at 2537.

quite similar use of a market-based framework for regulating electric power sources a “permissible, workable, and equitable interpretation” of Section 110, on which Section 111(d) is modeled.⁵⁸ There simply is no parallel here to the extension of EPA’s authority to millions of smaller sources faulted in *UARG*.

Far from a “transformative” exercise of authority, the Clean Power Plan established a BSER based on the strategies that states and industry already use to reduce carbon pollution in the power sector.⁵⁹ Applying that BSER, EPA set achievable emission reduction targets that the industry is already well on its way to reaching.⁶⁰

If the Administrator’s claim is that the Clean Power Plan passes some barrier against “transformative” regulation because of the scale of its emission reductions or how those reductions are being achieved, then the claim fails on the facts. The U.S. Energy Information Administration estimates that 2017 CO₂ emissions in the electricity sector were already 27 percent lower than 2005 levels, meaning that the power sector is already within striking distance of the Clean Power Plan’s 2030 goal 13 years ahead of that date.⁶¹ The Clean Power Plan would gradually phase in the emissions limits between 2022 and 2030, and was projected to result in emissions cuts of roughly 32 percent below 2005 levels by 2030. Viewed from the perspective of 2012 – the baseline year used to set the emissions targets – the Clean Power Plan’s 2030 goal translates to a 19 percent reduction. Since 2012, power sector carbon emissions have already fallen by 14 percent. In other words, the power sector had already achieved in the five years between 2012 and 2017 more than 72 percent of the cuts required by 2030.

Meanwhile, the costs of compliance with the Clean Power Plan have continued to decline as the prices of lower- and zero-emitting generation have continued to drop.⁶² The continued shift from coal to natural gas-fired generation has accelerated, and EPA’s natural gas price assumptions underlying Building Block 2 have proven to be quite conservative. Over the last several years since the Clean Power Plan was developed, natural gas prices have fallen well below forecasted levels and spawned a range of new gas price projections that are far below previous expectations.

⁵⁸ *EPA v. EME Homer City Generation, L.P.*, 134 S. Ct. 1584, 1610 (2014).

⁵⁹ 80 Fed. Reg. at 64,727.

⁶⁰ *See e.g.*, EPA, Basis for Denial of Petitions to Reconsider and Petitions to Stay the Clean Power Plan, Appendix 1: State Progress and Trends (Jan. 11, 2017) (finding that numerous states are on track to meet their CPP obligations).

⁶¹ U.S. Energy Information Administration, *Monthly Energy Review*, (March 2018), <https://www.eia.gov/totalenergy/data/monthly/>; power sector carbon emissions are presented in Table 12.6, https://www.eia.gov/totalenergy/data/monthly/pdf/sec12_9.pdf.

⁶² EPA, Basis for Denial of Petitions to Reconsider and Petitions to Stay the Clean Power Plan at Appendix 2 – Power Sector Trends (finding “new information and data show that the CPP goals will be less impactful on the generation mix of the industry and considerably less costly to implement *than previously thought*”).

Henry Hub gas prices in the Energy Information Administration’s 2018 Annual Energy Outlook (AEO) are on average 33 percent lower over the period from 2016-2040 when compared with projections from AEO2015.⁶³

The costs of wind and solar technologies have also fallen dramatically in recent years, outpacing EPA’s expectations.⁶⁴ In many places, these zero emissions resources are out-competing fossil fuel-based electricity generation. According to the investment firm Lazard, the cost of generating power from new wind and solar projects has declined by 67 percent and 86 percent, respectively, since 2009.⁶⁵ In the past two years alone, according to the same analysis, the cost of wind and solar power has fallen by 17 percent and 22 percent, respectively. Even as emissions have declined, the potential to achieve cost-effective emissions reductions continues to grow. Appendix A provides a more detailed discussion of recent market trends in the power sector.

Thus, contrary to the Administrator’s attempt to classify the Clean Power Plan as unlawfully “transformative,” the Plan in fact has turned out to be too modest. EPA should be strengthening the Clean Power Plan to achieve further cost-effective reductions, not repealing it.

2. *Federal and state roles*

Consistent with the cooperative federalism model long employed under the Clean Air Act, the Clean Power Plan sets air pollution limits for individual affected sources while providing extensive flexibility for states to develop implementation plans.⁶⁶ States may choose whether to adopt a model plan design provided by EPA, take advantage of the emission guideline’s flexibility to design their own plans, or decline to do adopt any plan at all – in which case EPA will regulate affected sources’ carbon dioxide emissions directly through a federal plan.⁶⁷ Courts have repeatedly upheld the constitutionality of such cooperative federalism arrangements.⁶⁸

⁶³ U.S. Energy Information Administration, Annual Energy Outlook 2018 (Feb. 6, 2018), <https://www.eia.gov/outlooks/aeo/pdf/AEO2018.pdf>; U.S. Energy Information Administration, Annual Energy Outlook 2015 (Apr. 2015), [https://www.eia.gov/outlooks/aeo/pdf/0383\(2015\).pdf](https://www.eia.gov/outlooks/aeo/pdf/0383(2015).pdf).

⁶⁴ In its power sector modeling in the final CPP Regulatory Impact Analysis, EPA relied on cost projections developed by the National Renewable Energy Laboratory, as published in its Annual Technology Baseline. NREL updates its cost projections each year; their levelized cost projections for 2030 for wind and solar have fallen by 26% and 47%, respectively, since the time of EPA’s analysis.

⁶⁵ Lazard, *Lazard’s Levelized Cost of Energy Analysis – Version 11.0*, (Nov. 2017), <https://www.lazard.com/media/450337/lazard-levelized-cost-of-energy-version-110.pdf>.

⁶⁶ 80 Fed. Reg. at 64,832-33; see also 40 CFR 60.24(c).

⁶⁷ 80 Fed. Reg. at 64,986.

⁶⁸ *Mississippi Commission on Environmental Quality v. EPA*, 790 F.3d 138, 175 (D.C. Cir. 2015) (“[T]he Supreme Court has ‘repeatedly affirm[ed] the constitutionality of federal statutes that allow States to administer federal programs but provide for direct federal administration if a State chooses not to administer it.’” (quoting *Texas v. EPA*, 726 F.3d 180, 196-97 (D.C. Cir. 2013))).

Mr. Pruitt argued as Attorney General of Oklahoma that even if the state left pollution regulation to EPA under a federal plan, state regulators would be impermissibly coerced to take undertake other routine regulatory functions, such as the review of applications for permits to build new plants or the adjustment of electricity rates.⁶⁹ This sweeping assertion—that federal air pollution limits impermissibly require states to engage their police powers to address the ordinary secondary effects of air pollution standards on energy markets overseen by states—would effectively nullify *any* federal environmental regulation of the power sector. No state has a constitutional right to trump federal pollution standards on that basis.⁷⁰

The Clean Power Plan establishes a guideline for setting source-specific pollution limits that can be met through a variety of approaches, like many other Clean Air Act power sector air pollution control programs before it.⁷¹ The calculations EPA used to set the Clean Power Plan’s emission targets do not mandate any particular energy mix. Like any other Clean Air Act rule regulating the emissions of power plants, the Clean Power Plan can affect the relative costs of electricity generation by different plants. In response to the costs of meeting air pollution rules, a utility may decide to close an old plant or a generator’s position in the dispatch order may shift, resulting in that generator being called upon to run more or less.⁷² These incidental effects on energy mix are the normal consequences of regulating emissions from the power sector under the Clean Air Act.

In Appendix B we provide a detailed discussion of how two of the nation’s largest electric power producers have achieved compliance with the Mercury and Air Toxics Standards to illustrate how other air pollution standards also affect the mix of generation and trigger action by state power sector regulators.

As the Clean Power Plan appropriately sets limits on air pollution from power plants—and does *not* regulate electricity sales or rates—the rule does not intrude on the Federal Energy Regulatory Commission’s (FERC’s) authority under the Federal Power Act.⁷³ Indeed, three former FERC commissioners submitted comments on this proposal arguing that the Clean Power Plan does not interfere with the FERC’s jurisdiction in regulating electric transmission and wholesale rates and services.⁷⁴

⁶⁹ Legal Brief for Petitioners, *West Virginia v. EPA*, No. 15-1363 (D.C. Cir.).

⁷⁰ *Hodel v. Virginia Surface Mining and Reclamation Ass’n*, 452 U.S. 264, 282, 289-90 (1981) (“the power conferred by the Commerce Clause [is] broad enough to permit congressional regulation of activities causing air or water pollution ... that may have effects in more than one State”).

⁷¹ See Part II.E., *supra*.

⁷² See 80 Fed. Reg. at 64,693, 64,734.

⁷³ See 16 U.S.C. §§ 791a, et seq.

⁷⁴ Comments of Former FERC Commissioners Norman C. Bay, John Norris, and Jon Wellinghoff on the Proposed Repeal of the Clean Power Plan, Docket No. EPA-HQ-OAR-2017-0355-19640.

III. The Repeal Proposal interpretation is not the “best construction” of ambiguous statutory language.

In Part II of these comments, we demonstrated that the Clean Power Plan is plainly within the permissible boundaries of the statute. Nevertheless, the Repeal Proposal repeatedly asserts that the Administrator’s proposed interpretation is the “best construction” of the statutory language.⁷⁵ Although the proposal is not clear, it may be that Administrator Pruitt wishes to assert that his interpretation is *also* a permissible one and is preferable to – *better than* – the Clean Power Plan interpretation.

If that is the claim, the proposal falls far short of proving it. The proposition that the proposed rule’s interpretation is *better* than the Clean Power Plan’s requires the Administrator to measure and compare the two interpretations against the statutory factors enumerated in Section 111 and the core purposes of the Clean Air Act.⁷⁶ That comparison must take into account the massive factual record on the dangers posed by power plant pollution, on how the power sector actually functions, and on the benefits and costs of reducing that pollution. Yet the proposal fails to address the relevant factors under Section 111 or the Act’s core purposes, fails to consider the need for CO₂ reductions to address climate change, fails to consider how the power sector functions, fails to consider the relative effectiveness of the two interpretations at reducing power plant emissions of CO₂ and other pollutants, and fails to rationally weigh the benefits of those emission reductions against the costs of achieving them.

The proposal and the subsequent advance notice of proposed rulemaking suggest that the Administrator is considering a replacement rule limited to the minor emission reductions from heat rate improvements. Measured against the statutorily relevant factors and the record supporting the Clean Power Plan, a replacement rule so ineffective at curbing power plant CO₂ emissions could not qualify as better than the Clean Power Plan. Accordingly, the statutory interpretation behind such a replacement rule could not qualify as better than the one behind the Clean Power Plan. Indeed, if a patently ineffective replacement rule is all the Administrator intends to deliver, then his statutory interpretation cannot qualify as even a *permissible* statutory construction, let alone the “best” one.

⁷⁵ See, e.g., 82 Fed. Reg. at 48,039.

⁷⁶ See *Peter Pan Bus Lines*, 471 F.3d at 1354 (“*Chevron* step 2 deference is reserved for those instances when an agency recognizes that the Congress’s intent is not plain from the statute’s face. ‘In precisely those kinds of cases, it is incumbent upon the agency not to rest simply on its parsing of the statutory language’ — ‘[i]t must bring its experience and expertise to bear in light of competing interests at stake.’” (quoting *PDK Laboratories, Inc. v. DEA*, 362 F.3d 786, 797-98 (D.C. Cir. 2004))); *General Am. Transp. Corp. v. ICC*, 872 F.2d 1048, 1053 (D.C. Cir. 1989) (review of reasonable statutory construction and arbitrary and capricious review both require determination of whether agency has “rationally considered the factors deemed relevant by the Act.”).

The Repeal Proposal entirely fails to assess the net costs of the proposed interpretation, as is required by Section 111(a)(1). And the Repeal Proposal disregards important context, including the way the electric power industry operates and the market trends that affect the power sector. The finalization of a BSER that ignores both the measures actually used in the power sector and the reductions that are actually achievable will be both legally and factually unsound.

A. The Repeal Proposal fails to address statutory purpose and required statutory factors.

As EPA found in the Clean Power Plan final rule, the core purposes of the Clean Air Act “include protecting public health and welfare by comprehensively addressing air pollution, and, particularly, protecting against urgent and severe threats.”⁷⁷ To advance these purposes, Section 111 gives EPA wide discretion to identify an emission reduction system that relies on demonstrated solutions—the *best* system of emission reduction—to maximize environmental performance while considering costs.

In determining the Clean Power Plan’s BSER, EPA carefully analyzed each of the required statutory factors. The record shows that EPA reviewed a wide range of measures and determined that the three building block measures were “adequately demonstrated,” both independently and in combination.⁷⁸ EPA then determined the “best” system by assessing the statutorily-required considerations: cost,⁷⁹ non-air quality health and environmental impacts,⁸⁰ and energy requirements,⁸¹ as specified in Section 111(a)(1). EPA also assessed the amount of pollution reduced,⁸² a relevant factor under section 111 as recognized by the courts.⁸³ Based on the BSER, EPA established an “achievable” degree of emission limitation for affected sources.⁸⁴

In the Proposed Repeal the Administrator has ignored these statutory factors. He has failed to explain either how his proposed interpretation comports with the relevant factors, and why the

⁷⁷ 80 Fed. Reg at 64,773.

⁷⁸ 80 Fed. Reg. at 64,744-51.

⁷⁹ 80 Fed. Reg. at 64,801-02, 64,810-11.

⁸⁰ 80 Fed. Reg. at 64,746-48.

⁸¹ 80 Fed. Reg. at 64,670-71, 64,693-94, 64,800, 64,874-81.

⁸² 80 Fed. Reg. at 64,750-51.

⁸³ 80 Fed. Reg. at 64,719-20 (citing *Sierra Club v. Costle*, 657 F.2d 298, 326, 347 (D.C. Cir. 1981) and *Lignite Energy Council v. EPA*, 198 F.3d 930, 933 (D.C. Cir. 1999)).

⁸⁴ 80 Fed. Reg. at 64,741-42, 64,751-52.

Clean Power Plan is inferior when measured against these factors.⁸⁵ As a result, EPA will violate the statutory mandate to identify the “best system” if it finalizes the interpretation proposed.

B. The Repeal Proposal fails to analyze the costs and benefits of the proposed interpretation.

Because Section 111 requires the standard to reflect the degree of emission reduction achievable by the BSER taking into account cost, EPA must engage in a factual assessment of the costs of reduction and the magnitude and benefits of possible reductions—including both direct benefits and co-benefits of reducing power plant emissions.⁸⁶ No such analysis appears in the proposal’s discussion and application of the factors relevant to the determination of the emission standard reflecting the “best system of emission reduction.” An analysis appears in a separate section of the proposal summarizing the Regulatory Impact Analysis (RIA) conducted under E.O. 12866,⁸⁷ but nothing in the proposal connects that analysis with the decision-making on the proposed repeal as required under Section 111(d).

In any event, we strongly disagree with the revised cost-benefit calculations put forth in the Repeal Proposal RIA,⁸⁸ which we address in greater detail in joint comments with other environmental and public health organizations.⁸⁹ If the Administrator relies on those calculations for the analysis of costs and benefits required under Section 111, his final decision will plainly be arbitrary and capricious.

The consideration of “the advantages and the disadvantages of agency decisions,” *Michigan v. EPA*, 135 S. Ct. 2707, requires a rational analysis. The recalculations in the Repeal Proposal RIA grossly misrepresent the Clean Power Plan’s costs, while distorting the science and economics of assessing the climate and health benefits of curbing pollution from power plants. The Repeal Proposal RIA goes against the overwhelming weight of scientific evidence to posit that there are no health benefits of reducing particulate matter below a given threshold, contradicting the

⁸⁵ In Appendix C we provide a detailed discussion of why the Repeal Proposal’s assertions concerning the reliability and jobs impacts of the Clean Power Plan are not factually supported.

⁸⁶ See *Sierra Club v. Costle*, 657 F.2d at 326 (quantity of emission reductions is an important factor in determining “best” system of emissions reduction); see also *Michigan v. EPA*, 135 S. Ct. 2699, 2707 (2015) (“reasonable regulation ordinarily requires paying attention to the advantages *and* the disadvantages of agency decisions”).

⁸⁷ 82 Fed. Reg. at 48,043-47.

⁸⁸ U.S. EPA, Regulatory Impact Analysis for the Review of the Clean Power Plan: Proposal (Oct. 2017), Docket No. EPA-HQ-OAR-2017-0355-0110.

⁸⁹ Joint Comments of Environmental and Public Health Organizations Regarding the Proposed Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units – Comments Specific to the “Regulatory Impact Analysis for the Review of the Clean Power Plan: Proposal” (submitted Apr. 26, 2018 to Docket No. EPA-HQ-OAR-2017-0355).

consensus of scientific experts that there is no evident threshold for the dangerous impacts of fine particles on human health. The RIA also deflates the benefits of climate action by disregarding the global impacts of climate change and discounting the well-being of future generations—ignoring the 2003 guidance from the Office of Management and Budget on properly considering intergenerational impacts.⁹⁰ The Repeal Proposal RIA manipulates the numbers on both sides of the benefit-cost balancing, and relying on those faulty recalculations for the determination of the best system of emission reduction would be irrational and unreasonable.

C. The Repeal Proposal ignores the real world context of the power sector and the implications of the proposed interpretation.

The Repeal Proposal blatantly disregards the key factual characteristics of this industry and of the type of pollution it emits. The Repeal Proposal also ignores key data and trends concerning the rapid changes occurring in this sector.⁹¹ EPA analyzed these characteristics, data, and trends in developing the Clean Power Plan, and came to reasonable conclusions about the best system of emission reduction to require achievable pollution reductions from existing power plants. Administrator Pruitt must consider these same factors and evidence in order to justify his reversal of prior decisions and rationally show that his proposed interpretation is superior to the Clean Power Plan BSER as a matter of policy preferences.

To define the “best system of emission reduction” in the Clean Power Plan, EPA took account of the unique characteristics of carbon dioxide pollution and the electric power industry.⁹² Because carbon dioxide mixes evenly in the atmosphere, a ton of emission reductions from any plant provides equal climate benefit.⁹³ Power plants—both those that emit carbon dioxide and those that do not—are part of an interconnected electric grid and are jointly operated to supply exactly the amount of electricity demanded at any given time.⁹⁴ To meet a given level of electricity demand, increased generation by one plant necessarily causes decreased generation by other plants. Power companies and grid operators routinely shift generation among facilities to meet demand subject to economic and environmental constraints.⁹⁵

⁹⁰ Office of Management and Budget, Circular A-4 (Sept. 17, 2003), <https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf>.

⁹¹ See Appendix A.

⁹² 80 Fed. Reg. at 64,723-24, 64,733-35.

⁹³ *Id.* at 64,725-26.

⁹⁴ *Id.* at 64,691-93.

⁹⁵ *Id.* at 64,728-29. See also *Fed. Energy Regulatory Comm’n v. Elec. Power Supply Ass’n*, 136 S. Ct. 760, 768 (2016) (“[E]lectricity flows...through an interconnected grid of near nationwide scope.”).

As EPA demonstrated in the Clean Power Plan, there are a wide range of well-established means of reducing carbon pollution already in use by the electric generating industry.⁹⁶ Subsequent evidence has only deepened the strength of EPA’s conclusion that these techniques are adequately demonstrated. Using these very approaches, by 2017 the power sector had already reduced its carbon pollution by 27 percent from 2005 levels.⁹⁷ Further, the costs of making these emission reductions have declined considerably even in the few years since EPA finalized the rule. The RIA for the Repeal Proposal itself acknowledges that more recent modeling efforts “indicate that the CPP would have had a more modest impact at lower cost than projected at the time the CPP was finalized.”⁹⁸

Ongoing trends in the power sector demonstrate that the industry is already drastically reducing its pollution, and can do a lot more. In the Repeal Proposal RIA, EPA details the impacts that these and other shifting dynamics in the electricity sector have had on projections from the Annual Energy Outlook (AEO), conducted by the Energy Information Administration. AEO provides modeled projections of domestic energy markets, released annually to represent updates to current policy and a variety of assumptions for economic growth, fuel prices, and technological progress. AEO has accounted for the Clean Power Plan since 2015, and has presented cases both with and without the policy in place. In its evaluation of the 2015, 2016 and 2017 AEO projections, EPA’s RIA for the proposed repeal recounts three key ongoing trends in the electricity sector that have occurred independent of the Clean Power Plan since it conducted the 2015 RIA analysis of the finalized rule: projected demand for electricity between 2020 and 2030 has fallen in each of the AEO projections since 2015; there has been a projected increase in new renewable capacity between EIA’s 2015 and 2017 projections; and AEO’s projected natural gas price forecasts have been continually revised lower between 2015 and 2017.

In the RIA EPA suggests that updating its Clean Power Plan analysis to account for the latest market and sector information would likely show fewer incremental capacity additions and lower compliance costs. To test this hypothesis, EPA compared the 2016 and 2017 AEO projections that include the Clean Power Plan. It finds that in the 2017 projections using the most up-to-date baseline, the Clean Power Plan drives less incremental new generating capacity, has less impact on natural gas prices, and requires a more modest amount of emissions reductions beyond what is already expected, since a portion of the reductions are now projected to occur in the Reference Case. The RIA sensibly points out that the implication of these shifts would be that the compliance costs associated with the Clean Power Plan would be more modest than previously estimated. “Together, these factors contribute to an expectation that updated EPA analysis would

⁹⁶ See, e.g., 80 Fed. Reg. at 64,725, 64,785, 64,803-04.

⁹⁷ U.S. Energy Information Administration, *Monthly Energy Review*, (March 2018), <https://www.eia.gov/totalenergy/data/monthly/>; power sector carbon emissions are presented in Table 12.6, https://www.eia.gov/totalenergy/data/monthly/pdf/sec12_9.pdf.

⁹⁸ Repeal Proposal RIA at 80.

project fewer CO₂ emissions in the absence of the Clean Power Plan than was projected in the 2015 RIA. It follows that, on average, compliance with Clean Power Plan mass-based emission targets would be less costly since fewer reductions would be required.”⁹⁹

This analysis of the trends in the Annual Energy Outlooks for recent years reaffirms the findings of many other industry and governmental analyses that the sector is well-positioned for Clean Power Plan compliance. In June 2016, NRDC reviewed four studies published after the extensions of the renewable energy tax credits, published by Rhodium Group (RHG), the National Renewable Energy Laboratory (NREL), MJ Bradley and Associates (MJBA), and Bloomberg New Energy Finance (BNEF).¹⁰⁰ NRDC found that each study reached a similar conclusion, with renewables capacity expected to nearly double from 2015 levels by 2021. This growth in renewable energy will put the power industry in an excellent position to meet, or even exceed, the goals of the Clean Power Plan. As noted previously, EPA should be considering strengthening the Clean Power Plan, not repealing it.

D. A source-specific or source-oriented interpretation limited to heat rate improvements would be unreasonable and impermissible.

Administrator Pruitt strongly signaled in the ANPR that he intends to issue a replacement rule that requires nothing more than the minimal emissions reductions achievable through heat-rate or combustion efficiency improvements at coal plants. A standard this ineffective at curbing power plant CO₂ emissions would be both legally impermissible and factually arbitrary and capricious.

EPA found in the Clean Power Plan rulemaking that such a standard likely would reduce emissions by only a few percentage points at most, and could actually *increase* net emissions if coal plants with improved heat rates are used more and displace cleaner sources of generation. If that is the result of the Administrator’s so-called “source-oriented” or “source-specific” interpretation, then it would fall outside the range of permissible interpretations of section 111(a)(1) and (d), and it would be arbitrary and capricious on the factual record before the agency.¹⁰¹

The factual consequences of an agency’s statutory interpretation are relevant not only to whether it is arbitrary and capricious, but also to whether it is even a permissible construction. As a

⁹⁹ Repeal Proposal RIA at 118.

¹⁰⁰ Natural Resources Defense Council, *The Clean Power Plan: Keeping Climate Progress On Track* (June 2016), <https://www.nrdc.org/sites/default/files/clean-power-plan-climate-progress.pdf>.

¹⁰¹ *See General Am. Transp. Corp. v. ICC*, 872 F.2d 1048, 1053 (D.C. Cir. 1989) (Both statutory reasonableness and arbitrary and capricious review require court to determine whether agency has “rationally considered the factors deemed relevant by the Act.”). *See also. Pharm. Research & Mfrs. of Am. v. FTC*, 790 F.3d 198, 204 (D.C. Cir. 2015) (noting that it is “often the case” that an agency’s “interpretation of its authority under *Chevron* Step Two overlaps with our arbitrary and capricious review”).

matter of both factual and legal analysis, EPA cannot rationally limit itself to considering only coal plant heat-rate improvements. This option was already thoroughly considered in the Clean Power Plan rulemaking process. There, EPA determined that improving the heat rate of individual coal-fired EGUs would at best reduce those plants' carbon pollution emission rate by only several percent and could even result in an overall increase in carbon dioxide emissions because those plants would likely be used more than before.¹⁰² It would be unreasonable and arbitrary and capricious for EPA to interpret the “*best system of emission reduction*” in a manner that could lead to an overall emissions increase.

The agency must analyze the potential reductions achievable from the full suite of measures that coal plants can apply, as described in NRDC's comments on the ANPR.¹⁰³ These include measures far more effective than heat-rate improvements, such as gas co-firing and partial carbon capture and storage (CCS). The Administrator needs to assess the cost of these measures and the emission reductions achievable by these strategies, compare them against the emission reductions and costs of a heat-rate only standard, and rationally explain why he has or has not chosen the more environmentally effective and protective option.

Further, it is incumbent on the Administrator to compare the reductions achievable through these so-called “source-oriented” options against those achievable through the legal interpretation underlying the Clean Power Plan—which, as we have shown above, the Administrator has failed to demonstrate is statutorily barred. Neither the Proposed Repeal nor the ANPR has undertaken, or even invited, these comparisons. The factual record for the Clean Power Plan provides a very strong indication how these comparisons will come out, however. A heat-rate only standard will produce less emission reductions than the current Clean Power Plan – and far less than an update of the Clean Power Plan based on current emission trend and cost data.¹⁰⁴ As we show in Appendix A, much greater reductions are achievable at reasonable cost. We estimate that by updating the same building blocks EPA used and applying them to a 2016 baseline, the Clean Power Plan could be strengthened considerably and the targets could be set at 40 percent below a 2016 baseline, equivalent to 55 percent below 2005 levels.

¹⁰² See 80 Fed. Reg. at 64,727 n.370, 64,745, 64,748.

¹⁰³ Comments of the Natural Resources Defense Council on EPA's Advance Notice of Proposed Rulemaking: State Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units (Feb. 26, 2018), Docket No. EPA-HQ-OAR-2017-0545-0358.

¹⁰⁴ For example, the Department of Energy's National Renewable Energy Laboratory (NREL) releases a set of cost projections for new electricity generation technologies annually, available at: <https://atb.nrel.gov/>. NREL also analyzes a wide range of electricity sector futures using the most recent available information, available at: <https://www.nrel.gov/docs/fy18osti/68548.pdf>.

| Updating the Clean Power Plan Targets | | |
|--|-------------|--------------------------------|
| | CPP Targets | Updated Targets ¹⁰⁵ |
| National Emissions (million short tons) | 1812 | 1194 |
| Reductions below: | | |
| 2005 | -32% | -55% |
| 2012 | -19% | -47% |
| 2016 | -10% | -40% |

For these reasons, compared with what is achievable at reasonable cost through other approaches that are permissible under the statute and supported by the factual record, a heat-rate only standard cannot be considered either permissible or rational, and the Administrator’s failure to assess these options is plainly arbitrary and capricious. Further, the Administrator’s deliberate effort to select a constrained legal interpretation in order to thwart the accomplishment of the core purpose of the Clean Air Act cannot be upheld as a reasonable interpretation of the “best system of emission reduction.” And given his apparent commitment to a do-nothing standard based on minimal heat-rate improvements, the legal interpretation he has embraced falls outside the widest range of legally permissible interpretations available to the agency under *Chevron*.

IV. Conclusion

By pursuing his present course of revoking the Clean Power Plan, Administrator Pruitt is abandoning his Clean Air Act duty to protect the public from harmful power plant carbon pollution. The Repeal Proposal fails to justify the rescission of the Clean Power Plan, which is based on a statutory construction that conforms to the text and purposes of the Clean Air Act and builds upon power sector trends already well underway. NRDC urges Administrator Pruitt to withdraw this Repeal Proposal and instead implement – and strengthen – the Clean Power Plan.

The foregoing comments are respectfully submitted on behalf of NRDC.

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¹⁰⁵ For the updated targets, the national emissions estimate refers to covered emissions under a set of mass-based targets applied to existing and new sources. Power sector modeling would be needed to determine the final emissions outcome.

Appendix A: Power Sector Trends

A.I. System-wide emissions reductions have continued and even accelerated since EPA finalized the Clean Power Plan.

The Clean Power Plan rulemaking found that shifting generation among power plants is an “everyday occurrence,”¹⁰⁶ and that “fossil fuel-fired EGUs have long implemented, and are continuing to implement, the measures in building blocks 2 and 3 for various purposes, including for the purpose of reducing CO₂ emissions.”¹⁰⁷ Further, EPA found that generation shifting has been utilized for both target-setting and compliance purposes in a variety of other EPA rules, including (as discussed in Part II.E., *supra*) the Acid Rain Trading Program and the Air Transport Rules.¹⁰⁸

EPA further documented in the rulemaking that there had been a sharp and accelerating shift in generation away from higher-emitting fossil fuel-fired power plants and toward zero-emitting renewable energy resources, spurred in significant part by the 29 states and the District of Columbia with renewable portfolio standards or similar laws.¹⁰⁹ Renewable capacity grew fivefold from 1998 to 2013,¹¹⁰ while renewable generation increased from 8 percent in 2005 to 12 percent of electricity in 2013.¹¹¹ And between 2009 and 2013, wind generation tripled while solar generation grew twentyfold.¹¹²

At the time of EPA’s rulemaking, this growth was expected to continue; in its 2015 forecast, U.S. Energy Information Administration (EIA) projected that renewable energy would increase by 70 percent from 2013 to 2040, accounting for over one-third of new generation capacity in that time period.¹¹³ In fact, the rate of growth of wind and solar since 2015 has significantly exceeded these expectations, driven by continued cost declines as well as federal and state policy

¹⁰⁶ 80 Fed. Reg. at 64,728-29.

¹⁰⁷ *Id.* at 64,769, n. 520 (citing utility climate mitigation plans utilizing generation shifting for pollution reduction).

¹⁰⁸ *Id.* at 64,729.

¹⁰⁹ *Id.* at 64,803.

¹¹⁰ *Id.* (citing EIA, 1990-2013 Existing Nameplate and Net Summer Capacity by Energy Source Producer Type and State (EIA-860), <http://www.eia.gov/electricity/data/state/>).

¹¹¹ *Id.* (citing EIA, Monthly Energy Review, tbl. 7.2b. (May 2015), http://www.eia.gov/totalenergy/data/monthly/pdf/sec7_6.pdf); *see also* EPA, Greenhouse Gas Mitigation Measures (Technical Support Document), Docket No. EPA-HQ-OAR-2013-0602-36748, at 4-19 (2015) (describing state integration of renewable energy resources into the generation mix).

¹¹² *Id.* (citing EIA, Monthly Energy Review, tbl 7.2b (May 2015), http://www.eia.gov/totalenergy/data/monthly/pdf/sec7_6.pdf).

¹¹³ *Id.* at 64,804 (citing EIA, Annual Energy Outlook 2015 with Projections to 2040, at ES-6-7 (2015), [http://www.eia.gov/forecasts/aeo/pdf/0382\(2015\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0382(2015).pdf)).

support.¹¹⁴ Between 2014 and 2017, wind and solar accounted for the majority of all new capacity additions.^{115,116,117} Wind capacity has already surpassed EIA's AEO 2015 projections for 2030, and utility-scale solar capacity has already exceeded EIA's AEO 2015 projections for 2040.¹¹⁸ EIA's projections show continual expansion of renewable energy growth year after year. In its most recent Outlook (AEO 2018), EIA projects in the Reference Case that renewable generation will increase 139 percent through 2050 and will, by 2034, surpass coal and nuclear to become the second largest source of power in the fuel mix. Between now and 2050, almost two-thirds of all new electricity generation is expected to come from wind and solar. In the next section, the impacts of these changes as well as other market trends on expectations for Clean Power Plan compliance are discussed.

Similarly, significant sector-wide changes have been occurring "since at least 2000" among fossil fuel plants themselves, with generation from higher-emitting, coal-fired plants decreasing and generation from lower-emitting natural gas-fired plants increasing.¹¹⁹ Generation from gas-fired units increased fourfold from 2000 to 2012, while coal-fired generation decreased by one-third during that interval.¹²⁰ In the Clean Power Plan rulemaking, EPA confirmed that this has been a conscious strategy of utilities based on a review of state-level integrated resource plans, which show "a pattern of shifting from coal steam capacity to NGCC capacity."¹²¹ EPA expected, at the time it finalized the Clean Power Plan, that this pattern would continue.¹²² And,

¹¹⁴ EPA, Basis for Denial of Petitions to Reconsider and Petitions to Stay the Clean Power Plan at Appendix 2, 23-30 (in 2016 the level of monthly renewable electricity generation surpassed levels from the corresponding month in 2015).

¹¹⁵ EIA, Wind Adds the Most Electric Generation Capacity in 2015, Followed by Natural Gas and Solar, *Today in Energy* (Mar. 23, 2016), <https://www.eia.gov/todayinenergy/detail.php?id=25492>.

¹¹⁶ EIA, U.S. Electric Generating Capacity Increase in 2016 Was Largest Net Change Since 2011, *Today in Energy* (Feb. 27, 2017), <https://www.eia.gov/todayinenergy/detail.php?id=30112>.

¹¹⁷ EIA, Electricity generation from fossil fuels declined in 2017 as renewable generation rose," *Today in Energy*, (Mar. 20, 2018), <https://www.eia.gov/todayinenergy/detail.php?id=35412>.

¹¹⁸ SNL Energy, Power Plant Summary, accessed January 8, 2017: Total U.S. wind and solar capacity has reached 88.0 GW and 26.8 GW; EIA's AEO 2015 projected 86.3 GW of wind by 2030 and 22.2 GW of solar by 2040.

¹¹⁹ 80 Fed. Reg. at 64,795.

¹²⁰ *Id.* (citing Ventyx Electric Power Database, Ventyx Monthly Plant-Level Generation, 2000-2012, Docket No. EPA-HQ-OAR-2013-0602-37116).

¹²¹ *Id.* (citing EPA, Review of Electric Utility Integrated Resource Plans (May 7, 2015), Docket No. EPA-HQ-OAR-2013-0602-36301).

¹²² *Id.* (citing EIA, Annual Energy Outlook (forecasting 40 GW of coal retirements and 53 GW of NGCC additions)).

indeed, it has.¹²³ EPA's natural gas price assumptions underlying Building Block 2 have proven to be quite conservative. Over the last several years since the Clean Power Plan was developed, natural gas prices have fallen well below forecasted levels and spawned a range of new gas price projections that are far below previous expectations, as discussed further in Appendix A.3.

Taken together, EPA's findings have consistently proven highly conservative as the shift from coal-fired to lower-emitting and zero-emitting forms of generation has persisted and deepened since the 2012 baseline year EPA used in setting the Clean Power Plan emission targets. While total generation fueled by coal decreased by 306 TWh between 2012 and 2017, total gas-fired generation increased by 47 TWh and non-hydro, utility-scale renewable generation grew by 162 TWh. Collectively, these sources helped meet 2017 generation demands that were 33 TWh lower than 2012.¹²⁴ This decline in total generation reflects the impact of energy efficiency measures and behind-the-meter renewable installations, among other factors.

As a result of these market shifts, the U.S. Energy Information Administration estimates that 2017 CO₂ emissions in the electricity sector were 27 percent lower than 2005 levels, and the power sector is already within striking distance of the 2030 Clean Power Plan goals.¹²⁵ The Clean Power Plan would gradually phase in the emissions limits between 2022 and 2030, and was projected to result in emissions cuts of roughly 32 percent below 2005 levels by 2030, which translates to 19 percent below 2012 levels. Since 2012, which was the baseline year used to set the emissions targets, power sector carbon emissions have already fallen by 14 percent. In other words, the power sector has already achieved more than 72 percent of the cuts required by 2030 in just the past five years.

While these trends show that the Clean Power Plan is eminently achievable, we cannot rely solely on market dynamics to reduce emissions. The Clean Power Plan ensures that these emissions reduction trends continue, particularly if natural gas prices rise in the future, which absent constraints on emissions could potentially drive some shift back to coal generation. The Clean Power Plan also provided important policy certainty for power companies and investors.

Moreover, the early achievement of the Clean Power Plan's interim goals if anything calls for stronger carbon pollution standards for the power sector, not repeal. As we discuss in greater

¹²³ EPA, Basis for Denial of Petitions to Reconsider and Petitions to Stay the Clean Power Plan at Appendix 2, 19-22 (showing continued growth in reliance on natural gas through increasing capacity factors and new builds).

¹²⁴ EIA, Electric Power Monthly (March 2018), <https://www.eia.gov/electricity/monthly/>.

¹²⁵ EIA, Monthly Energy Review (March 2018), <https://www.eia.gov/totalenergy/data/monthly/>; for power sector carbon emissions *see* Table 12.6, https://www.eia.gov/totalenergy/data/monthly/pdf/sec12_9.pdf.

detail in Joint Comments Specific to Climate Change,¹²⁶ immediate and aggressive reductions in greenhouse gas emissions are necessary to keep global warming well below a 2°C rise above pre-industrial levels. Achieving significant emission reductions from the U.S. power sector is crucial, as the U.S. is the world’s second-largest emitter of CO₂ from fossil fuels,¹²⁷ and in 2016, power plant emissions contributed about 35 percent of U.S. energy-related CO₂.¹²⁸ It is clear that the U.S. must rapidly reduce its power plant emissions, but instead Administrator Pruitt’s Repeal Proposal would delay critical emission reductions from power plants, jeopardizing our ability to avoid the most harmful impacts of climate change.

The Proposed Repeal concedes that “[t]he trends in projected emissions from the electric power sector are consistent with the projected shift away from higher-emitting generating sources to lower-emitting generating sources observable in future scenarios that assume no implementation of the Clean Power Plan.”¹²⁹ The proposal proceeds to describe EIA’s finding that “in the electric power sector, coal-fired plants are replaced primarily with new natural gas, solar, and wind, which reduced electricity-related CO₂ emissions.”¹³⁰ Even though these were the very considerations that EPA looked to when it arrived at the current interpretation of the best system of emission reduction (BSER) reflected in the Clean Power Plan, the Administrator fails to take these realities into account when reinterpreting the legal boundaries of BSER. Rational decision-making requires EPA to examine and acknowledge the current realities of the regulated industry, and to ensure that its actions accord with the facts in the record.¹³¹ EPA has fallen short of that standard here.

By refusing to “look out the window” and consider the predominant method by which the covered sources *actually* reduce their CO₂ emissions, EPA has ignored “significant and viable and obvious alternatives” to its proposed reinterpretation of “system” and has thus engaged in arbitrary and capricious rulemaking.¹³² Agency analysis must exhibit a “rational relationship”

¹²⁶ Joint Comments of Environmental and Public Health Organizations Regarding the Proposed Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units – Comments Specific to Climate Change (Apr. 26, 2018).

¹²⁷ International Energy Agency, CO₂ Emissions from Fuel Combustion: Overview at 6 (2017), www.iea.org/publications/freepublications/publication/CO2EmissionsFromFuelCombustion2017Overview.pdf.

¹²⁸ In 2016, carbon dioxide emissions from the U.S. electric power sector were 1,821 million metric tons. EIA, Frequently Asked Questions, www.eia.gov/tools/faqs/faq.php?id=77&t=11 (accessed Apr. 20, 2018).

¹²⁹ Repeal Proposal RIA at 110.

¹³⁰ *Id.* (citing AEO2017).

¹³¹ *Public Employees v. Hopper*, 827 F.3d 1077, 1083 (D.C. Cir. 2016).

¹³² *Nat’l Shooting Sports Found. v. Jones*, 716 F.3d 200, 215 (D.C. Cir. 2013).

with “known behavior.”¹³³ The known behavior of the electric system is that it has been, is, and will continue to shift generation from higher-emitting resources to lower- and zero-emitting sources in order to reduce emissions. EPA’s failure to consider this phenomenon, accessed through the well-established mechanism of emission credits, an adequately demonstrated “system” is fatal to the proposed rulemaking.

A.2. The competitiveness of renewable generation technologies has continued to improve rapidly, further strengthening the potential for cost-effective emissions reductions.

The Administrator fails to account for the decreasing costs and increasing competitiveness of renewable energy in his proposed repeal. To support the Clean Power Plan, EPA reviewed numerous studies showing “capital cost reductions and performance improvements for [renewable energy].”¹³⁴ EPA found that “[t]he cost and performance improvements for wind and solar are driven by increased scale of production, improved technologies, and advancements in system deployments.”¹³⁵

The increasing economic competitiveness of renewable energy has continued apace since the Clean Power Plan was promulgated; in fact, it is accelerating,¹³⁶ bringing about a period of rapid transformation that includes significant changes even in the few years since EPA conducted its Regulatory Impact Analysis of the Final Clean Power Plan. Even the proposed repeal recognizes that “[p]rojections of new renewable capacity have increased” significantly since 2015, reflecting decreased technology costs.¹³⁷

The costs of wind and solar technologies have fallen dramatically in recent years. In many places, these zero emissions resources are out-competing fossil fuel-based electricity generation. According to the investment firm Lazard, the cost of generating power from new wind and solar projects has declined by 67 percent and 86 percent, respectively, since 2009.¹³⁸ In the past two years alone, according to the same analysis, the cost of wind and solar power has fallen by 17

¹³³ *Chem. Mfrs. Ass’n v. EPA*, 28 F.3d 1259, 1265 (D.C. Cir. 1994); *see also API v. EPA*, 862 F. 3d 50, 68 (D.C. Cir. 2017) (same).

¹³⁴ 80 Fed. Reg. at 64,804 nn.691-697.

¹³⁵ *Id.* (discussing studies that found “novel deployments of new turbines” and system optimization trends in renewable generation; citing, *e.g.*, NREL, U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis (July 2012), <http://bnef.com/WhitePapers/download/53>; EIA, AEO2015, at 25).

¹³⁶ EPA, Basis for Denial of Petitions to Reconsider and Petitions to Stay the Clean Power Plan at Appendix 2, 36-38 (explaining that price declines in non-hydro renewable energy have continued and that continued improvements to solar PV system pricing reinforced long-term declines in renewable energy costs).

¹³⁷ Repeal Proposal RIA at 14, 72 (citing AEO2017).

¹³⁸ Lazard, Lazard’s Levelized Cost of Energy Analysis – Version 11.0 (Nov. 2017), <https://www.lazard.com/media/450337/lazard-levelized-cost-of-energy-version-110.pdf>.

percent and 22 percent, respectively. The average price of wind power fell to an all-time low of just \$20 per megawatt-hour in 2015 and remained that low in 2016.¹³⁹ In 2017, the Department of Energy (DOE) announced that the solar industry had hit the Sunshot target for utility-scale projects – an installation cost of \$1 per watt – three years ahead of the Sunshot target date.¹⁴⁰

In its Regulatory Impact Analysis (RIA) of the Final Clean Power Plan, EPA conducted power sector modeling using the Integrated Planning Model (IPM). In its modeling, EPA relied on cost projections developed by the National Renewable Energy Laboratory, as published in its Annual Technology Baseline. NREL updates its cost projections each year; as shown below, recent progress has had a significant impact on expectations for future costs.¹⁴¹

Table 1: Changes in Projected Costs for Wind and Solar¹⁴²

| Projected Levelized Cost of Energy (\$2015/MWh), 2030 | | | |
|---|------------------|------------------|-------------|
| | NREL ATB 2015 | NREL ATB 2017 | % Change |
| Onshore Wind | 51.4 | 38.1 | -26% |
| Utility Solar PV | 85.2 | 45.2 | -47% |

The policy landscape for wind and solar technologies has also changed considerably. In December 2015, four months after EPA finalized the Clean Power Plan, Congress passed legislation, signed into law by President Obama, that extends the Production Tax Credit for wind projects and the Investment Tax Credit for solar projects, placing both credits on a phase-down

¹³⁹ Lawrence Berkeley National Laboratory, 2016 Wind Technologies Market Report (Aug. 2017), https://emp.lbl.gov/sites/default/files/2016_wind_technologies_market_report_final_optimized.pdf.

¹⁴⁰ National Renewable Energy Laboratory, U.S. Solar Photovoltaic System Cost Benchmark: Q1 2017 (Sept. 2017), <https://www.nrel.gov/docs/fy17osti/68925.pdf>.

¹⁴¹ National Renewable Energy Laboratory, Annual Technology Baseline, <https://atb.nrel.gov/electricity/data.html>.

¹⁴² The projections in Table 1 are derived from the 2017 version of the ATB and an early draft of the 2015 version, which EPA relied on in its modeling (see https://www.epa.gov/sites/production/files/2015-08/documents/epa_base_case_v.5.15_incremental_documentation_august_2015.pdf). For onshore wind, NREL provides projections across multiple wind resource classes (Techno-Resource Groups, or “TRGs”). The point of comparison in Table 1 is the mid-case estimate for the central TRGs analyzed. In the 2015 ATB, estimate for TRG3 is presented (out of 5 TRGs analyzed); in the 2017 ATB, the average estimate for TRG5 and TRG6 is presented (out of 10 TRGs analyzed). For utility solar PV, the point of comparison in Table 1 is the mid-case estimate for a solar project with a 20 percent capacity factor.

schedule.¹⁴³ At the state level, several states have strengthened their Renewable Portfolio Standards since 2015.¹⁴⁴

The cost declines observed to date, and the further declines expected, must have a significant impact on the requisite compliance analysis of the Clean Power Plan. For example, in its 2015 analysis, EPA relied on NREL’s forecast, which did not project solar costs to reach the Sunshot target of \$1 per watt – which was met in 2017 – *until 2040*. Additionally, the extensions of the federal tax credits for wind and solar coupled with strengthened state renewables standards will result in significant wind and solar growth, which will in turn lower the remaining cuts needed to meet the goals of the Clean Power Plan.

A.3. EPA’s examination of recent Energy Information Administration forecasts reaffirms that ongoing progress will further lower Clean Power Plan compliance costs.

In the Regulatory Impact Analysis for the Proposed Repeal of the Clean Power Plan (“Repeal Proposal RIA”), EPA recognizes and details the impacts that these and other shifting dynamics in the electricity sector have had on the Annual Energy Outlook (AEO), another modeled analysis of the electricity sector, conducted by the Energy Information Administration. AEO provides modeled projections of domestic energy markets, released annually to represent updates to current policy and a variety of assumptions for economic growth, fuel prices, and technological progress. AEO has accounted for the Clean Power Plan since 2015, and has presented cases both with and without the policy in place. In its evaluation of the 2015, 2016 and 2017 AEO projections, EPA’s RIA for the proposed repeal recounts three key ongoing trends in the electricity sector that have occurred independent of the Clean Power Plan since it conducted the 2015 RIA analysis of the finalized rule. This discussion focuses on the key trends that EPA included in the RIA for the proposed repeal of the Clean Power Plan. AEO 2018 was released in February 2018, following the EPA’s proposal to repeal the Clean Power Plan. It is important to note that these electricity industry trends are also reflected in the AEO2018 forecast, signaling that the momentum towards low- and zero-emitting electricity generation is expected to endure.

First, projected demand for electricity between 2020 and 2030 has fallen in each of the AEO projections since 2015. In its 2017 outlook, EIA projected that electricity demand in 2030 will fall to 1.5 percent below 2015 levels. This is continuing evidence of a longstanding trend. Going

¹⁴³ As part of The Consolidated Appropriations Act of 2016, the Production Tax Credit (PTC) for onshore wind projects was extended at its full value of 2.3 cents/kWh through the end of 2016, and then will phase down to 80% of its full value in 2017, 60% in 2018, and 40% in 2019. The Investment Tax Credit (ITC) for solar projects was extended at its full value of 30% of project investment costs through the end of 2019, and will drop to 26% in 2020 and 22% in 2021. Without additional legislation, the PTC will expire after 2019, and after 2021, the ITC will drop to 10% of investment costs for utility-scale and commercial projects and will expire for residential projects.

¹⁴⁴ Lawrence Berkeley National Laboratory, Renewable Portfolio Standards: 2017 Annual Status Report (July 2017), <https://emp.lbl.gov/sites/default/files/2017-annual-rps-summary-report.pdf>.

even farther back, electricity consumption declined at an annual average rate of 0.2 percent in the five years preceding 2015. In every five-year period since 1996, electricity demand growth rates have declined.¹⁴⁵ Similarly, electricity demand in AEO2018 fell on average 1.6 percent below the AEO2017 Reference Case (without the CPP) through 2050. Lower electricity demand is driven by a number of factors, including lackluster demand from the industrial sector; little to no growth in the residential and commercial sectors; growing investment in energy efficiency programs; increased deployment of distributed generation such as rooftop solar; and slower growth in a mature U.S. economy.

Second, EPA observes the projected increase in new renewable capacity between EIA's 2015 and 2017 projections. EIA's projections of both cumulative unplanned new renewable energy capacity and total renewable energy capacity have increased substantially. Unplanned new renewable capacity additions grew almost 400 percent in AEO2017 over AEO2015. Total renewable energy capacity in 2030 increased 38 percent in AEO2017 compared with AEO2015. As EPA notes, "the increase in projected new builds of these generation technologies reflects the fact that the private cost of building these technologies has decreased over the past few years both because of the PTC/ITC tax credit extensions and because of decreases in the cost of new capacity."¹⁴⁶ This trend holds in AEO2018 as well. EIA projects 40 gigawatts (GW) of new wind capacity by 2020. From 2020 to 2050, utility-scale wind capacity is projected to grow by 20 GW, and utility-scale solar photovoltaic capacity is projected to grow by 127 GW. In total, AEO2018 projects that wind and solar capacity will total approximately 275 GW in 2030, exceeding the AEO2017 Reference Case (without the CPP) projection by more than 11 percent. As in the AEO2017 projection, federal tax credits lead to a significant increase in renewable electricity generation through the early 2020s, and continued favorable economics relative to other generating technologies result in a more than doubling of renewables generation between 2017 and 2050, with an average annual growth rate of 2.8 percent.

Third, EPA notes that AEO's projected natural gas price forecasts have been continually revised lower between 2015 and 2017. The power sector delivered gas price for 2030 in the 2015 No Clean Power Plan Reference Case was \$6.64/mcf (\$2016), and is revised downwards by 21 percent to \$5.25/mcf in the 2017 No Clean Power Plan case. Extending this pattern, AEO2018 projects delivered natural gas prices to be approximately 11 percent lower than the 2017 projections through the forecast period. These forecasts in turn lead to an expectation that competition from natural gas will continue to challenge coal in the electricity sector going forward. As EPA acknowledges, these three ongoing market trends are expected to further reduce the share of coal in the electricity mix. The AEO No Clean Power Plan projections

¹⁴⁵ M.J. Bradley & Associates, Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States (July 2016), <http://mjbradley.com/sites/default/files/Benchmarking-Air-Emissions-2016.pdf>.

¹⁴⁶ Repeal Proposal RIA at 106.

demonstrate a clear shift away from higher emitting generation sources to lower and zero emitting sources. In its RIA of the Proposed Repeal of the Clean Power Plan, EPA points out that between 2015 and 2017, the AEO No Clean Power Plan cases project a decrease of 290 TWh of 17 percent in coal generation in 2030, with commensurate declines in coal capacity and coal consumption.

The Clean Power Plan was designed to phase in emissions limits gradually between 2022 and 2030 and was projected to result in emissions cuts of roughly 32 percent below 2005 levels by 2030. Driven by market shifts, power sector carbon emissions have declined by 27 percent between 2005 and 2017, reaching their lowest levels in more than 25 years.

EPA suggests that updating its Clean Power Plan analysis to account for the latest market and sector information would likely show fewer incremental capacity additions and lower compliance costs.¹⁴⁷ To test this hypothesis, EPA compares the 2016 and 2017 AEO projections that include the Clean Power Plan. It finds that in the 2017 projections using the most up-to-date baseline, the Clean Power Plan drives less incremental new generating capacity, has less impact on natural gas prices, and requires a more modest amount of emissions reductions beyond what is already expected, since a portion of the reductions are now projected to occur in the Reference Case. EPA sensibly points out that the implication of these shifts would be that the compliance costs associated with the Clean Power Plan would be more modest than previously estimated. “Together, these factors contribute to an expectation that updated EPA analysis would project fewer CO₂ emissions in the absence of the Clean Power Plan than was projected in the 2015 RIA. It follows that, on average, compliance with Clean Power Plan mass-based emission targets would be less costly since fewer reductions would be required.”¹⁴⁸ Despite these positive trends, it is important to note that market forces alone cannot be relied upon to drive the necessary transformation of the electricity sector. EIA projects in AEO 2018 that power sector emissions will be 1777 million metric tons in 2050, nowhere near the progress needed to avoid the worst impacts of climate change. In its report documenting how the United States could achieve its 2050 climate targets, the Obama White House identifies “near-complete decarbonization of electricity” as “perhaps the most pivotal element to achieving the [Mid-Century Strategy] vision.”¹⁴⁹

EPA’s analysis of the trends in recent Annual Energy Outlooks reaffirms the findings of many industry and governmental analyses that the sector is well-positioned for Clean Power Plan compliance. In June 2016, NRDC reviewed four studies published after the extensions of the renewable energy tax credits, published by Rhodium Group (RHG), the National Renewable

¹⁴⁷ *Id.* at 116.

¹⁴⁸ *Id.* at 118.

¹⁴⁹ The White House, United States Mid-Century Strategy for Deep Decarbonization at 42, 45 (Nov. 2016), https://unfccc.int/files/focus/long-term_strategies/application/pdf/us_mid_century_strategy.pdf.

Energy Laboratory (NREL), MJ Bradley and Associates (MJBA), and Bloomberg New Energy Finance (BNEF).¹⁵⁰ NRDC found that each study reached a similar conclusion, with renewables capacity expected to nearly double from 2015 levels by 2021. This growth in renewable energy will put the power industry in an excellent position to meet, or even exceed, the goals of the Clean Power Plan.

A.4. States and power companies continue to press forward in their transition to cleaner electricity generation

Not only are market trends driving a reduction in fossil-fired generation and increases in zero- or lower-emitting generation, but states and companies, with an interest in reducing CO₂ emissions, have taken steps to substitute coal plants with lower-emitting plants.

Many owners/operators of affected power plants are already planning on deploying significant amounts of renewable energy (RE) according to their integrated resource plans (IRPs).¹⁵¹ Furthermore, “[m]any affected EGUs have already invested in RE. Of the 404 entities that owned part of at least one affected EGU under this rule, 178 also owned RE (biomass, geothermal, solar, water or wind) . . . as a whole, these entities’ share of RE capacity was equal to 25 percent of the total of their affected EGU capacity.”¹⁵²

Even during the current Administration, executives at a significant number of electric power companies that own or operate affected generating units have committed to investing in clean energy resources that reduce carbon dioxide emissions. Power companies owning more than 19.7 percent of U.S. generating capacity announced significant new renewable energy projects or carbon reduction commitments in 2017.¹⁵³ For instance, Duke Energy (with an overall portfolio of 52,700 MW) plans to reduce carbon emissions by 40 percent below 2005 levels by 2030.¹⁵⁴ Xcel Energy (17,000 MW) plans to reduce carbon emissions 60 percent by 2030 below 2005

¹⁵⁰ Natural Resources Defense Council, *The Clean Power Plan: Keeping Climate Progress On Track* (June 2016), <https://www.nrdc.org/sites/default/files/clean-power-plan-climate-progress.pdf>.

¹⁵¹ EPA, *Review of Electric Utility Integrated Resource Plans* (May 7, 2015), Docket No. EPA-HQ-OAR-2013-0602-36301.

¹⁵² 80 Fed. Reg. at 64,805

¹⁵³ Estimated from generating capacities of American Electric Power, Dominion, DTE, Duke Energy, Great River Energy, MidAmerican, NextEra, PacifiCorp, Portland General Electric, Southern Company, and Xcel Energy, against total installed U.S. generating capacity. See EEI, *Industry Data: Capacity*, <http://www.eei.org/resourcesandmedia/industrydataanalysis/industrydata/Pages/default.aspx>.

¹⁵⁴ Dylan Brown, *Duke Stays Course on CO₂ Cuts Despite Trump Politics*, GREENWIRE (Apr. 27, 201), <https://www.eenews.net/greenwire/2017/04/27/stories/1060053707>.

levels.¹⁵⁵ DTE Energy (11,000 MW) plans to reduce carbon emissions 80 percent by 2050.¹⁵⁶ And Southern Company (46,000 MW) plans to construct 3,000 MW of new wind project between 2018 and 2020 and has set a goal of achieving a 50 percent reduction in greenhouse gas emissions by 2030 from 2007 levels and achieving low- to no-carbon operations by 2050.¹⁵⁷

Power company executives cite the falling cost of cleaner resources, changing consumer and investor preferences for clean energy, and environmental concerns as the major reasons for these changes. Notably, these companies are planning from a perspective of multiple decades into the future, rather than simply operating according to the political exigencies of the moment. For example, NextEra Energy (45,900 MW capacity) Chief Financial Officer John Ketchum has reported that “[w]e anticipate that improved wind and solar economics and low natural gas prices will continue to lead to additional retirements of coal, nuclear, and less fuel-efficient oil and gas-fired generation units, creating significant opportunities for renewables growth going forward.”¹⁵⁸

As described above, “[s]tates have . . . taken a significant lead in requiring the development of RE resources. In particular, a number of states have adopted renewable portfolio standards (RPS), which are regulatory mandates to increase production of RE. . . . These RPS requirements continue to drive robust near-term growth of non-hydropower RE.”¹⁵⁹ States are also taking action to strengthen already established renewable energy requirements. For example, Illinois enacted legislation in December 2016 to improve the effectiveness of its existing renewables standard, in part by mandating 4,300 MW of new wind and solar generation.¹⁶⁰ In April 2018, New Jersey passed legislation boosting its RPS requirement to 35 percent by 2025 and 50

¹⁵⁵ Ben Fowke, *At Xcel, We’ll Stay on a Clean Energy Path*, STARTRIBUNE (June 14, 2017), <http://www.startribune.com/at-xcel-we-ll-stay-on-a-clean-energy-path/428513313/>.

¹⁵⁶ Hannah Northey, *Mich. Utility to Close Power Plants, Slash Emissions*, E&E NEWS, May 16, 2017, <https://www.eenews.net/eenewspm/2017/05/16/stories/1060054642>.

¹⁵⁷ Southern Company, *Southern Company Subsidiary Announces Strategic Wind Development Agreement*, PR NEWswire (Dec. 30, 2016), <https://www.prnewswire.com/news-releases/southern-company-subsidiary-announces-strategic-wind-development-agreement-300384200.html>; Southern Company, *Planning for a Low Carbon Future* (Apr. 2018), <https://www.southerncompany.com/content/dam/southern-company/pdf/corpresponsibility/Planning-for-a-low-carbon-future.pdf>.

¹⁵⁸ NextEra, *NextEra Energy Partners’ (NEE) CEO James Robo on Q1 2017 Results – Earning Call Transcript*, SEEKING ALPHA (Apr. 21, 2017), <https://seekingalpha.com/article/4064238-nextera-energy-partners-nee-ceo-james-robo-q1-2017-results-earnings-call-transcript?part=single>.

¹⁵⁹ 80 Fed. Reg. at 64,803.

¹⁶⁰ Nick Magrisso, *Future Energy Jobs Bill: A Path for Illinois to a Bright Clean Energy Economy* (Dec. 5, 2016), <https://www.nrdc.org/experts/nick-magrisso/future-energy-jobs-bill-path-illinois-bright-clean-energy-economy>.

percent by 2030, increasing its solar target, enabling community solar projects, and setting goals for energy storage.

States across the U.S. have also enacted *new* commitments to reduce carbon dioxide emissions under this Administration. These commitments include ones by organizations that span multiple states and large swathes of the U.S. population. For instance, the U.S. Climate Alliance reports, that at the time they published their report at the beginning of 2017, the fourteen states and Puerto Rico in their Alliance (California, Colorado, Connecticut, Delaware, Hawaii, Massachusetts, Minnesota, New York, North Carolina, Oregon, Rhode Island, Vermont, Virginia, Washington, and Puerto Rico), which represent more than 36 percent of country's population, had pledged to reduce their economy-wide emissions by 26-28 percent below 2005 levels by 2025.¹⁶¹ To meet these targets, several individual states have also made strong commitments to reduce greenhouse gases. For example, Colorado Governor John Hickenlooper signed an executive order committing his state to reduce its power sector emissions by 25 percent below 2012 levels by 2025, and by 35 percent below 2012 levels by 2030.¹⁶² These reduction goals are stronger than what would have been required by the Clean Power Plan.¹⁶³ In response to the proposed repeal of the Clean Power Plan, Governor Hickenlooper stated that “[c]lean energy is an economic engine for our state and for our nation.”¹⁶⁴ And Virginia is proposing to establish a program that will reduce carbon emissions from the power sector by 30 percent between 2020 and 2030.¹⁶⁵ The nine states comprising the Regional Greenhouse Gas Initiative (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont) are also proposing to build on the progress they have made over the past decade and reduce carbon emissions from the power sector an additional 30 percent in 2030 relative to 2020 levels.¹⁶⁶

¹⁶¹ U.S. Climate Alliance, 2017 Annual Report: Alliance States Take the Lead (2017), https://static1.squarespace.com/static/5936b0bde4fcb5371d7ebe4c/t/59bc4959bebafeb2c44067922/1505511771219/USCA_Climate_Report-V2A-Online-RGB.PDF.

¹⁶² State of Colorado, Executive Order D 2017-015: Supporting Colorado's Clean Energy Transition (July 11, 2017), https://www.colorado.gov/governor/sites/default/files/executive_orders/climate_eo.pdf.

¹⁶³ *Id.*

¹⁶⁴ State of Colorado, Gov. Hickenlooper's statement of repeal of Clean Power Plan (Oct. 10, 2017), <https://www.colorado.gov/governor/news/gov-hickenlooper%E2%80%99s-statement-repeal-clean-power-plan>.

¹⁶⁵ Virginia State Air Pollution Control Board, Tentative Agenda and Minibook: State Air Pollution Control Board Meeting (Nov. 16, 2017), http://www.townhall.virginia.gov/L/GetFile.cfm?File=C:%5CTownHall%5Cdocroot%5CMeeting%5C1%5C26694%5CAgenda_DEQ_26694_v1.pdf.

¹⁶⁶ RGGI Inc., RGGI States Announce Proposed Program Changes: Additional 30% Emissions Cap Decline by 2030 (Aug. 23, 2017), https://www.rggi.org/docs/ProgramReview/2017/08-23-17/Announcement_Proposed_Program_Changes.pdf.

City officials across the U.S. are also pledging to reduce emissions and accelerate clean energy deployment. At least 384 U.S. mayors have committed to “intensify efforts to meet each of our cities’ current climate goals, push for new action to meet the 1.5 degrees Celsius target, and work together to create a 21st century clean energy economy.”¹⁶⁷

The failure to recognize and account for the actual system of emission reduction that companies, cities, and states are utilizing to reduce carbon emissions from this source category renders the rulemaking arbitrary and capricious.

¹⁶⁷ Climate Mayors, 384 US Climate Mayors Commit to Adopt, Honor and Uphold Paris Climate Agreement Goals (June 1, 2017), <https://medium.com/@ClimateMayors/climate-mayors-commit-to-adopt-honor-and-uphold-paris-climate-agreement-goals-ba566e260097>.

Appendix B: Utility Compliance Under Previous Clean Air Act Standards

In order to achieve compliance with pollution standards promulgated under the Clean Air Act (CAA), electric utilities and independent power producers evaluate a range of compliance strategies for cost-effectiveness and any potential reliability impacts. These strategies include plant-specific pollution controls as well as changes to a utility's fleet that are similar to those contemplated in the Clean Power Plan.

By taking action on a system-wide basis, utilities and plant owners have consistently been able to achieve pollution reductions required by CAA standards at lower cost than projected by both the EPA and utilities themselves, without compromising grid reliability and resiliency. The system-wide approach for establishing the Clean Power Plan goals is representative of the systemwide shifts that are already occurring in the power sector. Similarly, compliance with the Clean Power Plan would merely build upon the sectoral trends already underway. It is also important to note that the Clean Power Plan provides more flexible compliance pathways than do the Mercury and Air Toxics Standards (MATS) discussed below. While MATS requires pollution controls at each coal-fired power plant, the Clean Power Plan would allow the owner of a coal or gas power plant to continue to operate and comply through the use of emission credits.

The discussion below examines how two of the largest electric power producers in the U.S. – American Electric Power and Tennessee Valley Authority – achieved compliance with the Mercury and Air Toxics Standards.¹⁶⁸

B.1. American Electric Power (AEP)

AEP is one of the largest electric utilities in the United States, serving over 5.4 million customers across 11 U.S. states.¹⁶⁹ AEP is the largest electricity transmission owner in the country, with over 40,000 miles of company-owned transmission lines in its network, and owns 26,000 MW of power capacity across the country. Following the 2011 proposal of the Mercury and Air Toxics Standards (MATS), AEP publicly warned that the MATS requirement to install pollution controls at each of its coal plants would be prohibitively expensive.¹⁷⁰

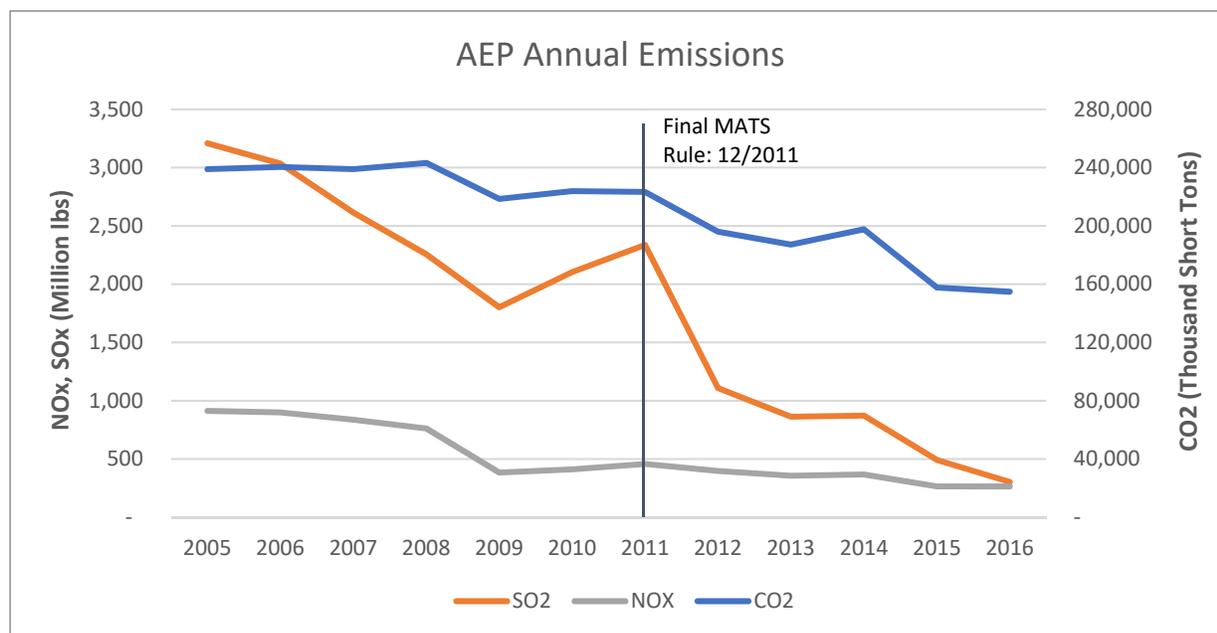
In fact, AEP was able to achieve MATS compliance at modest cost and without adverse grid and economic impacts through a combination of pollution controls and changes to the composition of its generation fleet. AEP met the standards by 1) installing pollution control technologies on certain coal plants that continued to burn coal, 2) switching fuels at other plants by re-firing

¹⁶⁸ M.J. Bradley & Associates, *Benchmarking Air Emissions 2017* (June 14, 2017), <http://www.mjbradley.com/benchmarking-air-emissions>.

¹⁶⁹ American Electric Power, *About Us*, <https://www.aep.com/about/>.

¹⁷⁰ AEP Shares Plan For Compliance With Proposed EPA Regulations (June 9, 2011), <https://www.aep.com/newsroom/newsreleases/?id=1697>.

those coal units with lower-emitting natural gas, 3) retiring older, less economic coal units, and 4) investing in new renewable, efficiency, and gas resources to replace the plants that closed. Data for sulfur dioxide emissions from AEP plants reveals their success in reducing pollution during this period: between 2011 and 2012 alone, AEP cut its SO₂ emissions in half. By the end of 2015, SO₂ emissions were 80 percent lower than 2011 levels.¹⁷¹ Carbon emissions fell by 30 percent in the same time period, as AEP retired 6,000 MW of coal in 2014 and 2015 for MATS compliance and added new gas and solar capacity.¹⁷²



AEP’s compliance strategy was assisted by reductions in the costs of renewable technologies and natural gas prices over this period, but company statements predating these cost reductions suggest that it would have made changes to its generation fleet even absent these cost declines.¹⁷³ By accelerating the retirement of older coal plants where investing in mercury controls was not as cost-effective as investing in low-cost “outside the fence line” generation options, AEP was able to comply at a cost that was about half of the amount AEP originally estimated in its 10-K filings in most years.¹⁷⁴ AEP initially estimated that it would spend over \$3.9 billion for environmental compliance between 2012 and 2016, but actual spending totaled just \$1.8 billion.

¹⁷¹ SNL Energy, Data Screener (*Subscription required*); underlying data from Environmental Protection Agency (EPA), Continuous Emissions Monitoring System (CEMS).

¹⁷² SNL Energy, AEP Power Plant Assets (*Subscription required*).

¹⁷³ See, e.g., AEP Shares Plan For Compliance With Proposed EPA Regulations (June 9, 2011), <https://www.aep.com/newsroom/newsreleases/?id=1697>.

¹⁷⁴ See American Electric Power, Key Filings and Previous Years Filings, available at <https://www.aep.com/investors/financialfilingsandreports/Filings/>.

And, while AEP projected 2017 spending would be \$531 million (2014 10-K), the company now expects that 2017 expenses will be less than half of that amount, at \$227 million.

| Projected Investment (in \$Million) | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-------------------------------------|-------|-------|-------|-------|-------|---------|-------|-------|-------|
| Actual | 457.2 | 303.8 | 186.8 | 235.4 | 415.0 | 539.8 | 599.4 | 383.7 | |
| 2011 10-K | | | | 510.7 | 999.0 | 1,100.0 | | | |
| 2012 10-K | | | | | 544.0 | 760.0 | 850.0 | | |
| 2013 10-K | | | | | | 588.0 | 644.0 | 447.0 | |
| 2014 10-K | | | | | | | 661.0 | 401.0 | 531.0 |
| 2015 10-K | | | | | | | | 353.2 | |
| 2016 10-K | | | | | | | | | 226.7 |

B.2. Tennessee Valley Authority (TVA)

TVA is the nation's largest public power company, supplying power to more than 9 million customers in most of Tennessee and parts of Alabama, Mississippi, Kentucky, Georgia, North Carolina, and Virginia.¹⁷⁵ Like AEP, TVA has also relied on fleetwide measures, including generation-shifting to lower- and non-emitting plants to meet Clean Air Act standards. In April 2011, TVA entered into a set of Environmental Agreements with the EPA, environmental groups, and several states where it operates, in order to resolve a number of violation complaints the EPA brought against the corporation for failing to comply with CAA pollution control requirements at eight of its coal plants at which it allegedly modified coal units without obtaining required permits or installing required pollution controls.¹⁷⁶ In order to comply with these CAA provisions, TVA retired more than 2.9 GW of old coal power plants (accounting for nearly 17 percent of its then-owned coal capacity),¹⁷⁷ installed pollution controls at more than 1.6 GW (accounting for nearly 10 percent of its then-owned coal capacity),¹⁷⁸ and made large investments in energy efficiency programs and clean energy projects.¹⁷⁹ The company also committed to retire, convert to gas, or install pollution controls at an additional 2.8 GW of older coal units—nearly 16 percent of its then-owned capacity. TVA ultimately retired these units due to MATS compliance requirements and other market dynamics (discussed below).

¹⁷⁵ Tennessee Valley Authority, TVA at a Glance, <https://www.tva.gov/About-TVA/TVA-at-a-Glance>.

¹⁷⁶ In the Matter of: Tennessee Valley Authority, Consent Agreement and Final Order, <https://www.epa.gov/sites/production/files/documents/proposedtva-cafo.pdf>.

¹⁷⁷ The Johnsonville plant will be fully retired by December 31, 2017.

¹⁷⁸ Scrubbers and SCRs will be installed at Shawnee 1 and 4 by December 31, 2017.

¹⁷⁹ Tennessee Valley Authority, SEC Filing 10-K Annual Report for Fiscal Year Ending Saturday, September 30, 2017, <https://www.last10k.com/sec-filings/tvc/0001376986-17-000031.htm#fullReport>.

TVA has also closed a substantial amount of coal-fired capacity in the last five years, driven by CAA standards, modest electricity demand growth and competition from gas. In November 2013, it announced that it was retiring an additional 3 GW (eight units) of coal capacity because investing in other resources was more cost-effective than upgrading those plants to comply with MATS (the planned retirements were in addition to the coal retirements included in the Environmental Agreements discussed above¹⁸⁰). These decisions followed detailed analyses, including an Environmental Assessment in 2013 that it titled “Mercury and Air Toxics Standards Compliance Project,” evaluating compliance options for its fifty-year-old Paradise Fossil Plant (PAF) in Kentucky.¹⁸¹ Since two of the plant’s units did not meet the rule’s Particulate Matter (PM) limit without installing additional controls, TVA evaluated how to comply with MATS while maintaining adequate reliable local generating capacity. The company considered installing additional PM emissions controls at the two units as well as multiple “outside the fence line” options, including replacing them with either a natural gas combined cycle plant at the site, a combination of transmission upgrades and energy efficiency, or increased renewable energy investments. The assessment found that adding on-site pollution controls at coal plants were not the most cost-effective approaches. The TVA Board decided that replacing the two coal units with a new gas plant was the best long-term solution when all the benefits and risks were considered.

Similarly, at its Colbert and Widows Creek coal plants in Alabama, TVA was under agreement with the EPA to either install additional environmental controls, retire the units, or convert the units to gas. The company’s economic evaluations indicated that investment in additional emission controls at these aging plants would not be as cost-effective as retiring the five units at the Colbert plant and the one remaining unit at Widows Creek.¹⁸² In fact, TVA estimated that retiring the units would avoid capital costs of \$1.01 billion at Colbert and \$163 million for controls at Widows Creek.¹⁸³ Based on its evaluation, TVA announced that the plants would retire by the time MATS would take effect.

To replace the retired coal generation and meet new demand, TVA invested in new gas and nuclear resources (including a 1,150 MW nuclear reactor at its Watts Bar plant in Tennessee), as well as renewable and energy efficiency resources. In fact, as the last Colbert unit was being

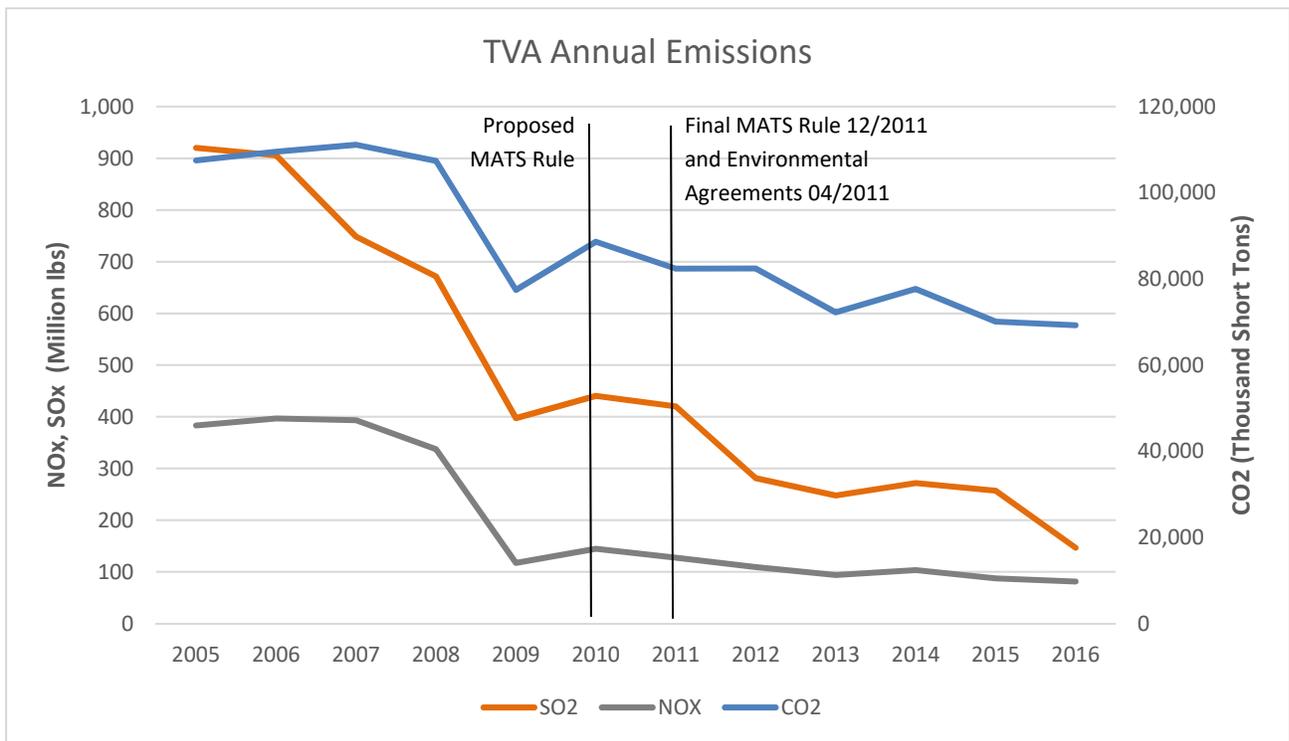
¹⁸⁰ U.S. EPA, Tennessee Valley Authority Clean Air Act Settlement (Apr. 14, 2011), <https://www.epa.gov/enforcement/tennessee-valley-authority-clean-air-act-settlement>.

¹⁸¹ Tennessee Valley Authority, Final Environmental Assessment: Paradise Fossil Plant Units 1 and 2 Mercury and Air Toxics Standards Compliance Project (Nov. 2013), https://www.tva.gov/file_source/TVA/Site%20Content/Environment/Environmental%20Stewardship/Environmental%20Reviews/Paradise%20Fossil%20Plant%20Units%201%20and%202/ParadiseFEA.pdf.

¹⁸² Tennessee Valley Authority, Colbert Fossil Plant Ends 61 Years of Electrical Generation, <https://www.tva.com/Newsroom/Colbert-Fossil-Plant-Ends-61-Years-of-Electrical-Generation>.

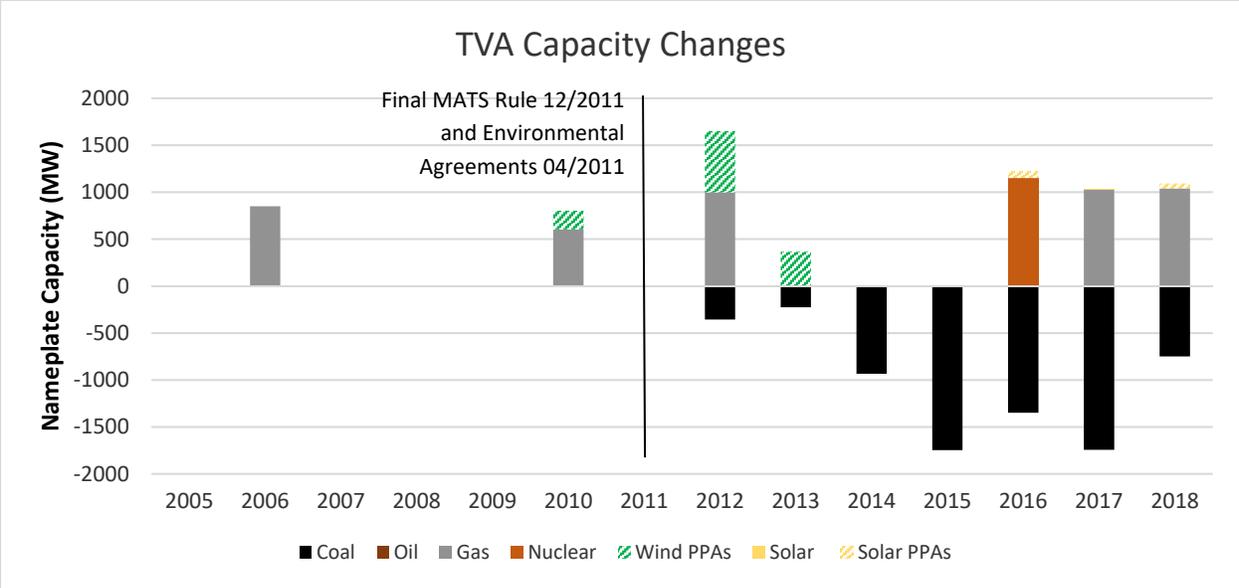
¹⁸³ *TVA to shut down coal units at Widows Creek, Colbert, Paradise*, TIMES FREE PRESS (Nov. 14, 2013), <http://www.timesfreepress.com/news/local/story/2013/nov/14/tva-shifts-more-gas-less-goal/124144/>.

taken offline, TVA pointed out that it would be purchasing the power produced by an 80 MW solar farm under construction across the river from the fossil plant.¹⁸⁴ TVA's transition to a cleaner energy portfolio is reflected in its emissions trends. Between 2011 and 2013 alone, TVA cut its SO₂ emissions by more than 40 percent, and by the end of 2016, SO₂ emissions were 65 percent lower than 2011 levels. This is the product of both coal plant retirements and investments in pollution controls under the Environmental Agreements.¹⁸⁵ TVA has been able to cost-effectively replace the retired coal generation with lower-emitting and non-emitting resources. Carbon emissions fell by more than 15 percent over the same time period, as TVA retired more than 5,000 MW of coal, added new gas and nuclear capacity, and increased its efficiency investments and renewables power purchases.



¹⁸⁴ Russ Corey, *Last Colbert Fossil Plant unit taken offline*, TIMES DAILY (Mar. 25, 2016), http://www.timesdaily.com/news/last-colbert-fossil-plant-unit-taken-offline/article_8bcea7ad-8aba-5f85-a7e1-41633f1da706.html.

¹⁸⁵ U.S. EPA, *Tennessee Valley Authority Clean Air Act Settlement* (Apr. 14, 2011), <https://www.epa.gov/enforcement/tennessee-valley-authority-clean-air-act-settlement>.



Appendix C: Reliability and Jobs Impacts

The Repeal Proposal's assertions about the reliability and jobs impacts of the Clean Power Plan are not factually supported.

C.1. The Clean Power Plan can be implemented and maintain reliability.

In the proposed repeal, Administrator Pruitt asserts that the Clean Power Plan “did not adequately ensure the national interest in affordable, reliable electricity, including from coal generation.”¹⁸⁶ The Repeal Proposal, however, provides no evidence to support this assertion. An agency's factual assertions must have a rational basis and be supported by evidence to withstand legal scrutiny; conclusory statements are not entitled to deference because they are not, in fact, exercises of agency expertise. Without underlying evidentiary or analytical support, conclusory assertions offer no foundation on which a court can properly defer to the agency.¹⁸⁷ That is the case here.

The Clean Air Act is intended to reduce pollution and protect public health and the environment.¹⁸⁸ Agency decisions under the statute – including determinations of BSER under Section 111 – must be based on relevant factors, including taking into account “the cost of achieving such reduction” and “energy requirements.” These factors, however, do not include protecting any specific form of generation from market forces or pollution control needs. The Administrator cannot choose to protect coal incumbents for political or other reasons that are not relevant under the Clean Air Act and that run counter to its purposes and structure.¹⁸⁹

In choosing the Clean Power Plan BSER, EPA was well aware of and heeded the Clean Air Act's requirement to “tak[e] into account...energy requirements.”¹⁹⁰ The changes anticipated from the Clean Power Plan – shifts from higher-emitting generation to lower- and zero-emitting generation – have been ongoing for years without posing any problems in the reliability of the

¹⁸⁶ 82 Fed. Reg. at 48,038.

¹⁸⁷ *Keyspan-Ravenswood v. FERC*, 474 F.3d 804, 812 (D.C. Cir. 2007); *see also Chem. Mfrs. Ass'n v. EPA*, 28 F.3d 1259, 1265 (D.C. Cir. 1994) (conclusory statements imply that the agency is committed to a path regardless of the facts).

¹⁸⁸ 42 U.S.C. § 7401(b)(1).

¹⁸⁹ *See Am. Petroleum Inst. v. EPA*, 706 F.3d 474, 479 (2013) (“EPA expressly viewed the data... toward “promoting growth” in the cellulosic biofuel industry....[S]uch a purpose has no basis in the relevant text of the Act.”); *see also Sierra Club v. Costle*, 657 F.2d 298, 409 (D.C. Cir. 1981) (“Political considerations are improper when they force an agency to make decisions based on factors not relevant to the applicable statute.”); *see also Motor & Equipment Mfrs. Assn. v. EPA*, 627 F.2d 1095, 1116 (D.C. Cir. 1979) (“An administrative agency has no charter apart from the framework constructed by that analysis to enforce or otherwise consider whatever suits its or someone else's fancy.”).

¹⁹⁰ 42 U.S.C. § 7411(a)(1).

electricity system.¹⁹¹ Indeed, the electric system incorporates various features that ensure reliability, including extensive planning, monitoring, and assessment requirements, mandatory reliability standards, and numerous remedies to address local or regional issues.¹⁹² In addition to this proven system, EPA meticulously designed the Clean Power Plan to ensure reliable electric generation, providing layers of protection and built-in redundancy to ensure against any possible compromises to the grid.

First, EPA engaged in extensive consultation with agencies responsible for maintaining reliability, including FERC and DOE.¹⁹³ This engagement included four technical conferences and a commitment to continue coordinated efforts throughout the Clean Power Plan's implementation.¹⁹⁴ Second, the compliance period does not commence until seven years after finalization of the rule and provides power plants with a long and forgiving averaging period within which to achieve the required emission reductions.¹⁹⁵ Third, the Clean Power Plan allows states to prescribe differing standards of performance on a plant-by-plant basis provided that the state's plan ensures that the fleet as a whole will satisfy the Clean Power Plan's emission reduction targets. As such, the Clean Power Plan allows for accommodation based on each state's unique circumstances.¹⁹⁶ States also have the flexibility to formulate compliance plans that suit their needs, including rate-based, mass-based, multi-state, and trading formats.¹⁹⁷ Fourth, states are required to demonstrate that their compliance plan considered reliability issues before EPA grants its approval.¹⁹⁸ Fifth, states have the option to propose amendments to approved plans in the event of an unanticipated and significant reliability challenges.¹⁹⁹ Finally, the rule provides a reliability safety valve for individual sources that take effect if the plant's requirements under the state plan are inconsistent with maintaining reliability.²⁰⁰

The Clean Power Plan thus affords a broad array of options for states to use to help ensure against reliability problems. During the rulemaking process, EPA modeled various illustrative

¹⁹¹ 80 Fed. Reg. at 64,874.

¹⁹² Craig Aubuchon, *et al.*, Analysis Group, *Electric System Reliability and EPA's Clean Power Plan: Tools and Practices* at ES-1 (2015), Docket No.EPA-HQ-OAR-2013-0602-37015 (“the standard reliability practices that industry and its regulators have used for decades are a strong foundation from which any reliability concerns about the Clean Power Plan will be addressed”).

¹⁹³ 80 Fed. Reg. at 64,671.

¹⁹⁴ *Id.* at 64,671, 64,874.

¹⁹⁵ *Id.* at 64,671.

¹⁹⁶ *Id.*

¹⁹⁷ *Id.*

¹⁹⁸ *Id.*

¹⁹⁹ *Id.*

²⁰⁰ *Id.*

plan approaches and found that under each scenario, “implementation of [the Clean Power Plan] can be achieved without undermining resource adequacy or reliability.”²⁰¹ The agency reiterated this finding in its 2017 reconsideration denial when it concluded that “no approach to meet the final requirements need interfere with the ability of [the] sector to meet electricity demand.”²⁰² Nothing in the agency’s repeal proposal undermines – or even addresses – this conclusion.

The DOE Staff Report to the Secretary of Electricity Markets and Reliability – released on August 23, 2017 in response to Secretary of Energy Rick Perry’s order to assess electricity markets and reliability in the face of the dynamic changes occurring within the U.S. power sector – reaffirmed that competition from lower- and zero-emitting resources have been the major driver behind coal retirements and the decline in coal generation.²⁰³ The report also found that electric reliability remains strong.²⁰⁴ This conclusion is consistent with voluminous literature and evidence that concludes there are no signs of deteriorating reliability on the grid today, and that continued growth in cleaner resources is fully compatible with sustained reliability. The North American Electric Reliability Corporation’s (NERC) 2017 State of Reliability report found that over the past five years the trends in planning reserve margins were stable while other reliability metrics were either improving, stable, or inconclusive.²⁰⁵ NERC also found that bulk power system resiliency to severe weather continues to improve.²⁰⁶ PJM Interconnection, which has recently experienced both significant coal retirements and new deployment of clean energy resources, found that “the expected near-term resource portfolio is among the highest-performing portfolios and is well equipped to provide the generator reliability attributes.”²⁰⁷ A wide range of literature further indicates that high renewable penetration scenarios are possible without compromising grid reliability. According to the Brattle Group, grid operators have been

²⁰¹ EPA, Technical Support Document: Resource Adequacy and Reliability Analysis at 2 (Aug. 2015), Docket No. EPA-HQ-OAR-2013-0602-36847.

²⁰² EPA, Basis for Denial of Petitions to Reconsider and Petitions to Stay the Clean Power Plan at 129 (citing Sarah K. Adair, *et al.*, Nicholas Institute for Environmental Policy Solutions, Duke University, *The Clean Power and Electricity Demand: Considering Load Growth in a Carbon-Constrained Economy* (Jan. 2016)).

²⁰³ DOE, Staff Report to the Secretary on Electricity Markets and Reliability (Aug. 2017), https://energy.gov/sites/prod/files/2017/08/f36/Staff%20Report%20on%20Electricity%20Markets%20and%20Reliability_0.pdf.

²⁰⁴ *Id.*

²⁰⁵ North American Electric Reliability Corporation, State of Reliability 2017 (June 2017), http://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/SOR_2017_MASTER_20170613.pdf.

²⁰⁶ *Id.*

²⁰⁷ PJM Interconnection, PJM’s Evolving Resource Mix and System Reliability (Mar. 2017), <http://www.pjm.com/~media/library/reports-notices/special-reports/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx>.

developing mechanisms to encourage greater operational flexibility to better integrate renewables while maintaining cost-effective and reliable electric service.²⁰⁸

Studies also show that cleaner resources and new technologies being added to the system have, in combination, most if not all the reliability attributes provided by retiring coal-fired generation and other resources exiting the system and can indeed enhance reliability.²⁰⁹ In fact, the evolving resource mix that includes the retirement of aging coal-fired capacity and the addition of new lower- and zero-emitting capacity can increase system reliability from a number of perspectives. For instance, available data indicates that forced and planned outage rates for renewable and natural gas technologies can be less than half of those for coal.²¹⁰ Renewable resources also help hedge against fuel supply and price volatility, contributing to increased resilience. Indeed, clean energy resources have demonstrated their ability to support reliable electric service at times of severe stress on the grid. In the 2014 polar vortex, for example, frozen coal stockpiles led to coal generation outages, while wind and demand response resources were increasingly relied upon to help maintain reliability.²¹¹ More recently in 2017, wind energy contributed critical power during Hurricane Harvey, while W.A. Parish, one of America's largest coal plants, was forced to shutter two of its units after its coal piles were flooded.²¹² Thus, an approach that seeks to block transition to cleaner and renewable energy in order to protect coal threatens to *reduce* – not enhance – reliability.

Comments from a diverse array of stakeholders opposing the DOE Grid Resiliency Pricing Rule proposal, issued on September 29, 2017, further bolster the record that the shift away from coal-fired generation towards cleaner resources enhances grid reliability.²¹³ Contrary to the body of

²⁰⁸ Chang *et al.*, The Brattle Group, Advancing Past “Baseload” to a Flexible Grid: How Grid Planners and Power Markets Are Better Defining System Needs to Achieve a Cost-Effective and Reliable Supply Mix (June 2017), http://www.brattle.com/system/publications/pdfs/000/005/456/original/Advancing_Past_Baseload_to_a_Flexible_Grid.pdf?1498246224.

²⁰⁹ Hibbard *et al.*, Analysis Group, Electricity Markets, Reliability and the Evolving U.S. Power System at Figs. 27-28 (June 2017), http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/ag_markets_reliability_final_june_2017.pdf (showing the reliability effects of a generation mix increasingly reliant on RE and gas).

²¹⁰ *Id.*

²¹¹ PJM Interconnection, Analysis of Operational Events and Market Impacts During the January 2014 Cold Weather Events (May 2014), <http://www.pjm.com/~media/library/reports-notice/weather-related/20140509-analysis-of-operational-events-and-market-impacts-during-the-jan-2014-cold-weather-events.ashx>.

²¹² Benjamin Storrow, *Flooded Texas Coal Piles Dampen Reliability Arguments*, CLIMATEWIRE (Sept. 29, 2017), <https://www.eenews.net/climatewire/2017/09/29/stories/1060062093>.

²¹³ See, e.g., Comments of MISO Transmission Owners, RM-18 (Oct. 23, 2017); Comments of ISO New England, Inc., RM18-1 (Oct. 23, 2017); Comments of Bipartisan Former FERC Commissioners, RM18-1 (Oct. 19, 2017); Multistate Comments of Attorneys General, State Agencies and State Consumer

evidence in its own Staff Report on Electricity Markets and Reliability, the DOE proposal asked FERC to intervene in wholesale markets to keep coal and nuclear plants online, arguing that certain units with 90-day on-site fuel provide necessary reliability and resiliency services.²¹⁴ The DOE proposal was both procedurally and substantively deficient and failed to articulate any reliability benefit or resiliency service tied to on-site fuel supply.²¹⁵ Commenters observed that, given technological advancements, new variable renewable generation can provide essential reliability services including voltage support, fast frequency response, and dynamic reactive power. In fact, in some cases, the bulk power system recovery performance is expected to be faster with high levels of variable generation and low levels of thermal plant generation as compared to today's system.²¹⁶ A detailed examination of outages by Rhodium Group demonstrated that on-site fuel supply is not correlated with reliability. According to Rhodium Group, only 0.00007 percent of disturbances over the past five years were due to fuel supply problems and only 0.00858 percent were due to generation inadequacy.²¹⁷ Additionally, Rhodium Group found no evidence of any relationship between the generation share of coal and nuclear and the frequency or duration of outages experienced.²¹⁸ Rhodium Group also found that there is no relationship between the share of variable renewable generation and the frequency or duration of outages; in other words, there is no evidence to support the claim that renewables growth is eroding overall system reliability.²¹⁹ In fact, Rhodium Group notes that utilities in balancing authorities²²⁰ with the highest share of renewable energy generation experienced the fewest outages in terms of both frequency and duration.²²¹

Advocates, RM18-1 (Oct. 23, 2017); Comments of Advanced Energy Management Alliance, RM18-1 (Oct. 23, 2017); Comments of Public Interest Organizations, RM18-1 (Oct. 23, 2017).

²¹⁴ DOE, Grid Resiliency Pricing Rule, 82 Fed. Reg. 46,940 (Oct. 10, 2017).

²¹⁵ See, e.g., Comments of Public Interest Organizations, RM18-1 (Oct. 23, 2017); Reply Comments of Michael Milligan, RM18-1 (Nov. 7, 2017).

²¹⁶ See, e.g., Reply Comments of Michael Milligan, RM18-1 (Nov. 7, 2017).

²¹⁷ Houser *et al.*, Rhodium Group, The Real Electricity Reliability Crisis (Oct. 3, 2017), <http://rhg.com/notes/the-real-electricity-reliability-crisis>.

²¹⁸ Larsen *et al.*, Rhodium Group, Electric System Reliability: No Clear Link to Coal and Nuclear (Oct. 23, 2017), <http://rhg.com/notes/doe-nopr-ferc-comments>.

²¹⁹ *Id.*

²²⁰ A balancing authority is the responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a balancing authority area, and supports interconnection frequency in real time. A balancing authority area is the collection of generation, transmission, and loads within the metered boundaries of the balancing authority. See North American Electric Reliability Corporation, Glossary of Terms Used in NERC Reliability Standards (Sep. 2014), https://library.e.abb.com/public/f091b8ae9dec300f85257d6500660234/pa_Stand_Glossary-2.pdf.

²²¹ *Id.*

Consistent with this evidence, FERC rejected the DOE proposal, finding that the proposal did not satisfy the “fundamental legal requirements under section 206 of the [Federal Power Act].”²²² According to FERC, “the extensive comments submitted by the RTOs/ISOs do not point to any past or planned generator retirements that may be a threat to grid resilience.”²²³

In light of these findings, it is clear that EPA’s vague statements of concern over maintaining reliability do not withstand scrutiny. The extensive literature and evidence, as well as the many layers of reliability protection included in the Clean Power Plan, demonstrate that the agency’s earlier position remains correct: the Clean Power Plan poses no risk to grid reliability. The agency’s attempt to justify its Clean Power Plan repeal proposal based on reliability concerns finds no support in fact record, and is yet another reason why this proposal is arbitrary and capricious.

C.2. The Clean Power Plan spurs jobs in lower-emitting sectors.

In the Repeal Proposal, the Administrator makes claims regarding the Clean Power Plan’s effects on employment and suggests that the opportunity to avoid disruptions to labor markets is a potential benefit of repealing the program. The proposal avers that “employment effects are not experienced uniformly across the population and may be offset by new opportunities in different sectors.”²²⁴ It contends those who lose jobs in weak labor markets may have difficulty finding new employment or equivalent earnings, and that “involuntary job loss may increase risk to health, of substance abuse, and even mortality.”²²⁵ By repealing the Clean Power Plan, the proposal suggests, these negative effects can be avoided.

While the employment impacts of any regulation should be taken seriously, EPA fails to acknowledge the flexibilities the Clean Power Plan includes to mitigate job loss. The Clean Power Plan provides states with significant flexibilities to design their state plan in ways that reduce employment impacts. EPA also encouraged states to consider these effects in order to ensure that workers and communities in coal country affected by the transition to clean energy benefit from the implementation of the Clean Power Plan.²²⁶

²²² Federal Energy Regulatory Commission, Order Terminating Rulemaking Proceeding, Initiating New Proceeding, and Establishing Additional Procedures (January 8, 2018). The Order terminates the DOE proposal proceeding and instead initiates a new proceeding to develop a common understanding of resilience that would enable a more holistic examination of the resilience of the bulk power system including transmission and distribution system impacts.

²²³ *Id.*

²²⁴ 82 Fed. Reg. at 48,049.

²²⁵ *Id.*

²²⁶ 80 Fed. Reg. at 64,928, 64,670.

In developing the Clean Power Plan, EPA modeled illustrative plan approaches and found that while there may be job losses associated with coal extraction and generation, new jobs associated with improving fossil fuel-fired power plant efficiency, construction and operation of new natural gas-fired power plants and renewable energy production, and demand-side energy efficiency are expected to far exceed such losses.²²⁷ In particular, increases in demand-side energy efficiency jobs (full-time or part-time) in 2030 could range from 52,000 to 83,000.²²⁸

Egregiously, the Administrator offers no evidence of the overall economic effect that he claims would result from repealing the Clean Power Plan. In fact, the Clean Power Plan would bolster the clean energy economy, which is strong and growing. In 2016, in expressing their support for the Paris Agreement, over 1,000 U.S.-based companies and investors, representing over \$1.2 trillion in revenues, declared that “failure to build a low-carbon economy puts American prosperity at risk.”²²⁹ The energy efficiency industry now supports 2.2 million U.S. jobs, and there are over 260,000 jobs in the solar industry, as well as over 100,000 jobs in the wind industry.²³⁰ The Bureau of Labor Statistics recently estimated that the employment categories of solar panel installer and wind turbine technician would be the fastest growing jobs in the economy over the next decade.²³¹

By sending a clear signal to investors and power companies, the Clean Power Plan would accelerate growth in the clean energy sector. EPA ignores the potential for economic growth that it would forego by repealing the Clean Power Plan. In June 2017, Environmental Entrepreneurs released an analysis demonstrating that the Clean Power Plan could have added up to 560,000 net jobs and \$52 billion in net economic value in 2030.²³² In its proposal to repeal the Clean Power Plan, the EPA is passing up an opportunity to drive economic gains by supporting the growing clean energy economy.

²²⁷ *Id.* at 64,881.

²²⁸ *Id.*

²²⁹ Rona Fried, *Corporations Tell Trump: We Are Deeply Committed to Addressing Climate Change*, SUSTAINABLEBUSINESS.COM (Nov. 17, 2016), <http://www.sustainablebusiness.com/corporations-tell-trump-deeply-committed-addressing-climate-change/>.

²³⁰ DOE, 2017 U.S. Energy and Jobs Report (Jan. 2017), https://energy.gov/sites/prod/files/2017/01/f34/2017%20US%20Energy%20and%20Jobs%20Report_0.pdf.

²³¹ Bureau of Labor Statistics, Occupational Outlook Handbook: Fastest Growing Occupations, <https://www.bls.gov/ooh/fastest-growing.htm> (last modified Oct. 24, 2017).

²³² Environmental Entrepreneurs, Opportunity Lost: How Rolling Back the Clean Power Plan Hurts America’s Economy (June 2017), <https://www.e2.org/wp-content/uploads/2017/06/FINAL-CPP-jobs-report-6.21.17.pdf>.