Comments of the U.S. Chamber of Commerce, American Fuel & Petrochemical Manufacturers, National Lime Association, Aluminum Association, ConservAmerica, and American Chemistry Council

EPA New Source Performance Standards For Greenhouse Gas Emissions From New, Modified, And Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines For Greenhouse Gas Emissions From Existing Fossil Fuel-Fired Electric Generating Units; And Repeal Of The Affordable Clean Energy Rule
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I. Executive Summary

The undersigned associations—U.S. Chamber of Commerce, American Fuel & Petrochemical Manufacturers, National Lime Association, Aluminum Association, ConservAmerica, and American Chemistry Council (collectively "commenters")—strongly support effective, durable efforts to reduce greenhouse gas emissions while maintaining an efficient and stable national electric grid.

The U.S. Chamber of Commerce ("Chamber") is the world's largest business federation. The Chamber represents approximately 300,000 direct members and indirectly represents the interests of more than three million companies and professional organizations of every size, in every industry sector, and from every region of the country. As such, the reliability and affordability of electricity are important issues to our members, including those members who own and operate the facilities that are directly regulated by EPA's proposed rule.

American Fuel & Petrochemical Manufacturers (AFPM) is the leading trade association representing fuel producers that keep Americans moving, petrochemicals that are essential building blocks for modern life, and midstream companies connecting our safe and efficient supply chain. In addition to actively pursuing emissions reductions from their operations, our members are increasingly investing in lower carbon fuels and plastics circularity. We are committed to sustainably manufacturing and delivering affordable and reliable fuels and petrochemicals that power our transportation needs and enable our nation to thrive.

AFPM members are impacted by the outcome of this rulemaking because EPA is legally obligated to establish new source performance standards covering greenhouse gas (GHG) emissions for petroleum refineries after finalizing this proposal. Of particular concern is the

Proposal's conclusion that carbon capture and storage and co-firing of low-GHG hydrogen is adequately demonstrated as the best system of emission reduction for CO_2 emissions from power plants.

The National Lime Association (NLA) is the trade association for manufacturers of high calcium quicklime, dolomitic quicklime, dead-burned dolomitic lime, and hydrated lime, collectively referred to as "lime." Lime provides cost-effective solutions to many of society's manufacturing and environmental needs. Lime is an important ingredient in many other manufacturing processes and industries. It is used in the steel manufacturing process, road building, and the creation of other building products like mortar and plaster. Lime is also a critical component in environmental compliance for many industries, as it is used to purify water and scrub air pollutants from stack emissions. Lime is used by electric utilities to abate air emissions of pollutants under the Clean Air Act.

The Aluminum Association is the voice of the US aluminum industry and represents suppliers of primary aluminum, aluminum recyclers, producers of fabricated aluminum products, and industry related businesses. The industry's economic output directly generates $70 billion in economic output and indirectly generates an additional $102 billion. The continued availability of reliable and cost-effective electricity is key to the overall health and economic growth of the US aluminum industry and the effects of this rulemaking on the aluminum industry have the potential to be far-reaching.

ConservAmerica is a non-profit organization dedicated to pursuing market-based, fiscally responsible solutions to our nation's most pressing environment and energy challenges. Toward that end, ConservAmerica develops and supports policies that are grounded in the principles of

free markets, the rule-of-law, private property rights, subsidiarity, and cooperative federalism. ConservAmerica engages policymakers and the public through a variety of fora, including in major agency rulemakings impacting air and water pollution, the development and deployment of advanced energy sources, wildlife conservation, and access to public lands and waters.

ACC represents a diverse set of companies engaged in the business of chemistry, an innovative, $517 billion enterprise, driving innovation through investments in research and development (R&D) that exceed $11 billion annually, providing 537,000 skilled, good-paying jobs—plus over 4.1 million related jobs[1]. The business of chemistry operates by creating complex chemical reactions requiring large amounts of process heat and power, making reliable access to affordable energy and feedstocks essential to the industry's current and long-term competitiveness. ACC members also provide critical chemistries, materials, and products used in the sourcing, manufacture, production, and deployment of lower emissions technologies and infrastructure across the US and global economies – including but not limited to abatement solutions under consideration in this proceeding. In short, chemical manufacturers are affected as energy users, climate technology providers, and, indirectly climate technology takers.

We support a broad range of policy actions to accelerate emissions reductions, including investments in research, development, and deployment of a host of technologies, including carbon capture and storage ("CCS") and hydrogen. To facilitate a lower carbon emissions economy, the commenters lead efforts to support the enactment of permitting reforms that

[1] ACC delivers value to our members through advocacy, using best-in-class member engagement, political advocacy, communications, and scientific research to foster progress in our economy, environment, and society.

would address extensive delays to build much needed infrastructure to support the energy transition, such as transmission lines, renewable energy projects, pipelines, and much more.

At the same time, regulations addressing these issues must be based on realistic, credible assumptions and must comply with the law. Progress must be made consistent with technological feasibility and commercial availability to ensure a safe, reliable, and affordable energy supply to the country at a time when EPA is also proposing to significantly increase electricity demand through the mandated transition to electric vehicles, the continued growth and electrification of U.S. manufacturing fostered under the Administration, and the buildout of the hydrogen economy envisioned by the EPA as a significant new electricity resource. EPA's proposal, however, relies on a putative best system of emission reduction (BSER) that has not been consistently demonstrated in existing power plants today, and faces challenges that may not be fully contemplated by the proposed rule. A system that does not have a proven track record is not "adequately demonstrated" today and cannot serve as the basis for projecting the emergence of best systems in the future. Moreover, the information that EPA does provide as the basis for its projections about the future only confirms that the systems on which the proposal is based have not been adequately demonstrated.

Section 111 of the Clean Air Act (CAA), the authority for this proposal, has been subject to significant litigation since its adoption in 1970, reaching the Supreme Court again just last year in *West Virginia v. EPA*, 142 S. Ct. 2587 (2022). Justice Kagan's dissent in *West Virginia* captured certain key "meaningful constraints" that section 111 places on EPA's authority to determine the BSER—that is, EPA must "take into account costs and nonair impacts, and make sure that the best system *has a proven track record*." *Id*. at 2629 (Kagan, dissenting) (emphasis added). In the

proposed rule, EPA exceeded its authority under section 111 by requiring systems that have no "track record" at all for power plants, much less a proven one.

The two primary technologies that EPA proposes as integral to its BSER, clean hydrogen co-firing and carbon capture and storage (CCS), are not operating at any power plant in the United States—and even though technically possible in isolation, these BSER options cannot be made to operate at U.S. power plants within the timeframes contemplated in the proposal. This is evidenced, in part, by prior attempts to commercialize carbon capture technologies at power plants, which were abandoned or shut down due to technical challenges and economics. EPA's proposed BSER also includes substantial components that are "outside the fence," *i.e.*, not subject to the control of any individual source owner/operator and cannot be applied to or at any individual source, all requirements that EPA once disclaimed authority to impose under section 111 in the 2020 Affordable Clean Energy ("ACE") Rule, 84 Fed. Reg. 32,520 (July 8, 2019), which it now proposes to repeal. EPA has not reasonably and persuasively explained why it how has authority to impose these requirements.

In addition to these fundamental issues, EPA has also failed to appropriately account for the costs of the proposal and other critical nonair quality and energy impacts such as reliability impacts to the nation's energy grid amid a period of increasing electricity demand and multiple regulatory and other pressures that are driving increasing levels of generation retirements. If the nation's energy system is to benefit from these emerging low carbon solutions, EPA must provide an honest and transparent accounting of the costs of shifting vast amounts of generation over a short time horizon. EPA's latest release of its integrated planning model (IPM) results on July 7,

2023, only one month before comments are due, contains inherent contradictions and appears to vastly underestimate the cost of CCS and hydrogen deployment.

In effect, EPA's proposal is another attempt to use section 111 to restructure the nation's electric grid through "generation shifting" to its preferred sources of electric generation. This is evidenced clearly by the proposal to require the retirement of sources that cannot comply using undemonstrated technologies by the proposed deadlines. EPA lacks authority to propose standards under section 111 that are so lacking in achievability, and so expensive, that fossil fueled power plants must shutter prematurely. Forced closures cannot be the best system of emissions reduction for existing power plants. Because exercising authority in this manner is contrary to the CAA and to the Supreme Court's decision in *West Virginia v. EPA*, EPA should withdraw the proposed rule, and should repropose legally sound and durable regulations to address EGU GHG emissions.

II. Background

A. Clean Air Act section 111

The CAA establishes three primary regulatory programs to control air pollution from stationary sources such as power plants. First, section 109 of the Act establishes the National Ambient Air Quality Standards (NAAQS), and section 110 in turn establishes a program to implement the NAAQS that addresses air pollutants that "may reasonably be anticipated to endanger public health or welfare," and "the presence of which in the ambient air results from numerous or diverse mobile or stationary sources." 42 U.S.C. § 7408(a)(1). Second, the Hazardous Air Pollutants program under section 112 targets pollutants, other than those already covered by NAAQS, that present "a threat of adverse human health effects." *Id.* § 7412(b)(2).

The third set of programs, and the one at issue here, is the group of programs established under section 111 for both new and existing sources. *Id.* § 7411. The New Source Performance Standards provision requires EPA to list "categories of stationary sources" that it determines "cause[], or contribute[] significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare." *Id.* § 7411(b)(1)(A). Under section 111(b), the Agency must then promulgate "[f]ederal standards of performance for new [and modified] sources." *Id.* § 7411(b)(1)(B). A standard of performance is one that "reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the [EPA] administrator determines ***has been*** adequately ***demonstrated***." *Id.* § 7411(a)(1) (emphasis added).

Section 111 also addresses emissions limits for existing sources. Under section 111(d), once EPA "has set new source standards addressing emissions of a particular pollutant under . . . section 111(b)," 80 Fed. Reg. 64,711, it must then address emissions of that same pollutant by existing sources if they are not already regulated under the NAAQS or HAP programs. *Id.* § 7411(d)(1). In doing so, EPA determines the BSER, and States must then submit "plan[s]" setting "standards of performance" for the individual sources in the State, *id.* § 7411(a)(1), (d)(1), pursuant to a "procedure" described in "emissions guidelines." 40 C.F.R. Part 60, Subpart Ba. The State's "standards of performance" must "reflect[]" the "degree of emission limitation achievable" through application of the EPA-determined BSER, but States are authorized to tailor the standards to reflect a facility's remaining useful life and other factors. *Id.* § 7411(d)(1). As the Supreme Court noted in *West Virginia,* section 111(d) is an ancillary provision of the CAA, and EPA has used it only a handful of times since enactment of the statute in 1970. *See* 80 Fed. Reg. at 64,703 & n.275; *West Virginia*, 142 S. Ct. at 2602.

B. The Clean Power Plan

In 2015, EPA promulgated a rule that determined that the BSER for existing coal-fired power plants under section 111(d) included a requirement that such facilities either (1) reduce their own production of electricity; or (2) subsidize increased generation by natural gas, wind, or solar sources. 80 Fed. Reg. 64,661 (Oct. 23, 2015) ("Clean Power Plan" or "CPP"). EPA identified three building blocks that constituted the BSER: (1) heat rate improvement; (2) increased utilization of natural gas-fired plants; and (3) shifting to renewable generation. EPA then identified three ways that a power plant operator could implement building blocks 2 or 3: (1) by reducing the regulated plant's production of electricity; (2) by building a new gas plant, wind

farm, or solar installation, or by investing in someone else's existing facility to increase generation there; or (3) by purchasing emission allowances or credits as part of a cap-and-trade regime. *Id.* at 64,731.

EPA considered, and rejected, including CCS as part of the BSER for existing coal-fired power plants. *Id*. at 64,727–78. The agency did so "[b]ecause there are lower-cost systems of emission reduction available to reduce emissions from existing plants." *Id.* at 64,883–84.

EPA then determined "the degree of emission limitation achievable through application" of the generation shifting system designated as the BSER. EPA projected that by 2030, it would be feasible for coal to provide 27% of national electricity generation, a substantial reduction. *Id.* at 64,665, 64,940. In the preamble, EPA characterized the rule as "generation shifting from higher-emitting to lower-emitting" producers of electricity. *Id.* at 64,728.

The CPP, however, never went into effect. The same day that EPA promulgated the rule, dozens of parties petitioned for review in the D.C. Circuit. After the D.C. Circuit declined to stay the CPP, the Supreme Court granted a stay preventing the rule from taking effect. *West Virginia v. EPA*, 577 U.S. 1126 (2016).

C. EPA's repeal of the Clean Power Plan

In 2019, after a change in presidential administrations and before the D.C. Circuit could decide on the merits of the legal challenges, EPA repealed the Clean Power Plan. 84 Fed. Reg. 32,520 (July 8, 2019). In doing so, EPA explained that generation shifting could not be considered the BSER because section 111 "limits the BSER to those systems that can be put into operation at a building, structure, facility or installation," such as "add-on controls" and "inherently lower-emitting process/practices/designs" to constitute BSER. *Id.* at 32,524. Rather than setting a

standard "based on the application of equipment and practices at the level of an individual facility," the CPP based BSER on "a shift in energy generation mix at the grid level." *Id.* at 32,523. EPA also concluded that the CPP's generation-shifting measures triggered application of the "major questions doctrine" under which courts expect clear congressional authorization when an agency decides matters of vast economic and political significance. *Id.* at 32,529 (citing *Util. Air Regul. Grp. v. EPA*, 573 U.S. 302, 324 (2014)). EPA determined that a clear statement authorizing the CPP was necessary because billions of dollars of economic impact were anticipated from generation shifting, because no section 111 rule had ever been based on generation shifting, and because reading the statute to authorize generation shifting would empower EPA to wholly restructure the energy sector. *Id.* EPA found that far from providing clear authorization, Congress had expressly precluded use of measures such as generation shifting. *Id.*

In the same rulemaking, EPA promulgated a different section 111(d) rule, the Affordable Clean Energy ("ACE") Rule. *Id.* at 32,532. EPA determined that the BSER for emissions of CO_2 from existing coal-fired EGUs consisted of only building block one from the Clean Power Plan—a combination of equipment upgrades and operating practices that would improve facilities' heat rates ("heat rate improvement" or "HRI"). *Id.* at 32,522, 32,537. In that rule, EPA again rejected CCS as the BSER, explaining that "[t]he high cost of CCS, including the high capital costs of purchasing and installing CCS technology and the high costs of operating it, including high parasitic load requirements," precluded adopting it as BSER. *Id.* at 32,548.

D. The Supreme Court's decision in *West Virginia v. EPA*

A number of states and private parties filed petitions for review challenging EPA's repeal of the CPP and its enactment of the replacement ACE Rule in the D.C. Circuit. A divided D.C. Circuit

panel held that EPA's repeal of the CPP was based on a fundamental misreading of section 111 that foreclosed generation shifting as a "system of emission reduction." *Am. Lung Ass'n v. EPA*, 985 F.3d 914, 995 (D.C. Cir. 2021). The panel also held that the major questions doctrine did not apply. *Id.* at 959–68. Accordingly, the court vacated the repeal of the CPP and the ACE Rule and remanded to EPA. *Id.* at 995.

After the D.C. Circuit's decision, another change in presidential administrations took place. EPA then requested, and the D.C. Circuit granted, a partial stay of the mandate to ensure that the Clean Power Plan would not go back into effect while EPA was considering issuing a new rule. *West Virginia*, 142 S. Ct. at 2606. States and other interested parties defending the repeal of the CPP appealed the D.C. Circuit's decision to the Supreme Court.

In *West Virginia v. EPA*, the Supreme Court reversed the judgment of the D.C. Circuit, holding that EPA had been correct to repeal the CPP because section 111 does not authorize EPA to set emission standards based on a generation-shifting approach. 142 S. Ct. at 2616. The Supreme Court explained that EPA "had never devised a cap by looking to a 'system' that would reduce pollution simply by 'shifting' polluting activity from dirtier to cleaner sources." *Id.* at 2610. Instead, prior to 2015, EPA had always set emission limits under section 111 based on application of measures that would cause regulated sources to operate more cleanly. *Id.* The Court concluded that CPP effected a fundamental revision of the statute, from a paradigm limited to ensuring the efficient pollution performance of each individual regulated source to a paradigm based on requiring coal plants to shift away from coal or even to cease operation altogether. *Id.* at 2612. The Supreme Court rejected the CPP based on the major questions doctrine, finding that Congress did not provide "clear congressional authorization" for EPA to engage in a "generation

shifting approach" to determine the "best system of emission reduction" under section 111 of the CAA. As the Court explained, "section 111(d) empowers EPA to guide States in 'establish[ing] standards of performance' for 'existing sources,' § 7411(d)(1), not to direct existing sources to effectively cease to exist." *West Virginia*, 142 S. Ct. at 2612 n.3.

In her dissent, joined by Justice Breyer and Justice Sotomayor, Justice Kagan wrote that in her view, section 111 broadly authorized EPA to select the "best system of emission reduction" for power plants. *Id.* at 2628 (Kagan, J., dissenting). Justice Kagan noted that section 111(d) "imposes . . . a set of constraints … that would preclude [an] extreme … regulation" such as one that forces "coal plants to 'shift' away virtually all of their generation—i.e., to cease making power altogether." *Id.* at 2639 (Kagan, dissenting). According to Justice Kagan, "EPA hasn't forced the elimination of coal plants—whether through technological controls or generation shifting—because the statutory constraints prevent it from doing so." *Id.* at 2639 n.7 (emphasis added). These "constraints" include, Justice Kagan explained, the requirement for EPA to "take into account costs and nonair impacts, and make sure that the best system has *a proven track record*." *Id.* at 2629 (emphasis added).

E. EPA's current proposal

On May 23, 2023, EPA published in the Federal Register a notice of proposed rulemaking (NPRM) that proposes standards for new and reconstructed combustion turbines under section 111(b) and requirements for existing sources under section 111(d). 88 Fed. Reg. 33,240 (May 23, 2023). In addition, the NPRM proposes the repeal of the ACE Rule. *Id.*

1. EPA's proposed standards for new and reconstructed combustion turbines under section 111(b)

EPA is proposing NSPS for combustion turbines that commence construction or reconstruction after the date of publication in the Federal Register of the proposed rulemaking. *Id.* at 33,277. The proposal asserts authority to subcategorize these units into three subcategories: low load, intermediate load, and base load units. *Id.*

- The low load (or "peaking units") subcategory consists of combustion turbines with a capacity factor less than 20%. *Id.* at 33,244. For these units, EPA is proposing that the BSER is the use of lower emitting fuels such as natural gas and distillate oil with standards of performance ranging from 120 lb CO_2/MMBtu to 160 lb CO_2/MMBtu, depending on the type of fuel combusted. *Id.* at 33,244, 33,325.

- The intermediate load subcategory consists of combustion turbines with a capacity factor between 20% and a source-specific upper bound that is based on the design efficiency of the combustion turbine. *Id.* at 33,244. The BSER for these units would consist of two phases. For phase one, the unit must use highly efficient simple cycle combustion turbine technology with an associated standard of 1,150 lb CO_2/MWh-gross by the date that the rule is promulgated. *Id.* at 33,324. EPA proposes that the second phase include a BSER of co-firing 30% by volume low-GHG hydrogen by 2032 with an associated standard of 1,000 lb CO_2/MWh-gross. *Id.* at 33,325.

- The base load subcategory consists of combustion turbines that operate above the upper-bound threshold for intermediate turbines. *Id.* at 33,244. The proposed BSER for these units also consists of two phases. Phase one further breaks down the subcategory into larger base load combustion turbines (those with a base load rating of 2,000 MMBtu/h or more) and

smaller base load combustion turbines (those with a base load rating of less than 2,000 MMBtu/h), and in both cases requires compliance by the date the rule is promulgated. *Id.* For larger units, the first phase BSER would be highly efficient combined cycle technology with an associated standard of 770 lb CO_2/MWh-gross. *Id.* For smaller units, the first phase standard would range from 770 to 900 lb CO_2/MWh-gross depending on the specific base load rating of the combustion turbine. *Id.* The second phase under the proposal consists of two pathways. The first pathway is use of CCS to achieve a 90% capture of CO_2 with an associated standard of 90 lb CO_2/MWh-gross by 2035. *Id.* at 33,244–45. The second pathway involves co-firing of 30% by volume low-GHG hydrogen with an associated standard of 680 lb CO_2/MWh-gross by 2032 and ramping up to 96% by volume low-GHG hydrogen co-firing with an associated standard of 90 lb CO_2/MWh-gross by 2038. *Id.* at 33,244–45. EPA seeks comment on whether to finalize both pathways as separate standards of performance or to finalize one pathway with the option of meeting the standard of performance using either system of emission reduction. *Id.* at 33,277.

EPA is proposing to define low-GHG hydrogen as hydrogen produced through a process that results in a GHG emission rate of less than .45 kg CO_2/kg H2. *Id.* at 33,315.

2. EPA's proposed requirements under section 111(d) for existing sources

EPA also proposes emission guidelines for GHG emissions from existing fossil fuel-fired stationary combustion turbines under section 111(d). EPA proposes that BSER for large, frequently used combustion turbines, those larger than 300 MW with a capacity factor greater than 50 percent, is based on either (1) 90% capture of CO_2 using CCS by 2035, or (2) co-firing of 30% by volume low-GHG hydrogen beginning 2032 and co-firing 96% by volume low-GHG hydrogen beginning in 2038. 88 Fed. Reg. at 33,245–46. EPA is not proposing a BSER for small

combustion turbines, which it identifies as those below 300 MW or with a capacity factor less than 50% but solicits comment on BSER options. *Id.* at 33,246.

For existing coal-fired EGUs, EPA is proposing to further divide the subcategory based on the date by which the EGU commits to permanently cease operations. *Id.* at 33,344. For each subcategory, compliance would be required to be achieved by 2030. *Id.*

- "Imminent term" units are those that both (1) have elected to commit to permanently cease operations prior to January 1, 2032, and (2) elect to make that commitment federally enforceable by having it included in a state plan. *Id.* at 33,344. "Near term" units would be those that both (1) have elected to commit to permanently cease operations by December 31, 2034, as well as to adopt an annual capacity factor limit of 20%, and (2) elect to make both conditions federally enforceable by having them included in a state plan. *Id.* For both of these categories, EPA is proposing that the BSER is routine methods of operation and maintenance, resulting in an associated degree of emission limitation of no increase in emission rate. *Id.* at 33,377–78.

- For "medium-term" units, those that commit to permanently cease operations after December 31, 2031, and before January 1, 2040, EPA is proposing that the BSER is co-firing 40% natural gas on a heat input basis. The associated degree of emission limitation is a 16% reduction in emission rate (lb CO_2/MWh-gross basis). *Id.* at 33,376.

- For "long-term" units, those that plan to operate beyond December 31, 2039, or have not elected to commit to permanently ceasing operations as part of a state plan, EPA is proposing a BSER requiring the use of CCS with 90% capture of CO_2. *Id.* The associated degree of emission limitation is an 88.4% reduction in emission rate (lb CO_2/MWh-gross basis). *Id.*

III. Discussion

A. EPA has not met the statutory standard required to set these technologies as BSER.

As noted, the commenters strongly support the reduction of power sector carbon emissions consistent with the timeframe for the development and commercialization of the technologies necessary to support the continued reliability and affordability of electricity supplies. That is why the commenters have been some of the most vigorous supporters of investments in the research and development of a number of technologies, including renewables, hydrogen, and carbon capture and storage. The commenters have also emphasized their support for a broad range of tax incentives and other programs and policies created by the Bipartisan Infrastructure Law and Inflation Reduction Act ("IRA"). Moreover, to support the eventual deployment of these technologies at scale, the commenters are advocating with a wide range of stakeholders to encourage the adoption of the ambitious permitting reforms that are necessary to address the delays that currently hinder the building of pipelines, transmission lines, renewable projects, and many other types of critical infrastructure.

Although government policies can help drive innovation in this area, rulemakings must be based on realistic assumptions and facts rather than speculation and unsupported projections. *See Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (to comply with the Administrative Procedure Act, "the agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made'"). Moreover, administrative agencies must act within their statutory authority. 5 U.S.C. § 706 (agency action is unlawful if it is "in excess of statutory jurisdiction [or] authority"); *City of Arlington, Tex. v. FCC*, 569 U.S. 290, 297 (2013). For the

reasons below, EPA's proposed rule fails to comply with the standards required for rulemaking under the Administrative Procedure Act and would exceed the EPA's statutory authority under CAA section 111.

1. EPA's proposed technologies, whether considered individually or as a whole, have not been "adequately demonstrated."

EPA fails to show that its proposed system is "adequately demonstrated" as required under section 111. 42 U.S.C. § 7411(a)(1). An "adequately demonstrated" system must be commercially "available" to be "install[ed] in new plants," *Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375, 391 (D.C. Cir. 1973), "reasonably reliable, reasonably efficient," *Essex Chem. Corp. v. Ruckelshaus*, 486 F.2d 427, 433 (D.C. Cir. 1973), and not "unreasonably costly," *Sierra Club v. Costle*, 657 F.2d 298, 384 (D.C. Cir. 1981). EPA cannot select a system that is "purely theoretical or experimental." *Essex Chem. Corp.*, 486 F.2d at 433–34. Nor can EPA base its decision on "mere speculation or conjecture" that a system will emerge that is commercially available and technologically feasible for all regulated sources nationwide. *Lignite Energy Council v. EPA*, 198 F.3d 930, 934 (D.C. Cir. 1999) (per curiam). That means EPA cannot justify its standard based on only "prototype" or "pilot scale" demonstration facilities. *Sierra Club*, 657 F.2d at 341 n.157.

Indeed, as Justice Kagan explained recently in her dissent in *West Virginia v. EPA*, EPA must "make sure the best system has a *proven* track record." 142 S. Ct. at 2629 (Kagan, J., dissenting) (emphasis added). The U.S. Government has recognized the same, explaining that "any emission reduction system that isn't already in place and successful within an industry can't be used" for setting performance standards. Tr. Of Oral Arg. At 61, *West Virginia v. EPA*, No. 15-1363 (D.C. Cir. Sept. 27, 2016); see also Tr. Of Oral Arg. At 79, *West Virginia v. EPA*, No. 20-1530 (S. Ct. Feb. 28, 2022) ("part of EPA's task here is to see what is adequately demonstrated, *what*

is the power sector already doing to control emissions") (emphasis added); *id.* at 89-90 ("First, EPA has to determine that the standard is adequately demonstrated, or the system is adequately demonstrated. And I think that answers the concern about EPA just restructuring the industry. Instead, it looks at *what the sector is already doing* as the baseline.") (emphasis added); *id.* at 99 (indicating that "adequately demonstrated" means "what the industry is already doing to control pollution").

a) EPA fails to meet the "adequately demonstrated" standard for CCS.

EPA claims that it can set CCS as BSER because it would be requiring compliance at a future date. 88 Fed. Reg. at 33,272–73. But EPA has not shown that its chosen system "has a proven track record" in the industry—or even that it will have "a proven track record" in the industry by the time compliance would be required. Notwithstanding the significant promise that CCS holds for decarbonizing hard-to-abate industrial sectors, such promising—but not yet "adequately demonstrated"—technologies do not satisfy CAA section 111's requirements.

The CCS facilities described in the proposal experienced significant problems and in no case were able to achieve the emission standards that EPA now proposes to impose upon a significant portion of our generation fleet. For example, EPA claims that the 40-MW slipstream capture facility operated by Bellingham Energy Center in Massachusetts from 1991 to 2005 demonstrated the commercial viability of carbon capture on combined cycle combustion turbine EGUs. 88 Fed. Reg. at 33,292. That is not the case. In the DOE document that EPA cites to support this claim, DOE itself recognized that carbon capture for natural gas systems "ha[s] not been proven at full scale." *Id*. at 33,292 n.252 (citing DOE, *Carbon Capture Opportunities for Natural Gas Fired Power Systems*, https://www.energy.gov/fecm/articles/carbon-capture-opportunities-

natural-gas-fired-power-systems ("DOE Natural Gas Carbon Capture Report")). Rather, as DOE explained, "key issues" remain with respect to the technology that must be resolved before "future wide-scale commercial deployment" is available. DOE Natural Gas Carbon Capture Report at 4.

EPA also relies on the proposed 900-MW Peterhead Power Station combined cycle EGU, which would be located in Scotland, but that project is still in the planning stages and is not expected to become operational, even assuming no delays, until the end of this decade. *Id.* Similarly, EPA relies on a project in West Virginia that has only been "announced," and is not expected to begin operation until later this decade, assuming the unlikely scenario of no delays. *Id.* With respect to the SaskPower Boundary Dam project relied upon heavily in EPA's proposal, that project has been plagued with technical challenges related to carbon capture equipment and has never consistently sustained 90% CO_2 capture rates. In a report cited by EPA in its proposal, the authors included a chart indicating that Boundary Dam achieved 90% CO_2 capture during a few very brief periods over a five-year period (2014-2019). More troubling, EPA's proposal fails to address ongoing problems at the facility, such as those detailed in a 2022 article from S&P Global reporting that "the seven-year-old facility's carbon capture rate in 2021 was less than 37% of the official target of 90%."[2]

Based on our calculations of publicly disclosed data by the operator of Boundary Dam, the facility has averaged a carbon capture rate of less than 50% over the last eight quarters

[2] S&P Global, *Only still-operating carbon capture project battled technical issues in 2021* (Jan. 6, 2022), available at https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/only-still-operating-carbon-capture-project-battled-technical-issues-in-2021-68302671.

leading up to Q2 2022.[3] This is consistent with the findings of another recent report, which found that "Boundary Dam 3, the only active carbon capture project in the power sector worldwide, has captured less than its pre-specified target by a wide margin (about 50%)."[4] Contrary to EPA's claim, Boundary Dam Unit 3 is strong evidence that CO_2 capture at 90% has *not* been adequately demonstrated.

Transformative nationwide rulemakings of this magnitude should not be based on misleading or biased interpretations of data. EPA must present an objective summary disclosing the plant's operational cost and performance details from its opening in 2014 through the time of the proposal. EPA claims that CCS is "adequately demonstrated" within the power sector based on the foregoing examples, but also suggests that projects receiving government grants, loan guarantees, and Federal tax credits for "clean coal technology" under the Energy Policy Act of 2005 support this claim. *Id.* at 33,292–93. But none of these projects involve actual implementation of CCS technology; they are more like "pilot" or "prototype" studies and cannot be used to meet the "adequately demonstrated" standard, *Sierra Club*, 657 F.2d at 341 n.157; 88 Fed. Reg. at 33,293. For instance, EPA relies on the Petra Nova facility despite acknowledging it has now been idled for over three years. Like the SaskPower project, the Petra Nova CO_2 capture project "suffered chronic mechanical problems" and "missed its carbon capture targets by about 17%."[5] According to another report by the Institute for Energy Economics and Financial Analysis,

[3] Estimated based on operational summaries reported over the last eight quarters on the SaskPower.com blog. Available at https://www.saskpower.com/about-us/Our-Company/Blog.

[4] Bruce Robertson and Milad Mousavian, Institute for Energy Economics and Financial Analysis, *The Carbon Capture Crux: Lessons learned* at 47 (Sept. 1, 2022), available at https://ieefa.org/resources/carbon-capture-crux-lessons-learned.

[5] Nichola Groom, Reuters, *Problems plagued U.S. CO2 capture project before shutdown* (Aug. 2, 2020), available at https://www.reuters.com/article/usa-energy-carbon-capture/problems-plagued-u-s-co2-capture-project-before-shutdown-doe-document-idUKL1N2F82TE.

Petra Nova's shutdown highlights the current financial risks associated with developing CCS.[6] Although EPA claims "there are reports of plans to restart the capture system," it does not identify when that restart is expected to begin. *Id.* And with respect to a CCS project at Plant Barry in Alabama, EPA assumes, without support, that the small scale (25 MW) CCS project can be replicated on a large scale nationally, 88 Fed. Reg. at 33,293, despite numerous pipeline repurposing and infrastructure challenges. *Infra* pp. 17–23. In all events, the problems experienced with even these limited pilot studies are evidence that CCS is ***not*** demonstrated for purposes of CAA section 111 today. While we remain optimistic that continued public and private investment, IRA funding, and accompanying permitting reforms will support the advancement and ultimate demonstration of CCS systems, many obstacles must be first overcome before the technology can build a proven track record of demonstration necessary to be the BSER.

EPA also fails to meet the section 111 requirements for the sequestration part of CCS for two reasons. First, EPA's citation to natural geologic storage of CO_2 is inapplicable given that section 111 is about "available technology." 88 Fed. Reg. at 33,294–95. Second, with respect to saline injection facilities, EPA points to facilities that are "under development," including pointing to a number of Underground Injection Control (UIC) Class VI geologic sequestration well permit applications that EPA is currently reviewing. *Id.* at 33,295.

EPA fails to establish that proper geologic formations necessary to support saline sequestration are widespread and located near the location of existing plants. EPA claims that "[a]t least 37 States have geologic characteristics that are amenable to deep saline sequestration,

[6] Bruce Robertson and Milad Mousavian, Institute for Energy Economics and Financial Analysis, *The Carbon Capture Crux: Lessons learned* at 42 (Sept. 1, 2022), available at https://ieefa.org/resources/carbon-capture-crux-lessons-learned.

and an additional 6 States are within 100 kilometers of potentially amenable deep saline formations." 88 Fed. Reg. at 33,297. But that is far from establishing that the necessary saline reservoirs and geologic formations are near existing plants or that the infrastructure to take advantage of those formations exists in sufficient capacity and will work. Moreover, according to DOE's Carbon Atlas, nearly half the states in the United States have very little or no assessed geologic storage potential.[7] For example, 10 states have functionally zero carbon storage (Arizona, Delaware, Idaho, Iowa, Maine, Massachusetts, Minnesota, Missouri, New Jersey and Wisconsin). An additional four States have very low amounts of storage capacity (Maryland, New York, Tennessee and Virginia) so as to make geologic sequestration in these states unlikely in the absence of nearby interstate CO_2 pipelines, and six more States have so little carbon storage capacity or interest that DOE did not assess their storage capacity in its most recent Carbon Atlas (Connecticut, Hawaii, Nevada, New Hampshire, Rhode Island and Vermont).

EPA contends that unmineable coal seams provide another potential option for geologic CO_2 sequestration. 88 Fed. Reg. at 33,297. But EPA acknowledges that sequestration in unmineable coal seams has been demonstrated only in "small-scale demonstration projects." *Id.* When conducted at large scale, EPA indicates that the process can lead to swelling of coal, which could pose serious environmental and safety issues. *Id.*

In support of its assertion that the cost of CCS for new combined cycle units is reasonable, EPA relies primarily on the IRC Section 45Q tax credit even though it is far from clear that the tax credit will have the impact that EPA anticipates. *Id.* And even EPA recognizes that there are temporal limits to the availability of these credits, which means that they may not be available

[7] NAT'L ENERGY TECH. LAB'Y, CARBON STORAGE ATLAS 111 (5th ed. 2015).

for the life of a given project. Furthermore, if electricity transmission cannot be expanded faster than historical growth (about 1% per year), the increasing demand from electric vehicles and other electrification spurred by the IRA results in over 110 million tons of additional coal consumption in 2030 as compared with a scenario without the IRA.[8]

An essential component of CCS is the pipeline system needed to transport pressurized CO_2 from the generating facility to a sequestration site. According to EPA, 20,000 to 25,000 additional miles of pipeline are needed to capture over 1 billion metric tons of CO_2 emissions from large coal and gas EGUs per year. 88 Fed. Reg. at 33,369. EPA asserts that such build-out is feasible because the domestic CO_2 pipeline network has "steadily expanded and appears primed to continue to do so." *Id.* at 33,293. But EPA acknowledges that only 5,339 miles of CO_2 pipelines currently exist in the U.S., which is only a "13 percent increase in CO_2 pipeline miles since 2011." *Id.* at 33,294. As a result, within the last 12 years only 50 miles of CO_2 pipelines have been constructed per year on average. At that rate, only 350 miles of additional CO_2 pipeline would be constructed by 2030, falling well short of the 20,000 to 25,000 miles that EPA indicates are necessary, *Id.* at 33,369. EPA offers no reason for concluding that pipeline construction will take off over the next seven years to get to 20,000 to 25,000 miles. In addition, EPA ignores the many significant regulatory, technological, and logistical constraints that would delay or even halt construction of such a vast CO_2 pipeline network by 2030, as explained below.

(1) **Opposition to CO_2 pipelines.** The few CO_2 pipelines that are currently in development have faced significant litigation hurdles and public and stakeholder opposition,

[8] Princeton University, Zero Lab, *Electricity Transmission is Key to Unlock the Full Potential of the Inflation Reduction Act*, at 4, https://repeatproject.org/docs/REPEAT_IRA_Transmission_2022-09-22.pdf (Sept. 2022).

resulting in delays. EPA fails to adequately address these considerations. Although EPA claims that "several major projects have recently been announced to expand the CO_2 pipeline network across the U.S.," it cites just two examples—the Midwest Carbon Express and the Heartland Greenway. *Id.* at 33,294. Like many pipeline projects, Midwest Carbon (2,000 miles of proposed CO_2 pipeline through Iowa, Nebraska, North Dakota, South Dakota and Minnesota) and Heartland Greenway (1,300 miles of proposed CO_2 pipeline through Iowa, Nebraska, South Dakota, Minnesota, and Illinois) faced opposition from property owners, environmental groups, and other stakeholders.[9] As of 2022, Midwest Carbon had secured easements covering just 2% of its 700 mile route through Iowa.[10] And in Minnesota, regulators recently voted to require the pipeline to undergo an extensive environmental impact statement, which is "the most thorough environmental review [available] under state law."[11] Despite EPA's claim that the Midwest Carbon pipeline "is projected to begin operations in 2024," 88 Fed. Reg. at 33,294, pipeline construction has not begun.[12]

As support for the feasibility of building 20,000 to 25,000 miles of CO_2 pipeline by 2030, EPA points to the buildout of 25,000 miles of natural gas pipelines between 1997 and 2008. 88

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[9] David Velaquez, *New group voices concerns over Summit's CO2 pipeline, launches petition*, The Bismarck Tribune (Apr. 12, 2023), available at https://bismarcktribune.com/news/local/new-group-voices-concerns-over-summits-co2-pipeline-launches-petition/article_d036f82e-d96d-11ed-b433-27f90677e6bf.html; Mike Soraghan, E&E News , *Midwest CO2 pipeline rush creates regulatory chaos* (Mar. 3, 2023), available at https://www.eenews.net/articles/midwest-co2-pipeline-rush-creates-regulatory-chaos/; Leah Douglas, Reuters, *U.S. carbon pipeline faces setback as residents refuse to cede land rights* (Mar. 9, 2023), available at https://www.reuters.com/world/us/us-carbon-pipeline-faces-setback-residents-refuse-cede-land-rights-2023-03-09/.

[10] Leah Douglas, Reuters, *U.S. Midwest carbon pipeline has secured less than 2% of key Iowa route*, filings show (Mar. 8, 2022), available at https://www.reuters.com/business/environment/us-midwest-carbon-pipeline-has-secured-less-than-2-key-iowa-route-filings-show-2022-03-08/.

[11] Mike Hughlett, StarTribune, *Minnesota regulators vote to require environmental impact statement for CO2 pipeline* (Jan. 5, 2023), available at https://www.startribune.com/minnesota-regulators-will-require-environmental-impact-statement-for-co2-pipeline/600241081/.

[12] *Id.*

Fed. Reg. at 33,369. Additional pipeline capacity is needed—both to support a strong domestic energy posture and to facilitate the BSER options now proposed by EPA, but recent natural gas pipeline experience demonstrates that the buildout of pipeline capacity faces significant hurdles that may delay progress. According to the Energy Information Administration ("EIA"), 44 proposed natural gas pipeline projects have been placed on hold or cancelled within the past five years.[13] And the trend is the same for CO_2 pipelines. In a 2022 report, the Congressional Research Service noted that CO_2 pipeline developers repeatedly "face opposition among affected landowners and advocacy groups," often struggling to secure "agreements with landowners for pipeline rights-of-way through their properties."[14] Certain representatives of environmental justice communities recently vowed to stop the build-out of CCS infrastructure "in the permitting stage."[15] Without landowner agreements, "developers may . . . secure property rights through eminent domain authority," but CO_2 pipeline "siting authorities, landowner rights, and eminent domain laws reside with the states and vary from state to state, so securing rights-of-way for interstate projects is not guaranteed."[16]

The recent opposition to pipeline projects is a significant challenge that EPA must consider. As the New York Times explained in an article entitled "*Is This the End of New Pipelines?*," "pipeline projects are being challenged as never before as protests spread,

[13]Energy Information Agency, Natural Gas Pipeline Projects, available at https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.eia.gov%2Fnaturalgas%2Fpipelines%2FEIA-NaturalGasPipelineProjects.xlsx&wdOrigin=BROWSELINK.

[14] Congressional Research Service (CRS), Carbon Dioxide Pipelines: Safety Issues (June 3, 2022), available at https://crsreports.congress.gov/product/pdf/IN/IN11944.

[15] Timothy Puko, Washington Post, *Why these environmentalists are resisting part of Biden's climate push*, (June 25, 2023), available at https://www.washingtonpost.com/nation/2023/06/22/biden-carbon-capture-climate-environmentalists/.

[16] Congressional Research Service (CRS), *Carbon Dioxide Pipelines: Safety Issues* (June 3, 2022), available at https://crsreports.congress.gov/product/pdf/IN/IN11944.

economics shift, environmentalists mount increasingly sophisticated legal attacks and more states seek to reduce their use of fossil fuels to address climate change."[17] One lawyer from Earthjustice recently announced that "the era of multibillion dollar investment" in pipelines is "over" and that all pipeline projects are destined to fail "legally and economically in light of local opposition." *Id.* And in March 2023, Sierra Club's Iowa director said that "[l]andowners are remaining united, holding out and not signing easements," and that he has "every reason to think we'll stop all . . . of these pipelines."[18]

For these and other reasons, the CRS concluded just last year that (1) opposition "may prevent CO_2 pipeline development in certain localities and increase development and costs in others"; and (2) the "actual or perceived risks associated with CO_2 pipelines may limit the potential of CCS as a greenhouse gas mitigation option."[19] And in 2015, the Department of Energy explained that "the development of a national CO_2 pipeline network capable of meeting proposed CO_2 emissions goals may require a more organized approach and much closer cooperation among federal, state, and local governments than is currently in place."[20]

Although EPA's environmental justice discussion addresses some of the objections to CO_2 pipelines themselves, EPA ignores the fact that opposition to CO_2 pipelines, whether justified in

[17] Hiroko Tabuchi & Brad Plumer, New York Times, *Is This the End of New Pipelines?* (Jan. 18, 2020),available at https://www.nytimes.com/2020/07/08/climate/dakota-access-keystone-atlantic-pipelines.html.

[18] Kari Lydersen, Energy News Network, *Pipeline developer says Illinois carbon sequestration sites could be just the beginning,* (March 2, 2023), available at https://energynews.us/2023/03/02/pipeline-developer-says-illinois-carbon-sequestration-sites-could-be-just-the-beginning/.

[19] Congressional Research Service (CRS), Carbon Dioxide Pipelines: Safety Issues (June 3, 2022), available at https://crsreports.congress.gov/product/pdf/IN/IN11944.

[20] U.S. Department of Energy, A Review of the CO_2 Pipeline Infrastructure in the U.S. (Apr. 21, 2015), available at https://www.energy.gov/sites/prod/files/2015/04/f22/QER%20Analysis%20-%20A%20Review%20of%20the%20CO2%20Pipeline%20Infrastructure%20in%20the%20U.S_0.pdf

some instances or not, is likely to cause significant delays. Instead, EPA suggests that the "design and implementation of CO_2 transport and storage can be completed within 5 years." 88 Fed. Reg. at 33,372. But EPA fails to cite one example of a CO_2 pipeline project that has been permitted, constructed, and operational within that timeframe. Indeed, the two projects that EPA does cite—Midwest Carbon Express and Heartland Greenway have not even commenced construction, let alone received all necessary authorizations to begin construction. EPA must adequately "consider [this] important aspect of the problem." *Motor Vehicle Mfrs. Ass'n of U.S., Inc.*, 463 U.S. at 43.

(2) **Regulatory and permitting challenges**. The design and construction of a CO_2 pipeline entails a lengthy regulatory process involving numerous agencies and other stakeholders. As an initial matter, there is not agreement as to which federal agency has regulatory authority over CO_2 pipelines. Although FERC is responsible for regulating the sale and transportation of natural gas, it has rejected the argument that it has responsibility for overseeing CO_2 pipelines, because high-purity CO_2 is not natural gas. *Cortez Pipeline Co.*, 7 F.E.R.C. ¶ 61,024 (1979). The Interstate Commerce Commission ("ICC") also rejected the argument that it had oversight of CO_2 pipelines, finding that CO_2 is ultimately transported as a gas and so is exempt from ICC regulation. *Cortez Pipeline Co.*, 45 Fed. Reg. 85,177 (1980). The General Accounting Office subsequently released a report finding that the oversight of CO_2 pipelines falls within the authority of the U.S. Department of Transportation's Surface Transportation Board ("STB"), the ICC's successor agency.[21] To date, the STB has not heard any case concerning the argument that

[21] United States General Accounting Office, Surface Transportation: Issues Associated With Pipeline Regulation by the Surface Transportation Board (Apr. 1998), available at https://www.gao.gov/assets/rced-98-99.pdf.

it has jurisdiction over CO_2 pipelines, leaving some uncertainty as to the STB's view of its authority. With respect to safety, CO_2 transportation pipelines are subject to oversight from the Pipeline and Hazardous Materials Safety Administration ("PHMSA"). CO_2 pipelines must also rely on state eminent domain frameworks.

A massive buildout of CO_2 pipeline infrastructure would give rise to countless regulatory and permitting challenges, often resulting in additional delay (or cancellation). Because no workable regulatory framework exists, proposed CO_2 pipeline projects are subject to a web of complicated federal and state regulatory and permitting requirements, which would vary based on the size and location of each section of pipeline. *See, e.g.*, Tara K. Righetti, *Siting Carbon Dioxide Pipelines*, 3 Oil & Gas, Nat. Resources & Energy J. 907 (2017). In many cases, a proposed CO_2 pipeline project will require review under the National Environmental Policy Act ("NEPA"). 42 U.S.C. § 4332(2). If the proposed pipeline could affect a listed endangered or threatened species or critical habitat, consultation with the U.S. Fish & Wildlife Service ("USFWS") would also be required. 16 U.S.C. § 1536(a)(2). In cases where the permitting agency determines that the pipeline is not likely to adversely affect listed species, the permitting agency may complete informal consultation and obtain concurrence from USFWS. 50 C.F.R. § 402.13. In those cases where the project is likely to result in adverse effects, the permitting agency must undertake formal consultation with USFWS, after which USFWS issues a biological opinion stating whether the permitting agency has ensured that its action is not likely to jeopardize the continued

existence of a listed species and/or result in the destruction or adverse modification of critical habitat. *Id.* § 402.14. This process often takes several years and can entail many complexities.[22]

Further, when a project has the potential to affect historic properties, another multi-year process can be required under the National Historic Preservation Act. When the relevant statutory threshold is met, the permitting agency must consult with the state historical preservation officer where the project is located, and when appropriate, interested Indian tribes or Native Hawaiian organizations and the Advisory Council on Historic Preservation, to identify historic properties, assess potential adverse effects of the project, and consider ways to mitigate any adverse effects. 36 C.F.R. §§ 800.3–800.6. Any adverse impacts must ultimately be resolved through a Memorandum of Agreement involving the consulting parties.

(3) **Logistical challenges.** The buildout of CO_2 pipeline infrastructure also faces numerous logistical challenges that EPA fails to consider. While the vast majority of the existing CO_2 pipeline network is located west of the Mississippi River, most sources that may require capture are sited east of the Mississippi River.[23] As a result, many facilities emitting carbon dioxide are nowhere near existing CO_2 pipelines or proposed sequestration sites, presenting significant logistical challenges.

Further, CO_2 pipelines present design and construction challenges that are different from other pipelines. It is not possible to simply convert existing natural gas pipelines into CO_2

[22] The Fish and Wildlife Service and the National Marine Fisheries Service have proposed three rules that, if made final, are likely to further limit and delay federal actions, including federal authorizations required in order for energy projects to progress. *See* 88 Fed. Reg. 40,742 (June 22, 2023), 88 Fed. Reg. 40,753 (June 22, 2023), and 88 Fed. Reg. 40,764 (June 22, 2023).

[23] U.S. Department of Energy, Siting and Regulating Carbon Capture, Utilization and Storage Infrastructure, 20 (Jan. 2017), available at https://www.energy.gov/fe/downloads/siting-and-regulating-carbon-capture-utilization-and-storage-infrastructure-workshop.

pipelines. CO_2 is transported at pressures ranging from 1,200 to 2,700 psi, which is significantly higher than the pressures used for the transport of natural gas. CO_2 pipelines thus use thicker walled pipe and often require additional linings, claddings, and coatings to manage corrosion. Not only does this mean that natural gas pipelines are unlikely to be converted to transport CO_2, but it may also be impossible to co-locate CO_2 pipelines near natural gas pipelines where the right-of-way is too narrow, in which case new rights-of-way would be required.

For all of these reasons, a rapid and massive expansion of new CO_2 pipeline infrastructure across the country, including all of the design, permitting, and construction work that goes into such an undertaking, may not be completed at all, much less in just a few years as EPA projects. The following maps show the pipeline infrastructure that exists today and the infrastructure that the cited Princeton University study expects to be constructed by 2050:[24]

[24] Princeton University, Net-Zero America: Potential Pathways, Infrastructure, and Impacts Final Report (Oct. 29, 2021), at 212–18, available at https://www.dropbox.com/s/ptp92f65lgds5n2/Princeton%20NZA%20FINAL%20REPORT%20%2829Oct2021%29.pdf?dl=0.

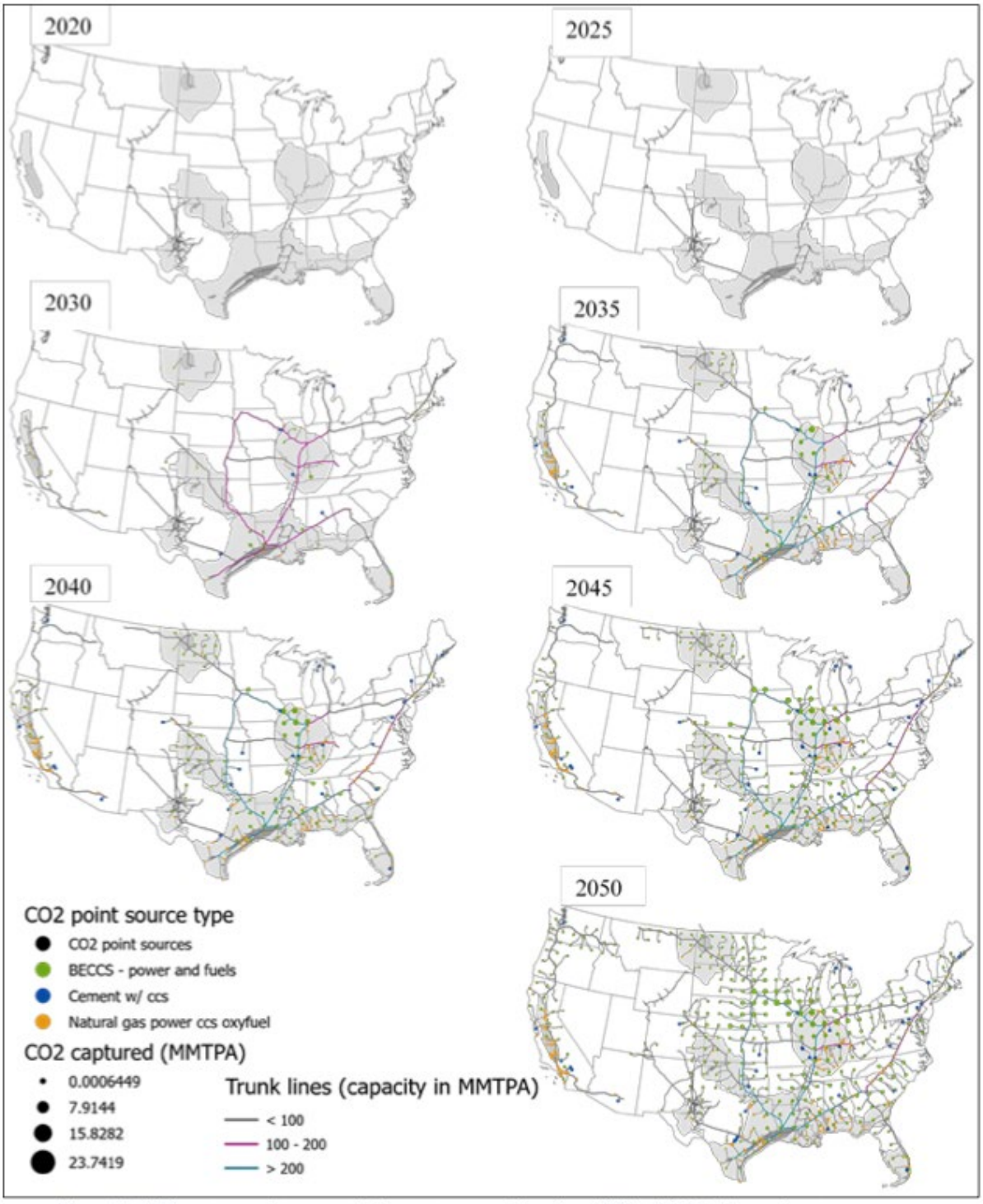


Figure 15 CO2 capture and transport infrastructure transition from 2020 to 2050 in 5-year timesteps

b) A low-GHG hydrogen co-firing system is also not adequately demonstrated.

EPA contends that some combustion turbine designs that can co-fire 30% hydrogen are currently available from multiple manufacturers in various sizes, and that implementation will therefore be feasible starting in 2032. 88 Fed. Reg. at 33,308. But EPA admits that existing combustion turbines have shown the ability to co-fire only up to 5 to 10 percent hydrogen, that hydrogen blends as high as 20 to 30 percent are only "being tested and demonstrated," and that "new turbine designs that can accommodate co-firing much greater percentages of hydrogen are being developed." *Id.* at 33,305. EPA highlights certain projects that plan to have hydrogen-ready combustion turbines, but EPA fails to cite any projects that are actually in commercial operation on a large scale in the utility sector. *Id.* at 33,305–08. EPA acknowledges that the ability of new sources to have access to sufficient volumes of low-GHG hydrogen for new sources to co-fire 30 percent by volume between 2030 and 2032, increasing for some base load sources to co-fire 96 percent by 2038 will depend on the deployment of additional low-GHG electric generation sources, the growth of electrolyzer capacity, associated infrastructure, and adequate market demand. Yet EPA fails to justify the assumption that any of these conditions is likely to arise by 2038, much less the assumption that all will do so. *Id.* The "adequately demonstrated" standard certainly requires more than the EPA's hope that all the necessary pieces to the proposed rule's second BSER will fall into place at some unknowable future time.

EPA finds that co-firing 30 percent hydrogen is technically feasible for new base load stationary combustion turbine EGUs by 2032, and that co-firing 96 percent hydrogen is technically feasible despite its own acknowledgment that most of the hydrogen projects in use are in the industrial sector, not the electric utility sector. *Id.* at 33,312. But EPA does not account

for the unique challenges that large scale hydrogen co-firing could pose across the public utility sector. Most of the hydrogen co-firing projects that EPA cites as examples are largely conceptual and have not yet been proven to have the impact that EPA suggests is possible under its proposal. *Id.* at 33,313.

For example, because a national hydrogen pipeline network does not exist and will not be constructed in the time allowed under EPA's proposal, EPA speculates that hydrogen could be simply injected into the existing U.S. natural gas pipeline system. 88 Fed. Reg. at 33,312 ("Existing natural gas infrastructure *may* be capable of accepting blends of hydrogen with modest investments.") (emphasis added). This claim is not true, as shown by the studies EPA itself cites in its proposal. In a 2022 study relied upon by EPA in its *Hydrogen in Combustion Turbine Electric Generating Units* Technical Support Document (*see, e.g.*, pp. 25-27), the California PUC determined that "[h]ydrogen has significantly different properties than methane including combustion properties and is known to have a degrading effect on a number of materials used in natural gas infrastructure."[25] The University of California identified several "major areas of concern" associated with hydrogen blending, including impacts on end-use appliances and safety implications; impacts (including degradation) on durability of the existing natural gas pipeline system; impacts on natural gas pipeline leakage rates; impacts on valves, fittings, materials, and welds due to hydrogen embrittlement; and impacts on natural gas storage facilities. *Id*. These many areas of concern led the California PUC to reject the "system-wide injection of clean

[25] University of California, Riverside for the CPUC, Hydrogen Blending Impacts Study (July 2022), available at https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-issues-independent-study-on-injecting-hydrogen-intonatural-gas-systems.

renewable hydrogen into California's … pipeline system," instead ordering additional extensive study and the development of pilot projects to evaluate standards for safe injection.

To the extent that EPA's proposal includes multiple "best system[s] of emission reduction," it violates section 111 of the CAA for an additional reason. In section 111(a), Congress made clear that EPA's authority to set a "standard of performance" was limited to selecting "*the best* system of emission reduction" that the agency determines "has been adequately demonstrated." To be sure, nothing in section 111 limits EPA from considering multiple systems as part of its evaluation, but section 111 (a) makes plain that EPA must ultimately select the single "best system" among the various options. As Justice Kagan explained *in West Virginia v. EPA*, EPA's "core command" under section 111 is to "find *the best system* of emission reduction." By failing to do so, EPA's proposal violates section 111 and must be reconsidered.

That section 111 limits EPA's authority to select the single "best system of emission reduction" among various options makes sense, as confirmed by the multiple problems created by EPA's proposal here. As just one example, EPA's proposal depends upon the buildout of massive infrastructure to accommodate EPA's proposals for CCS, hydrogen, and natural gas. Given that each option requires a dedicated system of pipelines within a short timeframe, EPA's proposal necessitates that thousands of miles of pipelines for CCS, hydrogen, and natural gas be constructed and operational *at the same time*. As discussed above, that scenario is simply not realistic and cannot be used as a reasonable basis for real-world regulation. By failing to select the one actual best system among various options (as opposed to a mélange of seemingly inconsistent possibilities), EPA's proposal creates an unworkable collection of potential

technologies, none of which "has been adequately demonstrated" or reflects the single "best system of emission reduction," as required by section 111.

c) EPA's reliance on systems that have not been "adequately demonstrated" effectively requires generation shifting.

EPA claims that any concerns over the lack of infrastructure will be addressed by funding available under the Inflation Reduction Act, and that all necessary pipeline and storage infrastructure for CCS will be built by 2030. This claim is not credible, as there is significant evidence to the contrary regarding existing infrastructure buildout times.[26] In any event, CAA section 111 requires performance standards based on technology that "has been"—not "will be" or "might be"—adequately demonstrated.

EPA's own modeling confirms that its proposed technologies have not been "adequately demonstrated." EPA's modeling for its proposed rule projects that virtually all operators of fossil generation would decline to implement the proposed technology required to meet the proposed emission reductions (*i.e.*, CCS, hydrogen co-firing, natural gas co-firing), and instead would shift generation to smaller or lower load gas-fired generation or renewable generation.[27] This acknowledgment illustrates that EPA's end goal is essentially generation shifting, and that the proposal indeed cannot work without such generation shifting.

In fact, EPA admitted as much. EPA characterized the proposal as having the effect of "shifting generation to lower-CO_2 emitting and non-affected EGUs" in earlier versions of the proposed rule that were released.[28] In the published proposal, however, that language was

[26] Congressional Research Service, *Carbon Capture and Sequestration (CCS) in the United States*, at 8 (Oct. 5, 2022), available at https://crsreports.congress.gov/product/pdf/R/R44902.

[27] Integrated Proposal Modeling and Updated Baseline Analysis, at Table 11; RIA, at 3-19–3-21.

[28] EPA, EO 12866 111 EGU 2060-AV09 and 2060-AV10 NPRM RIA 20230421 RLSO (Apr. 21, 2023), available at https://downloads.regulations.gov/EPA-HQ-OAR-2023-0072-0027/attachment_61.docx.

removed in response to inter-agency comments asking EPA to "avoid th[e] [generation shifting] verbiage."[29] Likewise, federal agency commenters on the draft proposal recognized that it "could be taken as generation shifting." While this verbiage was removed from the proposal in response to these comments, it does not appear that in response EPA made any substantive changes to remove the *de facto* generation shifting forced by its proposal.

2. EPA fails to show that its proposed systems are "best."

Section 111 instructs EPA to balance a number of factors in determining the "best system of emission reduction," including "the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements." 42 U.S.C. § 7411(a)(1). EPA also fails to meet that standard here.

The costs associated with EPA's proposed systems are exorbitant. The proposed rule, and its accompanying Regulatory Impact Analysis ("RIA"), do not adequately account for the costs of CCS, hydrogen, or the significant nationwide infrastructure networks necessary to facilitate the use of these technologies on power plants. Unfortunately, EPA's use of a black-box proprietary model makes it difficult, if not impossible, for commenters to understand how the proposed rule accounts for these costs, raising serious notice-and-comment issues under the Administrative Procedure Act (APA) and the CAA. What can be understood suggests that the modeling is not based on reasonable and appropriate assumptions.

[29] *Id.* EPA's contemporaneous rulemakings illustrate EPA's expectation that this rule will ensure shifting generation to renewables. The proposed Multi-Pollutant Emissions Standards for Model Year 2027 and Later Light-Duty and Medium-Duty Vehicles (LDV Rule), 88 Fed. Reg. 29,184, 29,303-304 (May 5, 2023), relies on the availability of renewable electricity by 2032 to justify that rule's environmental benefits. While EPA was careful to attribute increased renewable electricity to IRA *incentives*, *see id*. at 29,304, it is *this rule's* mandated generation shifting that allows EPA to count on those emissions reductions in the LDV rule.

With respect to CCS, technical assessments show that carbon capture technology has a significant parasitic power demand when deployed at power plants, making energy generation substantially less efficient. As EPA explains, "including a 90 percent or greater carbon capture system in the design of a new NGCC will increase the parasitic/auxiliary energy demand and reduce its net power output." 88 Fed. Reg. at 33,302. This means, for example, that an NGCC unit designed to provide 500 MWe-net of power would be de-rated by 11 percent (to a 444 MWe-net plant) with the installation of CCS. *Id.* EPA's solution to this problem is to insist that units can meet those demands by simply "scaling larger." *Id.* But EPA fails to explain how units can do so at the levels required or to examine the cost, energy and environmental impacts of so doing.

With respect to hydrogen, for example: in response to an interagency comment during review of the draft proposed rule, EPA acknowledged that "infrastructure needs associated with this level of hydrogen consumption are not accounted for within the modeling." This comment appears to suggest that IPM assigns no cost whatsoever to hydrogen infrastructure needs—a concern greatly exacerbated by the fact that EPA's July 7 updated modeling runs incorporating hydrogen co-firing and updated LNG export assumptions project a more than four-fold increase in hydrogen consumption as compared with the original RIA modeling.[30]

Additionally, hydrogen combustion has less thermal efficiency and is expensive to produce, making it a significantly less efficient form of energy generation than combusting 100% natural gas. For example, some have calculated that it would take multiple megawatts of power

[30] EPA, *Regulatory Impact Analysis* (May 2023), available at https://downloads.regulations.gov/EPA-HQ-OAR-2023-0072-0027/attachment_61.docx ("RIA").

from the grid to produce 1 MW of hydrogen power.[31] EPA's own proposal states that, in 2035, the rule would result in 70 Twh of hydrogen co-firing, which would require 108 Twh of electricity generation to produce. Incredibly, and as discussed later, EPA indicates that the costs and system demands associated with this 108 Twh of hydrogen production are "exogenous" to its IPM model, and therefore incur no costs.[32] Importantly, reliance on the Inflation Reduction Act funding does not offset these costs, because as explained, EPA overestimates the impact of the IRA, and in any event, is a temporary source of funding, which will ultimately shift costs to electricity customers. EPA also narrowly defines the subset of the IRA 45V qualified clean hydrogen that EPA would consider to meet its BSER and associated standards. Rather, EPA should allow all the IRA 45V qualified clean hydrogen (<4 kg CO2e/kg H_2), consistent with Congress's intent in enacting the IRA, to support emissions reductions across the power sector. EPA's treatment of this issue could create negative tension with the implementation of the 45V tax credit despite the fact that such issues are far outside EPA's area of expertise and should be handled by the Department of the Treasury.

Another problematic aspect of EPA's proposed BSER is that it defines low-GHG hydrogen based on the hydrogen's lifecycle GHG emissions, or in other words, well-to-gate emissions, rather than emissions from the regulated source itself. Regardless of the source of the hydrogen that is used at an affected source, that particular source will have no GHG emissions as a result of the hydrogen combustion. But by requiring sources to co-fire only with low-GHG hydrogen,

[31] PJM, *Energy Transition in PJM: Resource Retirements, Replacements & Risks*, at 1 (Feb. 24, 2023), available at https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx.

[32] Pages 3-13 and 3-24 of the RIA.

defined based on lifecycle emissions, EPA is effectively regulating the production of hydrogen. This exceeds EPA's statutory authority to set emissions standards for sources within the regulated source category and runs afoul of *West Virginia v. EPA*'s prohibition on regulating an entire industry rather than the affected sources.

EPA's proposal raises serious reliability and resource adequacy concerns. State PUCs and regional grid operators are becoming increasingly vocal about reliability concerns, and a proposed rule that effectively mandates reduced utilization and/or early retirement of fossil fuel fired generation only heightens those concerns.[33] To the extent that EPA promotes its reduced operation/retirement pathways as providing flexibility, even EPA has said (in the CPP preamble) that section 111 rules cannot be based on reduced utilization. 80 Fed. Reg. at 64,738, 64,762, 64,782.

Further, NERC's recently published study on reliability raises significant questions that EPA must consider carefully. In particular, the study points out that "[p]rojected growth rates of electricity peak demand and energy in North America are increasing for the first time in recent years."[34] The study also points out that "[g]overnment policies for the adoption of electric vehicles (EVs) and other energy transition programs have the potential to significantly influence demand."[35] One of the policy measures that the study recommends to ensure reliability is to

[33] PJM Inside Lines, *PJM Annual Meeting Panel Previews Reliability Challenges* (May 2, 2023), available at https://insidelines.pjm.com/pjm-annual-meeting-panel-previews-reliability-challenges/.

[34] North American Electric Reliability Corporation, 2022 Long-Term Reliability Assessment, at 7 (Dec. 2022), available at https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2022.pdf

[35] *Id.*; *see also* U.S. DRIVE, "Summary Report on EVs at Scale and the U.S. Electric Power System" (Nov. 2019), available at https://www.energy.gov/eere/vehicles/articles/summary-report-evs-scale-and-us-electric-power-system-2019 (summarizing impacts of light-duty vehicles on energy generation and generation capacity alone, and acknowledging several potential challenges without including analysis of impacts of medium- and heavy-duty ZEVs).

"[m]anage the pace of generator retirements until solutions are in place that can continue to meet energy needs and provide essential reliability services."[36] EPA's proposal undermines this approach to a managed retirement of electric generation resources by selecting as BSER systems that have not been adequately demonstrated and are not achievable in the timeframes presented, much less on the national scale that would be necessary under the proposed rule.

These serious concerns and questions about reliability are exacerbated by concurrent EPA and state and local efforts to electrify in other sectors, such as the transportation, industrial, and housing sectors, thereby increasing electricity demand. EPA's analysis fails to account for even its own efforts in this area and their foreseeable impacts, let alone the efforts of state and local governments and their associated impacts. *See supra* at III.A.1. 42 U.S.C. § 7411.

3. EPA's proposed emissions limitations are not "achievable" as required by the Clean Air Act.

Section 111 requires that a "standard of performance" be set at a level that "reflects the degree of emission limitation achievable" through application of the BSER, 42 U.S.C. § 7411(a), at "each individual regulated source," *West Virginia*, 142 S. Ct. at 2612. "An achievable standard is one which is within the realm of the adequately demonstrated system's efficiency" and is not "purely theoretical or experimental." *Essex Chem. Corp.*, 486 F.2d at 434; *see also* Brief for the Federal Respondents 49, *West Virginia v. EPA*, Nos. 20-1430 et al. (S. Ct. Jan. 2022) (quoting *Essex Chem. Corp.*). But EPA fails to show that its standard is achievable at individual sources, as section 111 requires. EPA makes predictions about the development of CCS and hydrogen co-firing that are unrealistic because they rely on the development of a vast, nationwide pipeline infrastructure

[36] *Id.*

in a very short timeframe, which is predicted by EPA to be driven by financial support from the IRA. Although the tax incentives are positive steps in boosting lower carbon energy generation, it is far from clear that these developments will occur at anything close to the pace that EPA has predicted. Moreover, well-known shortcomings in permitting processes make the buildout timeframe envisioned by EPA implausible, at best. The proposal rests on the assumptions that renewable energy and the needed transmission lines will timely obtain the necessary permits. But although the Fiscal Responsibility Act included a measure of permitting reform, it omitted many of the robust reforms that are needed to further modernize permitting in the United States, including modifications that could help to facilitate a rapid expansion of renewable sources of electricity and the transmission lines critical for the delivery of that energy to load.[37]

Further, in the preamble, EPA acknowledged significant economic challenges with its proposal. For example, "[m]idstream infrastructure limitations and the adequacy and availability of hydrogen storage facilities currently present obstacles and increase prices for delivered low-GHG hydrogen." 88 Fed. Reg. at 33,308. The standard imposed by EPA also is not achievable by individual sources because CCS and hydrogen co-firing are possible only if there exists a not-yet-built nationwide infrastructure network, which must include pipelines, injection wells, and

[37] Rayan Sud & Sanjay Patnaik, *How does permitting for clean energy infrastructure work?*, Brookings Institution (Sept. 28, 2022), available at https://www.brookings.edu/articles/how-does-permitting-for-clean-energy-infrastructure-work/; Rayan Sud, Sanjay Patnaik, Robert L. Glicksman, *How to Reform Federal Permitting to Accelerate Clean Energy Infrastructure: A Nonpartisan Way Forward*, Brookings Institution (Feb. 14, 2023), available at https://www.brookings.edu/articles/how-to-reform-federal-permitting-to-accelerate-clean-energy-infrastructure-a-nonpartisan-way-forward/; Philip Rossetti, *Potential Effects of the Inflation Reduction Act on Greenhouse Gas Emissions*, R Street (Step. 27, 2022), available at https://www.rstreet.org/commentary/potential-effects-of-the-inflation-reduction-act-on-greenhouse-gas-emissions/; Philip Rossetti, Written Testimony for the Hearing on "Tax Incentives in the Inflation Reduction Act: Jobs and Investment in Energy Communities," U.S. Senate Committee on Finance (May 18, 2023), available at https://www.finance.senate.gov/download/0518-rossetti-testimony.

electrolyzers that must be built by third parties in locations other than the power plant facilities and are wholly beyond the control of the owners and operators of the regulated sources. EPA further exacerbates the complexity of hydrogen supply by proposing to impose hydrogen production standards that would be more stringent than those set by Congress.

In addition to being inconsistent with section 111's requirement that standards of performance be "achievable" by individual sources, EPA's proposal is also arbitrary and capricious under the APA because it would impose requirements on regulated parties that are impossible for them to comply with. The requirements are impossible for individual sources to meet because they rely on a vast pipeline infrastructure that is beyond the control of any individual source and cannot be built during the timeframe EPA proposes. As the D.C. Circuit has explained, "[i]mpossible requirements imposed by an agency are perforce unreasonable." *All. for Cannabis Therapeutics v. Drug Enf't Admin.*, 930 F.2d 936, 940 (D.C. Cir. 1991). Indeed, standards that are impossible to meet are "incompatible" with "the substance of Congress' regulatory scheme." *Util. Air Regul. Grp.*, 573 U.S. at 322. Accordingly, EPA cannot set a standard of performance based on conditions that are impossible to achieve by a source.

4. The proposal is unlawful because its performance standards require installation of infrastructure beyond the source's fence line.

EPA's proposal is also unlawful because its performance standards require installation of infrastructure beyond the source's fence line. Section 111 provides that performance standards apply to sources, not to actions beyond the source itself. To commence section 111(b) regulation, EPA must first list categories of "stationary sources" to be regulated.[38] EPA then sets federal

[38] CAA § 111(b)(1)(A) (emphasis added).

standards for new "*sources* within such [listed] category."[39] These standards of performance must be "*applicable … to*" individual sources within the regulated source category.[40]

EPA argues that its proposal complies with section 111 because it is based on technologies that can be applied at individual sources by the owners/operators of those sources, but EPA ignores that these technologies depend on development of national infrastructure. The CCS and hydrogen systems that EPA proposes would require thousands of miles of pipelines to move the CO_2 and hydrogen to sites across the country, in some cases a great distance from the EGU. Development of such national infrastructure is not subject to the financial capacity or control of any individual source owner or operator, something EPA entirely ignores. Consistent with the language of the statute, EPA has reiterated its long-standing view that "[t]he standard that the EPA develops [is] based on the [best system of emission reduction] achievable *at that source*."[41] In EPA's 40-year-old Subpart B regulations establishing the section 111(d) "procedure,"[42] EPA determined that section 111(d) "emissions guideline[s]" must "reflect[] … *the application* of the best system of emission reduction … [that] has been adequately demonstrated *for designated facilities*."[43] And in the CPP, EPA acknowledged that the phrase "best system of emission reduction" may include only "measures that can be implemented—'appl[ied]'—by the sources themselves."[44] Thus, section 111, when read as a whole and consistently with EPA's own long-held reading of section 111, shows that "standards of performance" cannot depend on the

[39] *Id.* § 111(b)(1)(B) (emphasis added); *see also id.* § 111(a)(2) (defining the term "new source" and discussing standards of performance "which will be applicable to such source").

[40] CAA §§ 111(d)(1), 111(a)(2) (emphases added).

[41] 79 Fed. Reg. 36,880, 36,885 (June 30, 2014) (emphasis added).

[42] 40 C.F.R. pt. 60, subpt. B (promulgated by 40 Fed. Reg. 53,340 (Nov. 17, 1975).

[43] 40 C.F.R. § 60.21(e) (emphasis added).

[44] 80 Fed. Reg. at 64,720.

development of massive amounts of infrastructure beyond the fence line, much less infrastructure that must be developed by third parties.

5. EPA's claims that the rule would have minimal impact on the electric fleet, due to rapid and transformative changes occurring even in the absence of the rule, are without merit.

EPA claims that the proposed rule would reduce power sector carbon emissions by only about 1% in 2040 and would result in minimal costs and reliability impacts. Those claims are based on unrealistic baseline assumptions about emissions, natural gas demand, and the time needed for the development of national hydrogen and CCS infrastructure. Proper consideration of relevant factors, which EPA unreasonably discounts or ignores, would show that if promulgated as proposed, the rule will cause substantial cost and reliability impacts, including major regulatory costs not accounted for by the rule. EPA's unreasonable discounting of the costs of its proposal appears to be an attempt to avoid application of the major questions doctrine.

EPA factors into its baseline scenario—a world without the proposed rule—an aggressive forecast of the power-sector changes that could be driven by the IRA's many financial incentives for wind, solar, and other generation technologies. As a general matter, the commenters support these initiatives, but EPA's predictions regarding the IRA's impacts appear overblown and, again, rely upon faulty assumptions. EPA's baseline forecast assumes that aided by IRA tax incentives and the instantaneous and nearly free construction of transmission lines, 650 GW of new non-hydro renewables capacity (quadruple current capacity) will be operational by 2040. RIA at 3-27. EPA's updated modeling released on July 7 goes even further, projecting that about 750 GW of new renewables will be operating in 2040. A likely driving force behind this projection is EPA's modeling assumption that new transmission will be built instantly when needed, and at negligible

or even no costs. The "Power System Operation Assumptions" document accompanying the proposed rule indicates that the IPM model assumed a significant "transmission capacity expansion" within the next several years to "meet capacity and energy needs."[45] This design is unrealistic given the growing transmission and permitting constraints that are currently slowing renewables deployment across the nation.[46] In fact, the U.S. needs to invest $4.5 trillion to fully transition the power grid to renewable energy over the next 10 to 20 years.[47]

Moreover, while the IPM's non-transparent black box design makes understanding transmission cost assumptions difficult if not impossible, a 2022 peer review of the model stated that it assigns different capital costs to transmission infrastructure based on whether the energy source is wind and solar or something else, with wind and solar capital costs "as low as $1/kilowatt while non-wind and solar transmission costs are between $97 and $145/kw.[48] As noted in the IPM peer review, these costs are unrealistically low and biases the model toward wind and solar development.

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[45] EPA, *Power System Operation Assumptions*, at 3-11, available at https://www.epa.gov/system/files/documents/2021-09/chapter-3-power-system-operation-assumptions.pdf (describes the assumptions pertaining to the North American electric power system as represented in the EPA Platform v6 Summer 2021 Reference).

[46] There are increasing delays in studying, building, and connecting new energy projects to the grid, which mean that "much of this proposed capacity will not ultimately be built." Lawrence Berkeley National Laboratory, U.S. Department of Energy, Electricity Markets and Policy, Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection, https://emp.lbl.gov/queues (last visited Aug. 3, 2023). Among a subset of queues for which data are available, only 21% of the projects (and 14% of capacity) seeking connection from 2000 to 2017 have been built as of the end of 2022." *Id.* Other challenges cited by the Berkeley National Lab that prevent timely operation of new renewable energy projects include increased interconnection wait times, reaching agreements with landowners and communities, power purchasers, supply chain constraints, and financing. *Id.* EPA's evaluation should rely on the U.S. government's current assessment of renewable generation.

[47] Dan Shreve & Wade Schauer, *Deep decarbonization requires deep pockets*, Wood Mackenzie (June 2019), available at https://www.decarbonisation.think.woodmac.com/.

[48] EPA's Response to IPM v6 Peer Review Report. Available at https://www.epa.gov/system/files/documents/2022-04/epas-response-to-ipm-v6-peer-review-report-4-18-2022.pdf

These assumptions are unrealistic given the cost and amount of time that it takes to build the necessary supporting transmission infrastructure due to extensive federal and state permitting delays, supply chain and construction challenges, and local opposition. In fact, one study found that over 80% of the IRA's potential emissions reductions would not occur without reforms that significantly accelerate transmission buildout.[49] Of course, even if such reforms were to be enacted into law immediately and to be implemented by agencies immediately (which seems highly unlikely), construction of infrastructure would not be instantaneous, and would not be cost-free, either.

Further, there is not enough domestic copper and aluminum to create the infrastructure required under the proposal. The United States does not supply much of the world's aluminum. Instead, China and Russia lead global production, with an estimated 45 million metric tons per year. China possesses more than half of the entire world's aluminum smelting capacity and produces by far the most aluminum of any country, at over 36 million tons per year.[50] Copper demand is expected to rise by 53 percent by 2040, while supply is expected to rise by only 16 percent during the same period.[51] The United States, by contrast, produces approximately 1 million tons per year. Similarly, countries supplying the most copper are Chile, Peru, China, and the Democratic Republic of the Congo. These countries supply ten times the amount produced

[49] Princeton University, Zero Lab, *Electricity Transmission is Key to Unlock the Full Potential of the Inflation Reduction Act*, at 4, available at https://repeatproject.org/docs/REPEAT_IRA_Transmission_2022-09-22.pdf (Sept. 2022).

[50] Andy Home, Mining.com, *Global aluminum production pendulum swings back to China* (June 21, 2022), available at https://www.mining.com/web/column-global-aluminum-production-pendulum-swings-back-to-china/.

[51] BloombergNEF, *Copper Miners Eye M&A as Clean Energy Drives Supply Gap* (Aug. 30, 2022), available at https://about.bnef.com/blog/coppers-miners-eye-ma-as-clean-energy-drives-supply-gap/.

domestically.[52] The latest data indicate that sourcing copper for electric infrastructure (e.g., charging stations and storage) needed to accommodate increased electrical demand will be challenging.[53] Indeed, global copper demand is set to grow by 53% by 2040 while supply is projected to rise by only 16%.[54] According to the National Mining Association, it can take up to 10 years to obtain a permit to commence mining operations in the U.S., while permitting takes two years in Canada and Australia.[55] For example, the Resolution copper deposit in Arizona was discovered in 1995, and its developer has been trying to acquire the necessary regulatory approvals for over 27 years.[56] Other copper mining projects in Alaska and Minnesota have also been stalled, resulting in increased import dependence.[57]

EPA also makes assumptions about natural gas prices and associated supply and demand outlooks that are inconsistent with the EIA's 2023 Annual Energy Outlook. The EIA's baseline forecast also factors in the impact of the IRA but contains much more realistic assumptions. The EIA, which has superior expertise in this area, projects that power sector emissions in 2040 will be 47% higher than what EPA projects. And in 2045, EIA's projections are 73% higher. The difference between these forecasts results from different projections of coal and natural gas

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[52] World Economic Forum, *Which countries produce the most copper?* (Dec. 12, 2022), available at https://www.weforum.org/agenda/2022/12/which-countries-produce-the-most-copper/.

[53] International Energy Agency, *Global Supply Chains of EV Batteries*, at (July 2022), available at https://iea.blob.core.windows.net/assets/961cfc6c-6a8c-42bb-a3ef-57f3657b7aca/GlobalSupplyChainsofEVBatteries.pdf.

[54] BloombergNEF, *Copper Miners Eye M&A as Clean Energy Drives Supply Gap* (Aug. 30, 2022), available at https://about.bnef.com/blog/coppers-miners-eye-ma-as-clean-energy-drives-supply-gap/.

[55] National Mining Association, *Delays in the U.S. Mine Permitting Process Impair and Discourage Mining at Home* (May 31, 2021), available at https://nma.org/wp-content/uploads/2021/05/Infographic_SNL_minerals_permitting_5.7_updated.pdf.

[56] Ernest Scheyder, *U.S. Forest Service Pauses Timeline for Rio Tinto Arizona Copper Mine*, Reuters (May 19, 2023), available at https://www.reuters.com/legal/us-forest-service-pauses-timeline-rio-tinto-arizona-copper-mine-2023-05-19/#:~:text=May%2019%20(Reuters)%20%2D%20The,groups%20opposed%20to%20the%20project.

[57] *Id.*

generation. EPA projects 1402 TWh of natural gas generation and 120 TWh of coal generation in 2035, RIA at 3-24, while the EIA projects significantly more coal generation (at 354 TWh) and less natural gas generation (at 1036 TWh). These differences are driven by different natural gas price forecasts; in 2035 and 2040, EIA expects natural gas prices to be approximately double what EPA utilizes in its proposal.

Additional modeling runs released by EPA on July 7 consider updated natural gas market impacts related to one shortcoming (LNG exports) as well as include compliance of existing natural gas power plants with the rule. Unfortunately, these additional model runs only raise further questions about the assumptions embedded within the IPM model. As shown in the comparison tables below for the year 2035, the updated model runs project that the rule results in increased coal closures, renewable energy deployment, and coal plants complying with CCS, as well as a quadrupling of compliance via hydrogen co-firing. However, the IPM model forecasts that these changes result in significantly *lower* compliance costs—including negative compliance costs in 2035. This defies logic and must be explained in detail by EPA through transparent disclosure of the assumptions embedded in the model, including assumptions about market, transmission, infrastructure, and compliance cost issues.

Capacity in 2035 (GW)						
	Original EPA Proposal			July 7 Integrated Proposal with Existing Gas and Updated LNG Exports		
Electricity Source	**Baseline**	**Rule**	**Change**	**Baseline**	**Rule**	**Change**
Coal	33	0	-33	39	0	-39
Coal with CCS	11	12	1	12	17	5
Coal with Gas co-firing	0	1	1	0	1	1
Natural gas	460	476	16	455	434	-21
Hydrogen co-firing	0	11	11	0	48	48
Natural gas with CCS	10	8	-2	5	4	-1
Nuclear	84	84	0	84	84	0
Hydro	108	108	0	108	108	0
RE	668	670	2	691	698	7
Oil/Gas Steam	59	67	8	59	67	8

	Original Rule	**July 7 Integrated Proposal with updated LNG exports and Existing Gas**
Annualized compliance cost	$960M	$460M
Total compliance cost (2028-2042)	$14B	$6.2B
Compliance cost in 2035	$280M	-$950M (negative costs)
Emissions reduction in 2035	-34 mmt	-108 mmt
Cumulative emissions reductions relative to baseline, 2028-2042	-617 mmt	- 1,270 mmt

Further, EPA's RIA fails to account for significant increases in electricity demand that EPA itself projects will be caused by its own vehicle emissions rules. EPA recently proposed two rules requiring significant electrification of the transportation sector. EPA admits that these rules will increase electricity demand. In fact, EPA projects that its proposed rule targeting light-duty and medium-duty vehicles would increase electricity demand by 195 TWh in 2040[58] and that its

[58] EPA, *Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles: Draft Regulatory Impact Analysis*, 11-14 (Apr. 2023), available at https://nepis.epa.gov/Exe/ZyPDF.cgi?Docke y=P10175J2.pdf.

proposed heavy-duty vehicle rule would increase electricity demand by an additional 68 TWh in 2040.[59] Yet, EPA failed to account for these two current proposed rules and to account for how the power sector would meet the increased electricity demand that would result from their adoption and from the adoption of this proposed rule as well. EPA cannot make inconsistent projections in multiple rulemakings dealing with the same important subject matter. In addition, although the RIA, which is incorporated by reference in the preamble to the proposal, 88 Fed. Reg. at 33,253, admits that it does not take into account any incremental increase in electricity demand associated with hydrogen production, EPA reports that "incremental electricity demand from hydrogen production in 2035 is estimated at about 108 TWh, or approximately 2 percent of the total projected nationwide generation." RIA at 3-13. Thus, under EPA's own analyses, its RIA fails to account for an increase of 371 TWh in electricity demand, which amounts to an 8.7% increase in nationwide electricity use compared to 2022 levels.

With respect to hydrogen, this ignored demand is dramatically higher in the updated modeling released by EPA on July 7. For example, in the "Integrated Proposal with LNG Update" modeling scenario, EPA projects a more than four-fold increase in hydrogen use in 2035, amounting to a total of 309 Twh. Using the original proposal's 1.54 ratio of upstream power generation to downstream co-firing demand, this equates to 476 Twh of electricity generation to produce the hydrogen necessary for this co-firing. That equates to 8.8% of current nationwide electricity demand. It is inappropriate and highly misleading to simply ignore the enormous electricity demand and associated system costs necessary to produce the hydrogen that EPA says

[59] EPA, *Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles: Phase 3 Draft Regulatory Impact Analysis*, (Apr. 27, 2023), available at https://www.federalregister.gov/documents/2023/04/27/2023-07955/greenhouse-gas-emissions-standards-for-heavy-duty-vehicles-phase-3.

will be needed for compliance with the rule. EPA also ignores that a transition to burning a hydrogen blend is also likely to increase NOx emissions because hydrogen burns hotter than methane, and NOx is formed under high temperature conditions during combustion. In addition to potential environmental impacts, the turbine modifications required to enable hydrogen co-firing could trigger the CAA's new source review program based on such increases, including the need to obtain construction and operating permits. For the past 25 years, the new source review program has been plagued by complications, uncertainty, and litigation, and applying the program here would only make hydrogen blending permitting even more complex and time consuming.

Accordingly, the proposed rule misapprehends and misrepresents its associated emissions reductions and regulatory compliance costs by relying on faulty assumptions that shift compliance responsibilities and costs into the baseline scenario, thereby making it look as if the rule itself would not be accompanied by those serious consequences and costs. Thus, the rule is arbitrary and capricious for failure to "articulate a satisfactory explanation . . . including a 'rational connection between the facts found and the choice made.'" *Motor Vehicle Mfrs. Ass'n of U.S., Inc.*, 463 U.S. at 43. EPA must undertake a plausible and good faith effort to model the real-world costs and impacts of the rule, including by undertaking a sensitivity analysis that projects costs and impacts under more realistic infrastructure permitting and power market conditions. EPA's new modeling released on July 7 (which, in any event, is untimely) does not address these concerns, because it only purports to update the modeling by integrating all of the proposal

requirements and including the impact of updated liquefied natural gas export projections.[60] The new modeling does not properly account for foreseeable increased electricity demand, for reasonable predictions of IRA impacts (as opposed to the speculative and overly optimistic assumptions concerning such impacts that are set forth in the proposed rule), or for independently projected, reasonable estimates of future natural gas prices.

In summary, EPA's faulty underlying assumptions cause it to conclude that the proposed rule would lower power sector emissions by only 1% and thus to vastly underestimate, likely on the order of tens of billions of dollars, the regulatory compliance costs of the proposal. EPA has an obligation to produce an accurate, complete estimate of the rule's most likely real-world impacts, and therefore owes it to stakeholders and the public to model and transparently communicate the reliability implications and compliance costs of the rule that were ignored or underestimated in the proposal, including:

- Increases in future electricity demand stemming from concurrent EPA rulemakings such as the light- and heavy-duty vehicle GHG standards, including projections for regional and temporal variability in demand.
- Increases in electricity demand resulting from hydrogen production projected to be needed for compliance with the proposed rule.
- Costs associated with hydrogen and CCS pipelines and related infrastructure.

[60] The U.S. Chamber submitted a letter to EPA requesting a 60-day extension of the comment deadline as a result of the July 7 release of EPA's new modeling. U.S. Chamber of Commerce, Comment Letter on Proposed Rule, 88 Fed. Reg. 33,240 (July 13, 2023), https://downloads.regulations.gov/EPA-HQ-OAR-2023-0072-0169/attachment_1.pdf. As the Chamber explained, the APA and CAA require a meaningful opportunity for stakeholders to review and comment on proposed regulations and the key data and analysis underlying the proposal. *Id.* The comment opportunity must be commensurate with the complexity of the rulemaking, and it is inappropriate for EPA to add substantive and significant technical and factual claims during an established comment period. *Id.*

- Electricity transmission costs associated with buildout and operation of wind and solar capacity, with reasonable constraints on buildout timelines that take into account current delays and permitting obstacles.

6. EPA has twice determined that CCS was not BSER and has not provided an adequate basis to explain its change of position.

It is a mainstay of administrative law that an agency must give a reasoned explanation for its actions, including changes in position. *See Dep't of Commerce v. New York*, 139 S. Ct. 2551, 2576 (2019) ("Reasoned decisionmaking under the Administrative Procedure Act calls for an explanation for agency action."). The Supreme Court has held that "an '[u]nexplained inconsistency' in agency policy is 'a reason for holding an interpretation to be an arbitrary and capricious change from agency practice.'" *Encino Motorcars, LLC v. Navarro*, 579 U.S. 211, 222 (2016) (quoting *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 981 (2005)). An agency can change its existing policies, but it must provide "a reasoned explanation for the change." *Id.* at 221. The agency "must at least 'display awareness that it is changing position' and 'show that there are good reasons for the new policy.'" *Id.* (quoting *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009); *accord Baltimore Gas & Elec. Co. v. FERC*, 954 F.3d 279, 286 (D.C. Cir. 2020) (agency must show "'the new policy is permissible under the statute,' and 'show that there are good reasons for the new policy'" (quoting *Fox Television*, 556 U.S. at 515)).

That explanation must be more thorough when, as here, the agency's about-face upsets serious reliance interests. An agency must "provide a more detailed justification" when "its new policy rests upon factual findings that contradict those which underlay its prior policy" or "when

its prior policy has engendered serious reliance interests that must be taken into account." *Fox Television*, 556 U.S. at 515. "It would be arbitrary or capricious to ignore such matters." *Id*. "Sudden and unexplained change or change that does not take account of legitimate reliance on prior interpretation, may be arbitrary, capricious or an abuse of discretion." *Smiley v. Citibank (S. Dakota), N.A.*, 517 U.S. 735, 742 (1996) (cleaned up).

EPA has not adequately explained how it can determine CCS to be the BSER even though it has twice in the last eight years found that CCS *cannot* be the BSER for existing sources. In the preamble to the Clean Power Plan, EPA explained that it was not designating CCS as the BSER in part because "the scale of infrastructure required to directly mitigate CO_2 emissions from existing EGUs through CCS can be quite large and difficult to integrate into the existing fossil fuel infrastructure." 80 Fed. Reg. at 64,690; *see also* Brief for the Federal Respondents 49, *West Virginia v. EPA*, Nos. 20-1430 et al. (S. Ct. Jan. 2022) (explaining that constraints imposed by CAA section 111, including the "adequately demonstrated" requirement, "guard against the possibility of emission guidelines that have transformative consequences" and "have led EPA in prior rulemakings to exclude from the BSER several measures, including … [CCS]") ("In the CPP, for instance, EPA declined to identify natural-gas co-firing or carbon capture and sequestration as part of the BSER because those measures were 'more expensive than other available measures for existing sources.'"). Then, in the ACE Rule, EPA again rejected CCS as the BSER, explaining that "[t]he high cost of CCS, including the high capital costs of purchasing and installing CCS technology and the high costs of operating it, including high parasitic load requirements," foreclosed its adoption as BSER. 84 Fed. Reg. at 32,548.

EPA fails to provide anything like a reasonable explanation of what has changed so much in the past few years or why the required infrastructure and costs of CCS are no longer barriers to its adoption as BSER. In a September 2022 report, the Institute for Energy Economics and Financial Analysis explained that CCS "is more costly and complex than other applications," as confirmed "by the string of … several failed projects and cost blowouts."[61] Moreover, "[c]apturing CO_2 consumes a lot of energy, effectively reducing the amount of electricity delivered to consumers."[62] This introduces "additional energy penalties into the mix, typically by drawing steam or power to operate the capture process," all of which could result in "charging a premium price to consumers."[63]

EPA also fails to take into consideration significant reliance interests. Electric utilities have a long planning horizon for significant capital commitments, and in making those plans should have been able to rely on EPA's conclusion that CCS does not satisfy the requirements of BSER, especially with respect to the EGUs that have come into commercial operation between these prior EPA issuances and the proposed rule here.

7. EPA lacks authority to project which technologies might emerge as adequately demonstrated in setting BSER.

EPA claims that even though CCS and hydrogen co-firing are not in routine use, EPA can still select them as BSER because it has broad latitude to predict what technologies will emerge in the future. In support of this assertion, EPA relies on the D.C. Circuit's decisions in *Lignite Energy Council v. EPA*, 198 F.3d 930, 934 (D.C. Cir. 1999) (per curiam), and *Portland Cement Ass'n*

[61] Bruce Robertson and Milad Mousavian, Institute for Energy Economics and Financial Analysis, *The Carbon Capture Crux: Lessons learned* at 37 (Sept. 1, 2022), available at https://ieefa.org/resources/carbon-capture-crux-lessons-learned.

[62] *Id.* at 47.

[63] *Id.* at 37.

v. Ruckelshaus, 486 F.2d 375, 391 (D.C. Cir. 1973). Respectfully, EPA's analysis conflates the question of whether a system "has been adequately demonstrated" with whether the resulting "degree of emission limitation [is] achievable." 42 U.S.C. § 7411(a)(1), and unduly weakens the "adequately demonstrated" requirement. *Lignite Energy Council* and *Portland Cement* indicated that EPA could make projections about whether emission limitations would be "achievable," but they did not authorize EPA to make broad predictions to satisfy the requirement that a system be adequately demonstrated.

In *Lignite Energy Council*, the court accepted EPA's predictions about the level of emissions reductions that could be achieved with existing technology, but did not allow EPA to predict a technology that *might* emerge in the future and then to conclude, without an appropriately reliable factual basis, that the technology is adequately demonstrated. 198 F.3d at 934. The court explained that "it was reasonable for EPA to extrapolate from its studies of utility boilers in setting [a selective catalytic reduction] (SCR)-based new source performance standard for coal-fired industrial boilers." *Id.* EPA was unable to collect data on the application of SCR to coal-fired industrial boilers and so reasonably relied on utility boiler data because the boilers are similar in design and can attain similar levels of emissions reduction through combustion controls. *Id.* at 934. Similarly in *Portland Cement*, it was "the 'achievability' of the proposed standard that [wa]s in issue." 486 F.2d at 391.[64] *Appalachian Power Co. v. EPA,* 135 F.3d 791 (D.C. Cir. 1998) further emphasized that standards of performance must be based on "existing technology." *Id.* at 801; *see also Amoco Oil Co. v. EPA*, 501 F.2d 722, 743 (D.C. Cir. 1974) (noting

[64] To the extent *Portland Cement* and *Lignite Coal* can be read to expand EPA's authority to project what future technologies might be adequately demonstrated, they are wrong, as shown by Justice Kagan's explanation of the statutory provision.

survey evidence showed that 98% of existing gas stations were achieving levels well below the standard that EPA set). These cases recognized that, as Justice Kagan later explained in *West Virginia v. EPA*, any proposed technology under section 111 must have an established track record before EPA can set it as the BSER. Then EPA can project what level of emission limitation will be achievable by the time compliance is required based on such established technology.

Moreover, in those cases the technology would be applicable at the source and subject to the control of the source owner or operator. EPA's decision here, however, relies on predictions not only about the technology applied at the source but also about the actions of third parties in building a vast national system of infrastructure that is beyond the control of the source owner/operator. In addition, EPA relies on predictions about the impact of the IRA's tax incentives to encourage the production of clean energy. EPA cannot set BSER based on a combination of numerous highly uncertain predictions and speculation about how various third parties may behave many years into the future.

EPA claims it has even more leeway in making predictions here than it would otherwise have because it has provided "lead-time" for the development of national CCS and hydrogen infrastructure, citing *Portland Cement*. 88 Fed. Reg. at 33,272. But *Portland Cement* does not stand for the proposition that if EPA provides "lead time," it can impose any standard it wants. Rather, the court said that the analysis is "partially dependent on 'lead time'"; since EPA was putting in place standards that would "control new plants immediately . . . the latitude of projection [wa]s correspondingly narrowed." 486 F.2d at 391–92. Here, EPA's purported "lead-time" is illusory. In its discussion of state planning, EPA recognizes that to have any chance of complying with the proposed rule if it is made final, sources would have to begin making

commitments soon after the final rule is promulgated and well before state plans are developed. *Id.* at 33,402. EPA cannot rely on a speculative, "crystal ball" inquiry to make predictions about future technologies, while effectively requiring sources to begin complying immediately. *Essex Chem. Corp.*, 486 F.2d at 433 (quoting *Portland Cement*, 486 F.2d at 391).

B. EPA's proposal is contrary to *West Virginia v. EPA*.

In *West Virginia v. EPA*, the Supreme Court rejected EPA's attempt to "improve the overall power system by lowering the carbon intensity of power generation" and "forcing a shift throughout the power grid from one type of energy source to another." 142 S. Ct. at 2611–12. The majority and the dissent in that case agreed that section 111 imposes "meaningful constraints" on EPA's authority and that EPA cannot "force[] the elimination of coal plants," *id.* at 2612 n.3; *id.* at 2639 n.7 (Kagan, J., dissenting). Now, EPA attempts to do the same thing by basing the BSER on technology that has not been adequately demonstrated, and accordingly, on performance standards that cannot be met. This in turn would necessarily force facilities to shut down, reduce generation, or shift fuels in order to avoid the technology requirements altogether. In fact, EPA specifically ties various compliance obligations under the rules to EGU owners' agreeing to specific facility retirement dates.

Electric utilities must begin planning for significant capital projects well in advance. EPA proposes to alleviate the uncertainty as to whether CCS will be available by 2030 by providing a retirement pathway for coal-fired boilers. 88 Fed. Reg. at 33,343. But an electric utility cannot prudently base its long-range planning on a system that does not now exist in the hope that it will be available in the future. To avoid having to do so, EPA says that a company can make a federally enforceable commitment now to retire its coal plants by 2040 in favor of lower emitting

generation. This echoes the policy that EPA is implementing in its proposed vehicle emissions regulations, which would impose multi-pollutant emissions standards that can be achieved only through mass adoption of electric vehicles without considering the availability of critical minerals needed for battery production, metals needed for electrical transmission lines and charging stations, and the ability of the electrical grid to handle the increased load. The need for that escape hatch underscores what has already been shown above—that CCS and hydrogen co-firing are not "adequately demonstrated" or cost-effective. In fact, nearly without exception, EPA's own modeling predicts that the affected electric generating units will not implement any of EPA's proposed technologies.[65] Instead, they will either retire or reduce the amount of electricity generated so as to be exempt from the rule's more onerous compliance requirements.[66] This further proves that EPA's proposal amounts to the same generation-shifting approach that the Supreme Court concluded in *West Virginia v. EPA* exceeded EPA's statutory authority.

EPA tries to justify requiring hydrogen and natural gas co-firing by saying that the Supreme Court approved doing so in *West Virginia v. EPA* when the Court noted that even in the CPP, EPA described the sort of systems of emission reduction that it had always before selected as "efficiency improvements, fuel-switching, and "add-on controls." 88 Fed. Reg. at 33,315 (cleaned up) (quoting *West Virginia*, 142 S. Ct. at 2611 (quoting Clean Power Plan)). But that statement in *West Virginia v. EPA* did not endorse forcing closure of sources that rely on technologies that do not exist at scale now and that would also require re-configuration of a source. Indeed, the Court said in *West Virginia* that EPA could not simply require coal plants to

[65] Integrated Proposal Modeling and Updated Baseline Analysis, at Table 11; RIA at 8-2.
[66] *Id.*

become natural gas plants, as that would effectively "direct existing sources to effectively cease to exist." 142 S. Ct. at 2612 n.3.

C. EPA's proposal is not limited to activities at the source, as required by section 111.

Section 111 requires that standards of performance must be set "for" and be "applicable . . . to" individual sources within a regulated sources category. 42 U.S.C. § 7411. And as the Supreme Court explained, in section 111, "Congress intended a technology-based approach" that "focuses on improving the emissions performance of individual sources." *West Virginia*, 142 S. Ct. at 2611.

In contrast, EPA's proposal here is not limited to activities that take place at the source. Rather, the proposal goes far beyond activities at the source, relying on the development of national systems of infrastructure that cannot be applied at the source and are not within the control of any source owner or operator. In the overwhelming majority of cases, the production of hydrogen, the transportation of hydrogen, the transportation of CO_2, and the sequestration of CO_2 would require the development of vast infrastructure networks a considerable distance from the coal or gas-fired EGU. As noted and shown in the maps above, the majority of the existing CO_2 pipeline network is located west of the Mississippi River, while many of the sources that may require capture are east of the Mississippi River.[67]

In the case of most regulated EGUs, local geology does not support sequestration at or near the EGU site. For such EGUs, pressurized CO_2 pipelines would need to be constructed that do not currently exist and would extend far beyond the fence line of EGU sites. EPA claims that

[67] U.S. Department of Energy, Siting and Regulating Carbon Capture, Utilization and Storage Infrastructure, 20 (Jan. 2017), available at https://www.energy.gov/fe/downloads/siting-and-regulating-carbon-capture-utilization-and-storage-infrastructure-workshop.

"[a]t least 37 States have geologic characteristics that are amenable to deep saline sequestration, and an additional 6 States are within 100 kilometers of potentially amenable deep saline formations." 88 Fed. Reg. at 33,297. But that statement only further reveals the "beyond the fence line" nature of EPA's proposal. Even if an area has geologic features that might accommodate sequestration, such characteristics do not guarantee that a sequestration facility will be built. And even in the unlikely event that sequestration was to take place everywhere that EPA envisions, EPA admits that a vast, interstate network of CO_2 pipeline infrastructure would still be required. 88 Fed. Reg. at 33,369. Clean hydrogen co-firing too would require significant beyond-the-source infrastructure, including non-emitting energy sources such as solar, wind, nuclear, and hydroelectric power, electrolysis facilities, and hydrogen pipeline infrastructure. *Id.* at 33,308–09. This again represents a significant departure from EPA's traditional approach to CAA performance standards, as the Supreme Court recognized. *See West Virginia*, 142 S. Ct. at 2610.

D. EPA's proposal fails to consider numerous factors that EPA is required to evaluate under section 111 and the Administrative Procedure Act.

Section 111 requires that EPA consider the cost of achieving the proposed emission reduction, any nonair quality health and environmental impact, and energy requirements. 42 U.S.C. § 7411(a)(1). Also, under the Administrative Procedure Act ("APA") as well as the CAA, agencies are required to engage in reasoned decisionmaking, and the agency's rule will be found arbitrary and capricious and unlawful if the agency, among other things, "entirely failed to consider an important aspect of the problem." *Motor Vehicle Mfrs. Ass'n of U.S., Inc.*, 463 U.S. at 43, 52; *see also Michigan v. EPA*, 576 U.S. 743, 750–51, 752 (2015) (relying on *State Farm*). Here, EPA failed to consider numerous factors, many of which have already been discussed, that the

agency was required to consider under both of these obligations. These factors include, among other things, EPA's own predictions regarding substantial growth in electricity demand, *supra* pp. 36–37, infrastructure permitting problems and delays, *supra* pp. 17–23, NERC's reliability warnings, *supra* p. 29, and the Department of Energy ("DOE") hydrogen roadmap.

To take only the last of these items: The DOE hydrogen roadmap is designed to provide a holistic, government-wide strategy, addressing hydrogen production, transport, storage, and use in the United States, to ensure the development and adoption of clean hydrogen.[68] EPA failed to consider whether, and if so how, its hydrogen co-firing BSER fits into this broad strategic framework. For example, the roadmap explains "the use of clean hydrogen will be focused strategically to provide maximum benefits, particularly in sectors that are hard-to-decarbonize."[69] And "[r]ather than competing with alternative low-cost and efficient decarbonization technologies . . . clean hydrogen adoption will focus on end-uses that lack alternatives and are in industries that can build momentum to enable scale, increase benefits, and drive down cost."[70]

EPA's failure to consider these and other important factors and problems further highlights that EPA's proposal is inconsistent with section 111 and does not comport with *State Farm*. *See Michigan*, 576 U.S. at 753 ("reasonable regulation ordinarily requires paying attention to the advantages *and* the disadvantages of agency decisions"). EPA's failure to consider the substantial growth in electricity demand and the infrastructure required to support CCS and

[68] U.S. Department of Energy, U.S. National Clean Hydrogen Strategy and Roadmap, at 2, available at https://www.hydrogen.energy.gov/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf

[69] *Id.* at 27–28.

[70] *Id.*

hydrogen co-firing improperly veils the true costs of its proposal, and moreover cannot be used to avoid application of the major questions doctrine.

In addition, EPA has failed to provide a meaningful opportunity to comment on the proposal as required under the APA and the CAA, which require that agencies provide "[t]he opportunity for interested parties to participate in a meaningful way in the discussion and final formulation of rules." *Conn. Light & Power Co. v. Nuclear Regul. Comm'n*, 673 F.2d 525, 528 (D.C. Cir. 1982). EPA fails to do so here. First, the 77 days provided is far less than the time period EPA has previously provided for comments on similar rules. For example, when EPA proposed the NSPS for new fossil fuel-fired EGUs in 2014, it gave the public 120 days to file comments. Then later that year, when it proposed emission guidelines for existing fossil fuel-fired EGUS, it provided 165 days. When EPA proposed the ACE Rule, it provided 192 days for comment. Second, EPA is not subject to any court order, consent decree, or statutory deadline that justifies a shortened comment period. Third, EPA took over two years to work on the proposal and yet is giving the public only 77 days to analyze them and prepare comments. Finally, on July 7, EPA added to the record new modeling that adds significant technical and substantive factual claims that require additional time for stakeholders to analysis and comment on. EPA's failure to provide a comment opportunity commensurate with the complexity of the proposal, particularly in light of the July 7 supplementation decision violates the APA and the CAA.

E. EPA's proposal would place unlawful restrictions on state planning authority that are not consistent with section 111(d).

EPA's proposed use of "presumptive" performance standards and restrictions on states' consideration of "remaining useful life" and "other factors" in the development of state plans is also unlawful. Under section 111(d), EPA is to "prescribe regulations which shall establish a

procedure . . . under which each State shall submit to the Administrator a plan which . . . establishes standards of performance for any existing source." 42 U.S.C. § 7411(d)(1). And in doing so, EPA's regulations must allow the state to "take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies." *Id.* In the proposed rule, however, EPA has imposed significant limits on states' ability to take into consideration the remaining useful life of a source, 88 Fed. Reg. at 33,398, which it is not authorized to do under section 111.

EPA's proposed requirement that state plans include "legally enforceable" increments of progress and milestones, 88 Fed. Reg. at 33,387–88, is inconsistent with section 111 and would cause significant disruption for national infrastructure development. Section 111 requires States to have flexibility to consider the "remaining useful life" of an existing source and other factors. 42 U.S.C. § 111(d)(1). As already explained, developing a vast national infrastructure for CCS and hydrogen co-firing will take time; because of the various obstacles involved that EPA has not considered, that project will take far more time than the proposed rule assumes. *Supra* pp. 17–23. Legally enforceable increments of progress and milestones would cause significant disruption to this process by requiring compliance from facilities when the necessary infrastructure does not yet exist and many factors necessary for compliance are outside the operator's control.

F. EPA's offer of "flexibility" is illusory.

For the same reason noted above, EPA's suggestion that if CCS does not prove workable, states can revise plans by 2028 to allow EGUs to retire, merely illustrates the "generation shifting" nature of the proposal. EPA's selection of two BSERs that are not adequately demonstrated in

turn would force units to retire, reduce utilization, or fuel switch. Again, that is generation shifting, which the Supreme Court has said EPA cannot impose under section 111.

The commenters' concerns about EPA's proposal are compounded by the fact that the agency has failed to adequately consider critical reliability issues. Even without considering the likely effect of EPA's proposal, regulators and regional transmission organizations have recently begun to issue warnings about near-term and long-term grid reliability. In May 2023, for example, the North American Electric Reliability Corporation ("NERC") released its 2023 Summer Reliability Assessment, which warned that nearly every region in the U.S. face elevated "risks of electricity supply shortfalls during periods of more extreme summer conditions." Similarly, on May 15, 2023, NERC issued its highest alert level ever, directing operators to take precautionary actions to prepare for cold weather and extreme weather events. In its alert, NERC noted that "the resource mix is undergoing significant change at a rapid pace. The system is becoming more reliant on variable energy resources and natural gas. Extreme winter weather events have stressed the supply of traditional fuels and the dependability of new resources."

Even before EPA issued its proposal, the PJM Interconnection (PJM) expressed similar concerns. In February 2023, PJM issued a report highlighting trends that present "increasingly reliability risks … due to a potential timing mismatch between resource retirements, load growth and the pace of new generation," including the fact that (1) the growth rate of electricity demand is likely to continue to increase from electrification; (2) thermal generators are retiring at a rapid pace due to government and private sector policies as well as economics; (3) retirements are at risk of outpacing the construction of new resources, due to a combination of industry forces, including siting and supply chain; and (4) PJM's interconnection queue is composed primarily of

intermittent and limited-duration resources and, in light of the operating characteristics of these resources, multiple megawatts of these resources are needed to replace 1 MW of thermal generation.[71]

EPA asserts that its extended deadlines for implementation and completion of BSER ensure that any grid reliability issues will be few and isolated. According to EPA, "[t]he stringency of these emission rate limits is set through assuming the installation of various greenhouse gas (GHG) emissions control technologies. Covered sources would therefore be able to comply with the rules with these within-the-fence technologies and are not required to reduce utilization or shift generation." EPA also cites several "off-ramps" it believes will address grid reliability issues caused by an individual unit's failure to complete BSER installation on time, or by a unit that selects retirement in lieu of BSER.

EPA's proposed extended compliance deadlines and off-ramps are not workable. As explained elsewhere in these comments (*supra* at III.A.3), EPA's proposed unrealistic deadlines would force EGU owners and operators to start BSER implementation well before the completion and approval of state plans, creating significant risk and uncertainty as to the ultimate obligations. Even if an EGU were to complete the on-site portion of its BSER by EPA's deadline, the BSER very likely would not be operational until the completion of massive amounts of infrastructure beyond the facility's control, such as thousands of miles of new interstate pipelines or the construction of new CO_2 sequestration sites and green hydrogen hubs—"technologies" that EPA implausibly characterizes as "within-the-fence" of an EGU site.

[71] PJM, *Energy Transition in PJM: Resource Retirements, Replacements & Risks*, at 1 (Feb. 24, 2023), available at https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx.

Any failure of EGUs to meet EPA's ambitious and unsubstantiated compliance deadlines has potentially significant impacts on system reliability. Indeed, despite EPA's optimism for its proposed implementation schedule, the agency's own modeling predicts that many EGU owners and operators will simply choose to retire generation units rather than install BSER. In recognition of this, EPA acknowledges that electric grid reliability may require continued operation of EGUs that do not have BSER in place or that have committed to retire in lieu of installing BSER. As potential remedies, EPA cites seldom-used system support agreements and U.S. Department of Energy temporary emergency orders; however, such measures are costly to consumers and each are subject to restrictions and process delays that make them inadequate to address the reliability problems created by EPA's proposal, particularly reliability problems that exist for lengthy periods due to multiple retirements.

In short, none of EPA's proposed contingency plans adequately address the resource reliability and adequacy issues raised by EPA's proposed rule. EPA's proposal relies on completion of a vast new network of pipelines, CO_2 storage and green hydrogen production, much if not all of which will be beyond the control of EGU owners and operators subject to the BSER deadlines. EPA's failure to propose adequately demonstrated BSER with realistic implementation deadlines risks economic waste and a simultaneous, nationwide shortfall of electricity generation, creating widespread grid reliability issues that cannot be mitigated through off-ramps.

In addition to failing to consider these serious reliability issues, EPA's proposal also fails to adequately consider the costs and its potential impact on consumers. Most notably, neither CCS nor hydrogen co-firing has been demonstrated to be cost-effective. *Supra* III.A.5. Nevertheless, EPA projects that the Inflation Reduction Act ("IRA") will "accelerate the pace of

innovation and deployment" of these technologies and that it was reasonable for EPA to take the IRA "into account" in its RIA "because it reduces the cost of the controls to the source." But this is nothing more than speculation. As an initial matter, it seems implausible that tax incentives alone under the IRA could spur the conversion of CCS and hydrogen into proven technologies in the short time required under EPA's proposal. As discussed above, these technologies are still in their development stages and are far from being scaled at national level. *Supra* III.A.1.

But even if these technologies had a proven track record, researchers from Princeton University have explained that the impact of the IRA "depends on more than doubling the historical pace of electricity transmission expansion over the last decade."[72] According to the researchers, such infrastructure is needed to "interconnect new renewable resources at sufficient pace and meet growing demand from electric vehicles, heat pumps, and other electrification."[73] As discussed above, the expansion of any such transmission capacity has been met with fierce opposition across the country over the past several years, with many projects being delayed or cancelled altogether. *Supra* III.A.1.a.1. Indeed, as the researchers also explained, "several constraints . . . may limit" the impact of the IRA, "including the ability to site and permit projects at requisite pace and scale, expand electricity transmission and CO_2 transport and storage to accommodate new generating capacity, and hire and train the expanded workforce to build these projects."[74] As a result, even assuming that CCS and hydrogen co-firing can be

[72] Princeton University, Zero Lab, *Electricity Transmission is Key to Unlock the Full Potential of the Inflation Reduction Act*, at 3, https://repeatproject.org/docs/REPEAT_IRA_Transmission_2022-09-22.pdf (Sept. 2022).

[73] *Id.*

[74] Jenkins, J.D., Mayfield, E.N., Farbes, J., Jones, R., Patankar, N., Xu, Q., Schivley, G., Princeton University – Zero Lab REPEAT Project, *Preliminary Report: The Climate and Energy Impacts of the Inflation Reduction Act of 2022* (August 2022), available at https://repeatproject.org/docs/REPEAT_IRA_Prelminary_Report_2022-08-04.pdf.

adequately developed within the next few years, the prospect for the IRA to have the impact that EPA projects based on a massive expansion of infrastructure seems unlikely, particularly without the types of permitting reforms the commenters have proposed in the past.

EPA's failure to consider the consequences for regulated parties and consumers of its ambitious predictions' being proved wrong means that EPA's assessment of the costs and benefits of the proposed rule is incomplete and, indeed, may be wholly illusory. If EPA's predictions are wrong, the rule produces no benefits. And by diverting resources from existing utility decarbonization plans, the rule could substantially increase decarbonization costs beyond those currently being incurred by industry (and thus consumers), with no corresponding benefit.

EPA's offer to use "administrative compliance orders" to address reliability, 88 Fed. Reg. at 33,401, also is not a solution to the severe consequences of electricity shortfalls and may represent an unlawful blanket use of enforcement discretion, which must be carefully analyzed before EPA should undertake any such approach. *See, e.g., Texas v. United States*, 809 F.3d 134, 184-85 (5th Cir. 2015), *aff'd by equally divided vote*, 579 U.S. 547 (2016). EPA claims that it can mitigate any reliability impacts from the proposed rule by using "administrative compliance orders" to force EGUs to "temporarily operate for reliability reasons." *Id.* at 33,415. However, this is not a sustainable long-term solution to the potentially severe consequences of electricity shortfalls that may occur as a result of the proposed rule. Energy demand fluctuates at various times during the day and based on weather events. EPA's proposed solution of relying on administrative compliance orders is an emergency, stop-gap measure, but it is not sustainable or efficient for EPA to have to continue to intervene on an emergency basis in order to ensure sufficient electricity generation. Moreover, EPA is not the appropriate federal agency to be

making significant and material decisions regarding the reliability of the power grid, which is instead within the authority of the States and the Federal Energy Regulatory Commission ("FERC"). The Federal Power Act, 16 U.S.C. §§ 791a, *et seq.*, provides that "the States retain their traditional responsibility in the field of regulating electrical utilities for determining questions of need, reliability, cost, and other related concerns," *Pac. Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm'n*, 461 U.S. 190, 205 (1983), with the power of FERC limited "to those matters which are not subject to regulation by the States," 16 U.S.C. § 824(a).

EPA's effort here also may represent an unlawful attempt to exercise enforcement discretion by rule. "[A]n agency's decision not to prosecute or enforce . . . is a decision generally committed to an agency's absolute discretion." *Heckler v. Chaney*, 470 U.S. 821, 831 (1985). An agency's "exercise of its enforcement power" is distinct from an agency's exercise of rulemaking authority in practice because the enforcement power "presumptively lies beyond the reach of APA review as an action 'committed to agency discretion by law.'" *Schering Corp. v. Heckler*, 779 F.2d 683, 686 (D.C. Cir. 1985). But where, as here, EPA attempts to adopt a blanket policy regarding how it will exercise its enforcement discretion, it effectively is attempting to adopt a rule on this matter without acknowledging that it is doing so, which would be arbitrary and capricious and would raise concerns about circumvention of the statutory limits on how EPA may exercise its power under the relevant provisions of the Clean Air Act.

G. EPA should affirm the proposed preamble language and regulatory text, which exclude certain combustion and combined-cycle turbines and industrial EGUs.

Finally, consistent with its prior practice and to avoid economic waste and upsetting reliance interests, EPA should adopt its proposal that combustion and combined cycle turbines that began construction between January 8, 2014 and May 23, 2023, be excluded from the new

section 111(d) rule and remain subject to the TTTT rule from the 2015 NSPS. 88 Fed. Reg. at 33,280. Similarly, EPA should include in any final rule its proposal to exclude the industrial EGUs ("co-gens") from 40 CFR part 60, subpart TTTT and TTTTa. And to maintain consistency with NSPS UUUUb, the threshold for applicability for existing sources should be maintained at 300MW. Because NSPS apply to affected facilities that commence construction after the date of proposal, CAA section 111(b)(6), combustion and combined cycle turbines that began construction after January 8, 2014, relied upon the TTTT rule from the 2015 NSPS to make commitments to construct these new facilities. As a matter of law, new sources, subject to the 2015 NSPS, cannot be existing sources subject to EPA's latest proposal. In all events, it would be inequitable to upset their reliance interests. *See Dep't of Homeland Sec. v. Regents of the Univ. of California*, 140 S. Ct. 1891, 1913 (2020) ("When an agency changes course . . . it must 'be cognizant that longstanding policies may have 'engendered serious reliance interests that must be taken into account.'" (quoting *Encino Motorcars, LLC*, 579 U.S. at 221–22)).

IV. Conclusion

The commenters strongly support and are committed to working with EPA to develop—achievable, durable, cost-effective power sector GHG regulations that accelerate progress on emissions reductions goals. The commenters likewise support the potential for the further development and application of CCS and hydrogen technologies. However, agencies are required to comply with the statutory limits imposed by Congress and base their regulatory decisions on sound assumptions and reliable data. EPA's proposal fails to live up to that standard. EPA misapprehends and misrepresents the current state of CCS and hydrogen technology and infrastructure and makes projections about the future development of such technology and

infrastructure that are not plausible, even under the most optimistic scenarios. In turn, EPA has improperly proposed to designate as BSER systems that have not been "adequately demonstrated" as is required under the CAA. Incorrectly, EPA relies upon demonstration and test projects, facilities that operate in different industries, and planned projects that cannot show that CCS and hydrogen co-firing have a "proven track record" when applied to EGUs. Because the proposed BSER are not systems that have not been adequately demonstrated, its proposal necessarily amounts to a generation shifting regime, requiring units to either close down or switch to lower emitting fuels, in direct violation of the Supreme Court's decision in *West Virginia v. EPA*. Finally, EPA's proposed rule is arbitrary and capricious because it fails to consider a number of important factors and fails to afford states the flexibility in setting state plans required under section 111. Due to these many irremediable flaws with its proposal, the EPA should withdraw the proposed rule, and should repropose legally sound and durable regulations to address EGU GHG emissions.