Institute *for* Policy Integrity
NEW YORK UNIVERSITY SCHOOL OF LAW

May 28, 2024

To: Penny Lassiter, Director of Sector Policies and Program Division, Office of Air Quality Planning and Standards Environmental Protection Agency

Re: Non-regulatory Public Docket on Reducing Greenhouse Gas Emissions from New and Existing Fossil Fuel-Fired Stationary Combustion Turbines (Mar. 26, 2024) (Docket No. EPA-HQ-OAR-2024-0135)

The Institute for Policy Integrity at New York University School of Law (Policy Integrity)[1] respectfully submits the following comments to the Environmental Protection Agency (EPA) on its request for input on reducing greenhouse gas (GHG) emissions from new and existing fossil-fuel-fired stationary combustion turbines (the information request).[2] Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy.

EPA has indicated that it intends to develop not only regulations that will limit GHG emissions from existing fossil-fuel-fired stationary combustion turbines under Section 111(d) of the Clean Air Act, but additionally to review new source performance standards for criteria pollutants (40 CFR 60 KKKK) and to review and update the national emissions standards for hazardous air pollutants (NESHAP) (40 CRF 63 YYYY) for these units.

EPA should consider the following points and recommendations when developing regulations for existing fossil-fuel-fired stationary combustion turbines:

- EPA should move forward expeditiously to regulate GHG emissions from existing gas turbines, and regulate the fleet comprehensively, **to avoid creating perverse "grandfathering"-type incentives for operators to extend the natural useful life of existing turbines**. Since EPA has recently finalized GHG regulations for new gas turbines, without accompanying existing gas regulations, operators may experience incentives to run older, less-efficient turbines for additional years rather than invest in more heavily regulated new turbines, which have lower emissions intensities. While EPA does not need to regulate all types of units with similar levels of stringency, applying regulation to a larger percentage of the gas fleet than its prior proposal will better reduce these perverse incentives. **(Question 6)**
- **EPA should carefully design the final rule, and complementary regulatory programs, to ensure that use of hydrogen co-firing does not undermine the climate benefits of the rule.** EPA should make a low-GHG requirement severable only if it finds that promulgating an emission limit based on hydrogen co-firing without specifying the

[1] This document does not purport to present the views, if any, of New York University School of Law.

use of low-GHG hydrogen would also avoid a net increase in GHG emissions. If hydrogen co-firing is available only as a compliance pathway then EPA can still support the use of low-GHG hydrogen by **promulgating a model State Implementation Plan (SIP) that includes low-GHG hydrogen use. EPA should use additional levers to control lifecycle hydrogen emissions more comprehensively, and work in coordination with other federal agency and state actions to control these emissions, including the final Treasury rule for the clean hydrogen production tax credit. (Question 1)**

- EPA should offer **guidance to states on use of emissions trading as flexible compliance to ensure that such programs prevent leakage and co-pollutant hotspots that disproportionately burden environmental justice communities.** Under a rule that regulates a larger percentage of existing gas units, there are larger opportunities to reduce overall program costs through market-based mechanisms, but those mechanisms must be designed such that overall GHG and co-pollutant emissions do not increase, taking into consideration the complexities of any subcategorization that EPA may use. **(Questions 2b, 5b, 7)**
- EPA has the legal authority to include market-based mechanisms like emissions trading and averaging in its new Section 111 regulations as either a component of the "best system of emission reduction" or as a compliance option. Under Section 111 of the Clean Air Act, EPA must identify a "best system of emission reduction" (BSER) and then base emission guidelines for existing sources on the emission reductions achievable by application of this BSER. The Supreme Court's decision in *West Virginia v. EPA* left intact a pathway to include market-based mechanisms to reduce the costs of a BSER. **Even if EPA does not elect to exercise its authority to include market-based mechanisms as part of the BSER, these mechanisms are still lawful compliance pathways. (Question 2a)**
- EPA should continue its ongoing work to coordinate with the entities responsible for grid reliability, but **EPA can move forward to regulate existing gas resources without sacrificing grid reliability, and it must do so to fulfill its responsibility for pollution reduction.** The electric grid is in a period of transition which will require further action to ensure reliability, regardless of EPA's rules. Many different reliability entities, including the Federal Energy Regulatory Commission, electric reliability organizations, regional transmission operators, and state regulators, possess the tools and authorities/responsibilities to manage reliability effects of a shifting energy landscape. They have pathways to improve those tools to address new electric-grid challenges and any incremental reliability effects of EPA's rules. **(Question 5a)**

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I. Background

In May 2023, EPA proposed new GHG regulations under Section 111 of the Clean Air Act that included the largest and most frequently run existing gas-fired turbines in addition to new gas-fired turbines and existing coal- and oil-fired power plants.[3] When EPA finalized this rule's requirements for new gas-fired turbines and existing coal- and oil-fired units in April 2024, it did not include existing gas-fired turbines.[4] EPA announced it was redoing the proposal for existing gas regulation to be more comprehensive and in coordination with other regulations to address additional pollutants.[5]

Under Section 111, EPA must set air pollution limits for categories of new and existing sources that reflect "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 Administrator determines has been adequately demonstrated."[6] A BSER is not a mandate to install a particular technology. Instead, it determines the stringency of the performance standards for new sources or the emission guidelines for existing sources. For new and modified sources, EPA uses the BSER to set emission limits through New Source Performance Standards.[7] For existing sources, EPA sets them through emission guidelines, and then states submit SIPs that include performance standards of equivalent stringency.[8]

II. EPA should move forward expeditiously to regulate GHG emissions from existing gas turbines, and regulate the fleet comprehensively, to avoid creating perverse "grandfathering"-type incentives for operators to keep running existing turbines longer (Question 6).

EPA is legally obligated to move forward with regulating existing gas turbines,[9] and should quickly proceed with regulating new sources to avoid creating perverse economic incentives from having only existing sources regulated. Legal and economic scholars have long recognized

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[3] 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, 88 Fed. Reg. 33,240 (proposed May 23, 2023) [hereinafter Proposed Rule].

[4] 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, 89 Fed. Reg. 39798 (May 9, 2024) [hereinafter Final Rule for New Gas and Existing Coal].

[5] *Statement from EPA Administrator Michael S. Regan on EPA's Approach to the Power Sector*, EPA (Feb. 29, 2024), https://www.epa.gov/newsreleases/statement-epa-administrator-michael-s-regan-epas-approach-power-sector.

[6] 42 U.S.C. § 7411(a)(1) (emphasis added).

[7] *Id*. § 7211(b).

[8] *Id*. § 7411(d). Even though EPA is not, in the case of existing sources, charged with implementing existing-source standards, it is responsible for determining their minimum stringency through emission guidelines.

[9] Under Section 111, EPA's action to regulate a pollutant from new sources triggers an obligation to do the same for existing sources when the pollutant meets certain criteria. *See* 42 U.S.C. § 7411(d).This existing source requirement applies to pollutants which are not regulated as criteria pollutants under Section 110 or air toxics under Section 112. *See id*. GHG emissions are not regulated under Section 110 or Section 112. Consequently, EPA's regulation of GHG emissions from new gas turbines has triggered a requirement for EPA to regulate GHG emissions from existing gas turbines.

that stringently regulating new sources of pollution while exempting existing sources—a regulatory practice commonly known as "grandfathering"—can perversely encourage those existing sources to stay in operation longer than they otherwise would and lead to adverse environmental consequences.[10] Older plants can be less efficient and produce greater rates of not only GHG emissions, but also other air pollution, including NO_x emissions.[11] Reducing perverse incentives to increase emissions of both GHG and co-pollutants is consistent with EPA's regulatory goals to consider multiple pollutants from gas turbines. In particular, EPA has acknowledged the importance of reducing NO_x and other health-harming pollution from gas turbines, which can further exacerbate the disproportionate pollution burden borne by environmental justice communities.

The "grandfathering" of existing sources is sometimes called the "old plant effect"[12] and has been a longstanding challenge of Clean Air Act implementation.[13] In theory, major modification of existing sources should trigger more stringent requirements and reduce the old plant effect, but in practice, EPA has not consistently closed loopholes that allow existing plants to skirt these requirements.[14]

Expanding the applicability of the GHG regulations to cover more of the existing fleet will also help prevent the old plant effect and other perverse incentives. Leaving most of the source category unregulated, as EPA's original proposal for existing gas turbines would have done,[15] would have allowed some old plant effect given the many unregulated units in the sector. Regulating a small portion of the gas fleet can also create perverse incentives to shift generation from larger, more-efficient plants to smaller, less-frequently operated plants. Such smaller plants can be less efficient and produce greater rates of GHG emissions and other air pollution, including NO_x emissions (see Figures A & B).[16] In its new proposal, EPA can help prevent both of these types of effects by regulating a larger percentage of the gas fleet.

[10] *See* Richard L. Revesz & Jack Lienke, Struggling for Air: Power Plants and the "War on Coal" 30–35 (2016); *see also* Richard L. Revesz & Allison L. Westfahl Kong, *Regulatory Change and Optimal Transition Relief*, 105 Nw. U. L. Rev. 1581 (2011); Jonathan Remy Nash & Richard L. Revesz, *Grandfathering and Environmental Regulation: The Law and Economics of New Source Review*, 101 Nw. U. L. Rev. 1677 (2007).
[11] *See, e.g.*, U.S. Gov't Accountability Office, Air Emissions and Electricity Generation at U.S. Power Plants (Apr 18, 2012), https://perma.cc/GXG4-9FF6.
[12] Nash & Revesz, *supra* note 10, at 1708.
[13] *See generally* Revesz & Lienke, *supra* note 10.
[14] *See* Richard L. Revesz and Jack Lienke, *The Tragic Flaw of the Clean Air Act* (May 17, 2016), The Regulatory Review, https://perma.cc/6UDV-RS3Z.
[15] The proposed guidelines would have regulated only existing units that are larger than 300 MW and run more than 50% of the time. Proposed Rule at 33,362. EPA "projects that 37 GW of capacity would meet these criteria in 2035, representing 14 percent of the projected existing combustion turbine capacity and 23 percent of the projected generation from existing combustion turbines in 2035." Proposed Rule at 33,361. Other analysis estimates this threshold may cover as little as 7% of natural gas units, responsible for less than 30% of the CO_2 emissions from gas-fired units in the power sector.[15] Amanda Levin & Sophia Ahmed, *Strengthen Power Plant Carbon Standards for Greater Climate Benefit*, Nat. Res. Def. Council (May 22, 2023), https://perma.cc/G3SN-6FXW.
[16] *See, e.g.*, Figures A & B (comparing the GHG & NO_x emissions rates for existing gas-fired EGUs by size (nameplate capacity)). Many smaller units have higher emissions rates for GHGs and NO_x. *See id*.

Figure A: CO_2 Emissions Rates (lbs. / MWh-gross) vs. Nameplate Capacity (MW), Natural Gas-Fired Units, 2021

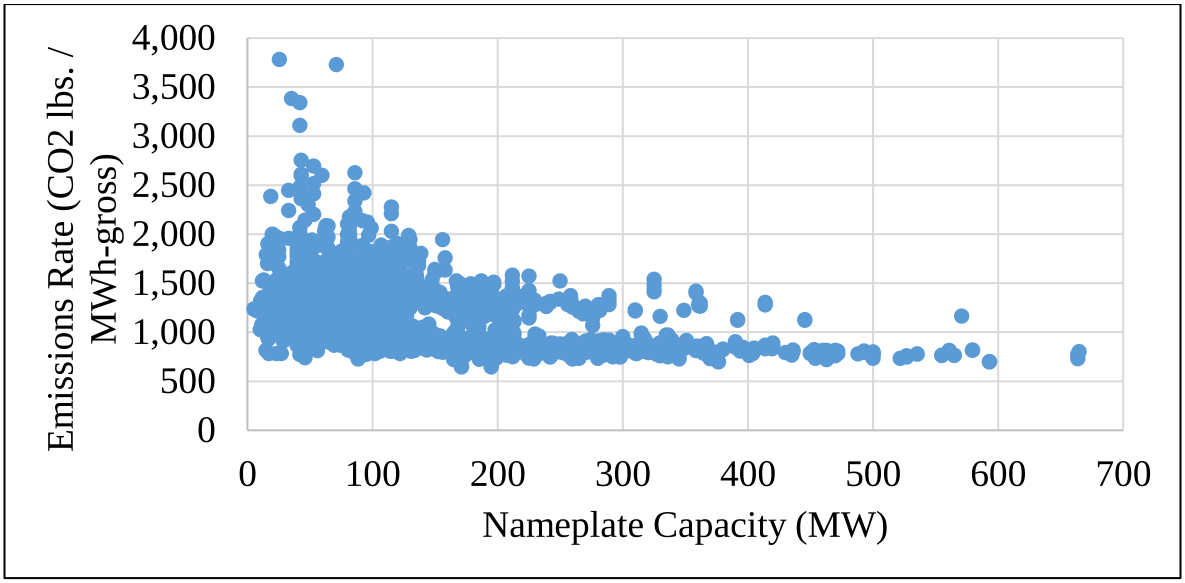
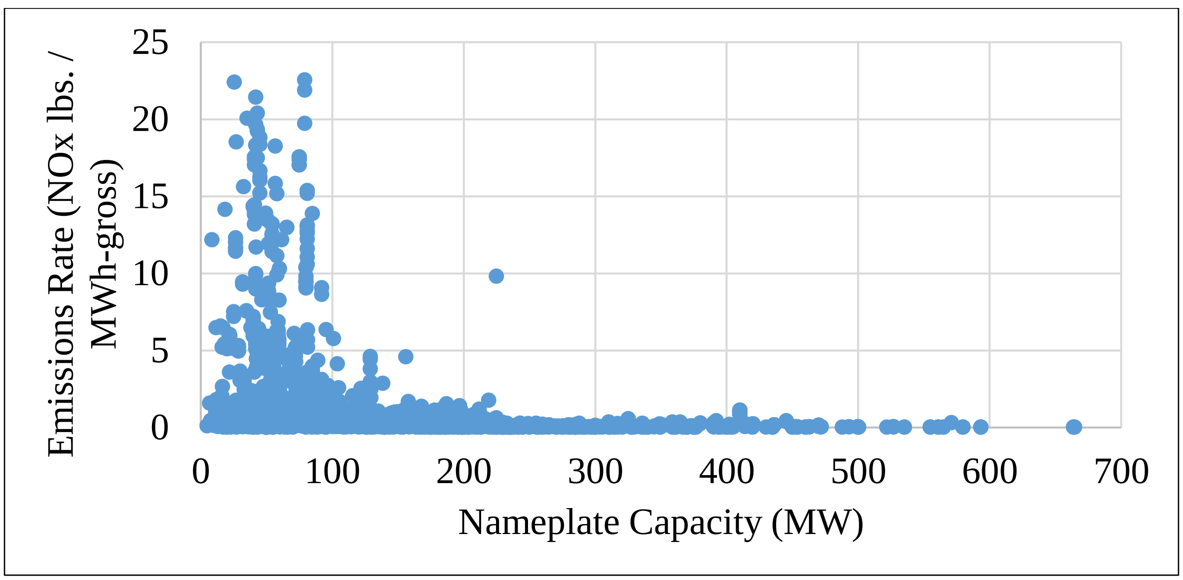


Figure B: NO_x Emissions Rates (lbs. / MWh-gross) vs. Nameplate Capacity (MW), Natural Gas-Fired Units, 2021



Emissions rates for the two figures were calculated using EPA's Clean Air Markets Program Data (CAMPD), available at https://campd.epa.gov/data/custom-data-download. We filter for units with natural gas or pipeline natural gas listed as the primary fuel type, and combustion turbine or combined cycle as the unit type. Consistent with the methodology employed by EPA in its technical support documentation (Natural Gas-and Oil-fired Steam Generating Unit Technical Support Document, Simple Cycle Stationary Combustion Turbine EGUs Technical Support Document, Docket ID No. EPA-HQ-OAR-2023-0072), we compute emissions rates as pounds of 2021 emissions divided by gross megawatt hours. Nameplate capacities for generators associated with each unit were determined using the CAMPD facility level data. Outliers with emissions rates greater than 4,000 lbs. CO2 per MWh-gross or 30 lbs. NO_x per MWh-gross are omitted from the plots.

The heterogeneity of existing gas units and the fact that they serve different load roles with a range of capacity factors (e.g., peaker, intermediate, and baseload) will add complexity to regulating the existing gas fleet more comprehensively. For example, it may not be cost reasonable for less frequently run peaker units to undertake the same emission reduction system that is cost reasonable for more frequently operated intermediate or baseload units. To regulate the fleet more comprehensively in light of these complexities, EPA can also tailor the program through subcategorizations or other means to distinguish between peakers and baseload generation to the extent such subcategorization is benefit-cost justified.[17]

III. EPA should carefully design the final rule, and complementary regulatory programs, to ensure that use of hydrogen co-firing does not undermine the climate benefits of the rule (Question 1).

EPA can also better ensure the climate benefits of its rule by offering further direction on the use of hydrogen co-firing and accounting for its related GHG emissions. In May 2023, EPA proposed a BSER for certain existing gas turbines based on co-firing hydrogen with natural gas. As EPA again considers whether to include hydrogen co-firing as part of a BSER for existing gas turbines, it should consider the following recommendations from Policy Integrity's recent report *Hydrogen Co-Firing and the EPA's Greenhouse Gas Limits for Power Plants* (attached).[18]

EPA can best ensure that the rule achieves CO_2 emission reductions by specifying that any hydrogen co-firing BSER is based on low-GHG hydrogen,[19] such as hydrogen with an emissions intensity of less than 0.45 kg CO_2e/kg H_2.[20] That emissions intensity is currently achievable only through zero-emissions-electricity-powered electrolysis.[21] Although hydrogen does not release CO_2 when burned, it can cause significant GHG emissions during production. The carbon intensity of the dominant production method (steam methane reforming) is 4.6 kg CO_2e/kg H_2 with 96.25% carbon capture & sequestration (CCS) and 10–12 kg CO_2e/kg H_2 without CCS.[22] Department of Energy modeling and other evidence suggest that, without a requirement to co-fire low-GHG hydrogen, operators would use significant amounts of hydrogen produced via steam methane reforming, which risk blunting or overwhelming a future EPA rule's climate benefits.[23]

In addition to direct emissions from hydrogen production (including steam methane reforming and the electric grid emissions from powering electrolysis, hydrogen leakage also affects hydrogen's emissions intensity.[24] Although hydrogen is only an indirect GHG, one recent study

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[17] For example, more frequently run new gas units will be able to afford more stringent pollution controls, while some less frequently operated peakers may not be able to but may still be needed for reliability.

[18] DENA ADLER & MATTHEW LIFSON, INST. FOR POL'Y INTEGRITY, HYDROGEN CO-FIRING AND THE EPA'S GREENHOUSE GAS LIMITS FOR POWER PLANTS (2024), [hereinafter HYDROGEN CO-FIRING REPORT] https://perma.cc/KD98-VAXE.

[19] *Id.* at 6–8.

[20] This was the definition of "low-GHG hydrogen" proposed last year by EPA. Proposed Rule at 33,304.

[21] HYDROGEN CO-FIRING REPORT, *supra* note 18, at 6 (citing DEP'T OF ENERGY, PATHWAYS TO COMMERCIAL LIFTOFF: CLEAN HYDROGEN 10 fig.2 (2023) [hereinafter DOE COMMERCIAL LIFTOFF], https://perma.cc/FB6J-L22K).

[22] *Id.* at 6–7 (citing DEP'T OF ENERGY, HYDROGEN SHOT TECHNOLOGY ASSESSMENT 12, 19–20 (2023), https://perma.cc/84CW-49X9).

[23] *Id.* at 7–8 (citing DOE COMMERCIAL LIFTOFF, *supra* note 21, at 37 fig.15).

[24] *Id.* at 8.

estimated the twenty-year global warming potential (GWP20) of hydrogen at 37.3.[25] Having a GWP20 37.3 means that hydrogen causes 37.3 times as much warming over a 20-year period as an equal mass of CO_2.[26] Hydrogen emissions occur throughout the entire value chain (production, conversion, transportation, distribution, storage, and end-use), both intentionally (operational purging and venting) and accidentally (leakage).[27] If co-fired hydrogen were associated with a hydrogen emissions rate of 1.2%, the hydrogen emissions by themselves would be the equivalent of 0.45 kg CO_2e /kg H_2.[28] One survey of the literature reports that total hydrogen leakage estimates range from 0.2% to 20%.[29] Because there is enough variability in the emissions intensity of hydrogen, only co-firing only certain types of hydrogen will actually result in climate benefits relative to burning natural gas alone.

In last year's proposal, EPA considered the possibility of promulgating a hydrogen co-firing BSER with a *legally severable* low-GHG hydrogen limitation—meaning the BSER would persist if a court were to reject EPA's authority to impose a low-GHG limitation.[30] As EPA considers this option, it should assess the risk that promulgating an emission limit based on hydrogen co-firing, without specifying the use of low-GHG hydrogen, would lead to a net increase in GHG emissions.[31] EPA should rely on this assessment to decide whether the low-GHG limitation should be legally severable.[32] A key factor influencing the risk of net climate harm absent a low-GHG limitation will be what additional actions EPA and other federal agencies take to address hydrogen's lifecycle emissions beyond this rulemaking.[33]

A variety of other complementary regulatory tools could help reduce the emissions intensity of the hydrogen supply and thus make a low-GHG requirement less necessary in a Section 111 rule for existing gas, and decrease the potential climate harms of promulgating a severable low-GHG requirement.[34] EPA, the Department of Treasury, the Pipeline and Hazardous Materials Safety Administration (PHMSA), and states all have relevant authorities and responsibilities for decreasing the emission intensity of the hydrogen supply. Possible actions include Treasury finalizing rules for the clean hydrogen production tax credit that require accurate emissions accounting for electrolytic hydrogen;[35] EPA setting emission limits for fossil-based hydrogen production (a topic on which it is about to open a non-regulatory docket);[36] EPA setting emission limits for hydrogen infrastructure;[37] the PHMSA setting safety standards for hydrogen pipelines;[38] and EPA further updating regulations for methane emissions in the oil and gas

[25] *Id.* (citing Maria Sand et al., *A Multi-Model Assessment of the Global Warming Potential of Hydrogen*, 4 COMMC'NS EARTH & ENV'T 1, 5 (2023)).
[26] *Id.*
[27] *Id.* (citing Sofia Esquivel-Elizondo et al., *Wide Range in Estimates of Hydrogen Emissions from Infrastructure*, 11 FRONTIERS IN ENERGY RES. 1, 3–4 (2023)).
[28] *Id.*
[29] *Id.* (citing Esquivel-Elizondo et al., *supra* note 27, at 5).
[30] *See* Proposed Rule, *supra* note 3, at 33,316.
[31] HYDROGEN CO-FIRING REPORT, *supra* note 18, at 8–10.
[32] *Id.* at 9–10.
[33] *Id.* at 10, 20–25.
[34] *Id.* at 20–25.
[35] *Id.* at 20.
[36] *Id.* at 21–22.
[37] *Id.* at 22–23.
[38] *Id.* at 23–24.

sector.[39] Additionally, the states have many policy options for addressing hydrogen's lifecycle emissions.[40]

Even if the final rule does not include a BSER based on hydrogen co-firing, sources may still choose to use hydrogen co-firing as a method to achieve compliance. EPA should provide direction on how states can specify practices in their state plans to ensure that use of hydrogen co-firing achieves compliance in a manner that does not undermine the regulation's climate benefits.[41] Without appropriate safeguards, SIPs may allow operators to use cheap, high-GHG hydrogen to comply. It would be strange, for example, if a natural gas unit were allowed to achieve compliance with a performance standard based on 90% CCS by co-firing hydrogen produced with electricity from burning natural gas *without any* CCS—a process that would result in more total emissions than burning gas directly without CCS.[42]

EPA has the authority to reject any SIP that is not "satisfactory," at which point EPA could establish a federal plan.[43] One technique that may help improve implementation and enforcement would be for EPA to design and define an automatically approved compliance alternative for hydrogen co-firing that meets specified standards for using low-GHG hydrogen.[44] Such an approved alternative for existing sources could be integrated into model SIPs.[45] As with including hydrogen co-firing as part of the BSER, the prevalence of other regulatory mechanisms to decrease the emissions intensity of the hydrogen supply (as discussed in the above paragraph) is relevant to the impacts of using hydrogen co-firing as a compliance strategy.

Additionally, to ensure that turbine operators comply with any requirement to co-fire with low-GHG hydrogen, EPA should impose an accurate verification requirement.[46] If the Department of Treasury (Treasury) finalizes a rule similar to its strong proposal for verification protocols for the clean hydrogen production tax credit based on the purchase of certain energy attribute certificates, EPA should adopt these protocols.[47] Three key features of Treasury's proposed protocols that would support accurate emissions verification are: an incrementality requirement, a transition to hourly matching, and a deliverability requirement. In our recent report, we define these features and explain how they help ensure that electrolyzers are not inducing additional GHG emissions on the grid beyond what they report.[48] Proper verification protocols will be important for use of hydrogen co-firing as part of a BSER or as a compliance strategy.

[39] *Id.* at 23.
[40] *Id.* at 24–25.
[41] *Id.* at 18–19.
[42] *Id.* at 18.
[43] *Id.* at 18–19 (quoting 42 U.S.C. § 7411(d)(2)(A)).
[44] *Id.* at 19.
[45] *Id.*
[46] *Id.* at 11–17.
[47] *Id.* at 11.
[48] *See id.* at 11–16.

IV. EPA should offer guidance to states on the design of emissions trading and averaging mechanisms used for implementation and compliance (Questions 2b, 5b, 7)

Using emissions trading and averaging mechanisms[49] as part of regulatory implementation can help lower implementation costs, but such tools must be used in a manner consistent with fully achieving the pollution reduction goals of the regulatory program. This section summarizes considerations to inform the use of emissions trading and averaging mechanisms as part of implementation and compliance. EPA should set guardrails to better ensure that states' use of these compliance mechanisms would not increase overall GHG emissions or disproportionate impacts from co-pollutants.

A. Regulating a larger portion of the existing gas fleet could allow for more significant economic gains from emissions trading if the program is designed appropriately to prevent regulatory leakage and other dynamics that can result in emission increases.

Market-based mechanisms like emissions trading and averaging may yield greater benefits under a future proposal with expanded application to a greater percentage of the gas fleet than under the prior proposal, which was limited to a smaller percentage of the fleet. A rule with broader coverage brings in greater variation in emission rates and potential abatement opportunities, and therefore larger gains from trading. The wide range of capacity factors across gas turbines[50] suggests there may be significant variation in abatement opportunities, and therefore economically significant cost reductions from using emissions trading for compliance.

The advantage of emissions trading relative to a command-and-control policy is that it facilitates the lowest-cost abatement solutions, particularly when abatement costs are highly varied across units and largely unknown to the regulator.[51] Use of emissions trading and averaging can increase economic efficiency for two reasons. First, if emissions trading and averaging is incorporated as part of the BSER, it can help achieve greater emissions reductions at a reasonable cost (see section below). Second, it can help achieve a given emissions target at a lower overall compliance cost. But implementation of a market-based approach must be designed to ensure that it does not undermine or weaken the designated emissions target. As EPA notes, such a "requirement is rooted in the structure and purpose of CAA section 111."[52]

Thus, a scenario in which states can use emissions trading and averaging as a compliance approach for existing gas turbines is effective and appropriate only when the program is designed with sufficient guardrails to ensure equivalent emissions reduction as would occur if implementing the rule without use of trading and averaging ("Emission Reduction

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[49] In the Final Rule for New Gas and Existing Coal, EPA specifically discussed rate-based averaging that "allows multiple affected [electric generating units] to jointly meet a rate-based standard of performance. The scope of such averaging could apply at the facility level (*i.e.,* units located within a single facility) or at the owner or operator level (*i.e.*, units owned by the same utility)." Final Rule for New Gas and Existing Coal at 39,983.

[50] *Use of Natural Gas-Fired Generation Differs in the United States by Technology and Region,* U.S. ENERGY INFORMATION ADMINISTRATION (Feb. 22, 2024), https://perma.cc/8QQN-EES8.

[51] *See, e.g.,* Montgomery, W. David, *Markets in Licenses and Efficient Pollution Control Programs*, 5 J. OF ECON. THEORY 2 (1972), 395–418. *See also* David A. Weisbach, *Regulatory Trading*, 90 UNIV. OF CHI. L. REV. 4 (2023) at 5-11.

[52] Final Rule for New Gas and Existing Coal at 39,980–81.

Equivalence"). Consequently, EPA should set up guidance for any states electing to use these mechanisms to ensure that their use does not undermine emission reduction goals.

Without proper safeguards, market-based mechanisms could undermine emission reduction goals through regulatory leakage, which occurs when generation moves to unregulated or less-regulated units, and gamesmanship, which occurs when owners and operators take advantage of loopholes in trading programs or otherwise game these programs to allow for higher emissions. For example, regulatory leakage could occur if production is diverted from units in one subcategory to units under a different subcategory with a less strict emissions standard (e.g., units that only need to report their emissions or units that are subject to less strict regulations under the "remaining useful life and other factors provision"). Gamesmanship could include the averaging of emissions between more heavily-regulated units and units subject to a less-strict emissions standard. Aware of such risks, EPA prohibited trading in certain cases under its Final Rule for New Gas and Existing Coal.[53] For example, EPA prohibited averaging emissions between more heavily-regulated units and units subject only to reporting requirements.[54]

Importantly, if EPA decides to use a similar system of subcategorization based on capacity factors as it drafted in its prior proposal, it will need to take precautions as it did in the Final Rule for New Gas and Existing Coal to ensure Emission Reduction Equivalence. For example, in its recently finalized guidelines for GHG emissions from existing coal-fired units, EPA requires that states include a backstop limit on emissions rates for affected Electric Generating Unit that use a mass-based compliance flexibility.[55] EPA should consider whether additional restrictions are needed under any future proposals. Such restrictions may include restricting trading between differently situated subcategories, or a dynamic resetting of the cap in light of retirements and other actions.

In addition to situations of regulatory leakage or gamesmanship, EPA should also consider the treatment of emission reductions that certain more efficient units would have achieved even absent a trading program, and that nevertheless result in tradeable credits under a trading program. If those more efficient units trade the allowances with units that are emitting in excess of the performance standards, the net effect will be greater emissions than absent the trading program.[56]

EPA should design its guidance to avoid such a situation, which could reward some sources with credits for emissions reductions that they would have achieved even without the rule and allow

[53] Final Rule for New Gas and Existing Coal at 39,982–83
[54] *Id*.
[55] Final Rule for New Gas and Existing Coal at 39,981.
[56] For example, certain subcategories may typically exceed their performance standards through routine operation (Group A), while other subcategories may require more retrofitting to comply with the BSER (Group B). Imposing standards on individual sources within each subcategory would result in Group A continuing to exceed its applicable performance standard, and in Group B installing retrofits to meet its applicable performance standard. The resulting real-world average emissions rate across the two subcategories would be lower than the average rate that would obtain if each individual source generates emissions exactly at the standard (due to Group A's over-compliance). Allowing trading or averaging between groups, in contrast, could result in relatively greater emissions (i.e., lower emissions reductions, thereby failing to achieve Emission Reduction Equivalence) if the emissions rates from both groups are counted in the aggregate, as these market-based approaches would require less stringent reductions specifically within Group B sources, which could instead count on Group A's overcompliance.

other sources to avoid compliance obligations by buying those credits, which do not reflect true "additional" reductions. EPA should, for example, carefully define standards for subcategories to minimize the potential for non-additional credits. EPA should further consider whether restrictions on trading across subcategories may be appropriate to prevent such outcomes. Similarly, the retirement of an Electric Generating Unit may lead to windfall emissions credits under mass-based trading, if the cap reflects expected emissions from that unit that are never realized. EPA should consider whether aggregate caps used in trading or averaging should be updated dynamically to reflect changing forecast emissions or emissions rates.

EPA's legal authority should enable it to develop such guidance for states. EPA has authority, for example, to make careful and appropriate distinctions between subcategories in setting emissions targets,[57] and to ensure that state implementation plans are "satisfactory."[58] EPA has also defined the limited circumstances under which states may be permitted to lower the stringency of a standard applicable to a particular source because of a facility's "remaining useful life."[59] EPA should exercise its authority when designing guidance for states to ensure that states adopting market-based mechanisms implement satisfactory guardrails to prevent regulatory leakage and avoid inappropriately granting credits for non-additional reductions or retirements.

B. Emissions trading for compliance should be paired with safeguards against disproportionate impacts.

EPA rightly noted concerns with respect to the local health and environmental impacts of its proposed regulations for people living near, or downwind of, stationary combustion turbines. In addition to CO_2 emissions, natural gas-fired turbines emit nitrogen oxides (NO_x). NO_x emissions are known to react with other atmospheric compounds to form ground-level ozone and particulate matter ($PM_{2.5}$), which are harmful to human health and the environment and which may cause more pronounced effects closer to the source of the emissions.[60] Health impacts are disproportionately high in communities with environmental justice concerns due to their proximity to emitting sources.[61]

[57] 42 U.S.C. § 7411(b)(2).
[58] *Id*. § 7411(d)(2)(A).
[59] 40 C.F.R. § 60.24a(e).
[60] *See, e.g.,* Eugene S. Mananga et al., *The Impact of the Air Pollution on Health in New York City*, J. OF PUB. HEALTH (Oct. 2023), at 8. For further discussion of how co-pollutants contribute to harmful health effects, including asthma, other respiratory diseases, pulmonary heart disease, and diabetes, as well as economic burdens including higher hospitalization rates and missed pay due to illness, see Denise L. Mauzerall et al., *NOx Emissions from Large Point Sources: Variability in Ozone Production, Resulting Health Damages and Economic Costs*, 39 ATMOSPHERIC ENV'T 2851 (2005); EPA, *Sulfur Dioxide Basics*, https://www.epa.gov/so2-pollution/sulfur-dioxide-basics (last visited Jan. 22, 2024); C. Arden Pope III, David V. Bates, Mark E. Raizenne, *Health Effects of Particulate Air Pollution: Time for Reassessment?*, 103 ENV'T HEALTH PERSP. 472 (1995).
[61] *See, e.g.,* Lara P. Clark at al., *National Patterns in Environmental Injustice and Inequality: Outdoor NO_2 Air Pollution in the United States*, 9 PLOS ONE 4 (2014); *See also* Eugene S. Mananga et al., *The Impact of the Air Pollution on Health in New York City*, J. OF PUB. HEALTH (Oct. 2023), at 8–9, 11; *See also* Iyad Kheirbek et al., *Air Pollution and the Health of New Yorkers: The Impact of Fine Particles and Ozone*, NYC HEALTH DEP'T (2010), https://perma.cc/ST2H-T8XC.

Emissions trading has the potential to exacerbate dangerous health risks and economic burdens in concentrated areas of pollution known as hotspots.[62] Specifically, an emissions trading program that solely focuses on GHG emissions does not automatically protect communities from high co-pollutant emissions. For example, hotspots could be worsened if GHG abatement costs are higher for facilities located close to, or upwind of, communities with environmental justice concerns relative to those located further away from population centers. In these circumstances, facilities affecting pollution levels in affected communities might purchase allowances from distant facilities rather than adopt mitigation measures, causing mitigation of harmful co-pollutants to occur disproportionately in remote areas while effecting less mitigation of these co-pollutants at facilities closer to communities with environmental justice concerns.[63] Thus an emissions trading program that does not consider hot spots could perversely cause or exacerbate poor air quality conditions in sensitive areas.

EPA should conduct a distributional analysis and assessment of cumulative impacts on environmental justice communities to understand how the use of emissions trading and averaging mechanisms may potentially increase the pollution burden for these communities—and how well-designed safeguards mitigate those effects. EPA has long been directed by Executive Order to consider environmental justice effects.[64] EPA's own guidance reinforces that EPA should consider cumulative impacts as part of this analysis.[65] Integrating such considerations into EPA's rule is consistent with Section 111's goal to set regulatory priorities that protect public health and welfare.[66] This analysis can support decisions about whether emissions trading and averaging mechanisms should be used and how to design these mechanisms to prevent increasing disproportionate burdens.

Several tools can help EPA limit disproportionate harms from GHG emissions trading and averaging, including: (1) complementary policies which directly target harm to communities caused by local pollution, and (2) through the design of the emissions trading or averaging rules themselves.

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[62] David A. Weisbach, *Regulatory Trading*, 90 UNIV. OF CHICAGO L. REV. 1095, 1121-1125 (2023); Jeff Todd, *Climate Cap and Trade and Pollution Hot Spots: An Economics Perspective*, 39 GA. STATE UNIV. L. REV. 1003, 1015 (2023).

[63] *See, e.g.*, Jeff Todd, *Climate Cap and Trade and Pollution Hot Spots: An Economics Perspective*, 39 GA. STATE UNIV. L. REV. 1003, 1015 (2023).

[64] *See* Exec. Order No. 12,898 § 1-101, 59 Fed. Reg. 7629, 7629 (Feb. 16, 1994) ("To the greatest extent practicable and permitted by law, . . . each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations . . . ."); id. at § 3-301, 7631 ("Environmental human health analyses, whenever practicable and appropriate, shall identify multiple and cumulative exposures."). Exec. Order No. 14,008, 86 Fed. Reg. 7619 (Feb. 1, 2021). Exec. Order No. 14,096, 88 Fed. Reg. 25,251, 25,253 (Apr. 26, 2023) ("Identify, analyze, and address: (1) "disproportionate and adverse human health and environmental effects..., including those related to climate change and cumulative impacts of environmental and other burdens on communities with environmental justice concerns;").

[65] EPA, LEGAL TOOLS TO ADDRESS ENVIRONMENTAL JUSTICE 6–7 (May 2022), https://perma.cc/K6KG-H7ZE [hereinafter EPA LEGAL TOOLS FOR EJ]; EPA, DRAFT TECHNICAL GUIDANCE FOR ASSESSING ENVIRONMENTAL JUSTICE IN REGULATORY ANALYSIS (Nov. 2023), https://perma.cc/5EDL-FBZ4.

[66] *See* 42 U.S.C. §§ 7411(b)(1)(a), 7411(f)(2)b), 7411(g)(2). *See also* EPA LEGAL TOOLS FOR EJ, *supra* note 65, at 12 (noting, under Section 111, "EPA discretion to consider how or whether emissions of certain categories of stationary sources have a disparate impact on communities with environmental justice concerns, and to consider the health impacts of the emissions from those sources.").

1. Complementary policies can directly address harms to communities from other types of pollution.

EPA notes that it is developing proposals to review the criteria pollutant new source performance standards (40 CFR 60 KKKK) for stationary combustion turbines and to review and update the national emissions standards for hazardous air pollutants (40 CRF 63 YYYY) for stationary combustion turbines.[67] While such rules can control reduce non-GHG pollution rates from gas-fired turbines, understanding the health and economic effects of gas turbines' non-GHG emissions requires a careful assessment of air pollution transport and processes such as ozone formation.[68] Combined with such an assessment, thresholds for reducing criteria pollutants and air toxics through these other regulatory programs can help inform design of any emissions trading or averaging program under the forthcoming 111 GHG rule. Importantly, these thresholds can provide supplemental limits on co-pollutant emissions to address potential hot spot issues that may result from trading under the GHG rule. EPA should assess how these other regulations that address local pollutants, including NO_x and formaldehyde, can work in concert with the proposed regulation of GHG emissions from existing natural-gas-fired turbines.

2. Emissions trading programs can be designed to mitigate harms to disproportionately burdened communities.

A growing body of economic research shows that emissions trading programs can themselves work to mitigate pollution disparities in communities with environmental justice concerns if regulators make careful design choices. For example, a study of California's cap-and-trade program finds that it has resulted in lower emissions of both GHG and local pollutants among covered facilities, and, using air dispersion modeling, shows that the program narrowed the pollution disparity for communities with environmental justice concerns.[69] Similarly, another study examines the effects of California's cap-and-trade program on air toxics pollution disparities in communities with environmental justice concerns, and finds that disparities in air toxics exposures narrowed as a result of the program.[70] The Institute for Policy Integrity, in a

[67] See Question 7 in EPA's Existing Stationary Combustion Turbine EGUs Framing Questions for Stakeholder Input,
[68] Danae Hernandez-Cortes & Kyle C. Meng, *Do Environmental Markets Cause Environmental Injustice? Evidence from California's Carbon Market*, 217 J. OF PUB. ECON. 1, 2 (2023) [hereinafter Hernandez-Cortes & Meng (2023)] ("We demonstrate the importance of modeling pollution dispersal for our results."); Glen Sheriff, *California's GHG Cap-and-Trade Program and the Equity of Air Toxic Releases*, 11 J. OF THE ASS'N OF ENV'T AND RES. ECONOMISTS, 137, 139 (2024) [hereinafter Sheriff (2024)] ("Moving from a theoretical acknowledgment of the possibility that a GHG cap-and trade program could adversely impact pollution exposure for people of color to an empirical assessment faces a number of challenges, including identifying pollutants of concern, determining where they go, and determining where they would have gone in a counterfactual world without the program.").
[69] Hernandez-Cortes & Meng (2023), *supra* note 68, at 2 ("Between 2012-2017, the program reduced California's EJ gap by 7%, 6%, and 10% annually for PM2.5, PM10, and NOx, respectively.").
[70] Sheriff (2024), *supra* note 68, at 164. The analysis first examines whether air toxic releases from facilities covered by the program and upwind of communities of color disproportionately increase relative to other comparable facilities as a result of the cap and trade program. This exercise results in no statistically significant evidence of such effects. Second, the study examines whether communities of color experience a disproportionate increase in exposure to air toxics from covered facilities relative to other sources as a result of the program. This exercise also resulted in no statistically significant evidence of such an effect, and found evidence that the cap-and-trade program reduced exposure to air toxics from GHG-covered facilities in communities of color. Third, the study examines whether the cap-and-trade program worsened the distribution of exposure to air toxics for communities of color. While noting the significant disparity between the distribution of air toxics for communities of color versus that of the white

joint project with other research centers, examined emissions trading in New York City's buildings sector as a means for complying with a local law which limits GHG emissions from large buildings, and concluded that "a carefully designed trading program could further the City's diverse goals," including environmental justice goals.[71]

There are several design choices that EPA may consider implementing to protect against disproportionate impacts and hot spots. These include, but are not limited to, facilities-based emissions caps and allowance-trading ratios. Facilities-based emissions caps would work in conjunction with emissions trading by simply placing limits on emissions (or emissions rates) from facilities that are deemed likely to cause disproportionate harm. In its recently finalized guidelines for limiting GHG emissions from existing coal-fired plants, EPA acknowledged that "trading programs can be designed to include measures like unit-specific emission rates that assure that reductions and corresponding benefits accrue proportionally to communities with environmental justice concerns."[72] Research conducted by Resources for the Future has shown that such an approach could be implemented in the context of California's cap and trade program with economically small effects on allowance prices.[73] A study of a proposed state-wide emissions trading program in New York found that "[i]ncluding facility-specific caps can ensure a minimum level of reductions for each facility without driving costs significantly higher, compared with not having facility-specific caps."[74]

Other economic research identifies allowance-trading ratios as a means for addressing differential harm caused by co-pollutants under an emissions trading program.[75] Such mechanisms have been applied in practice.[76] The intuition behind this approach is that the entities causing the greatest harm to communities should face the steepest incentives for reducing

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demographic group in all scenarios, the study concludes that the distribution of exposure improves for communities of color under the cap and trade program.

[71] Danielle Spiegel-Feld et al., *Carbon Trading for New York City's Building Sector: Report of the Local Law 97 Carbon Trading Study Group to the New York City Mayor's Office of Climate & Sustainability*, 8, 82–85, 94–101 (Nov.2021),https://policyintegrity.org/publications/detail/carbon-trading-for-new-york-citys-building-sector.

Appendix A to this report contains a literature review of the economics literature on the environmental justice implications of emissions trading, concluding that "[m]ost studies that have examined the distributional impacts of prior cap-and-trade programs fail to find that such programs have increased the relative pollution burden in disadvantaged communities." *Id.* at 113.

[72] Final Rule for New Gas and Existing Coal at 39,980.

[73] Dallas Burtraw & Nicholas Roy, *How Would Facility-Specific Emissions Caps Affect the California Carbon Market?* (Res. For the Future, Working Paper No. 23-09, 2023), https://perma.cc/3DVB-R8D3.

[74] Alan Krupnick et al., *Prioritizing Justice in New York State Cap-Trade-and-Invest* (Res. For the Future, Working Paper No. 24-05, 2024), https://perma.cc/2D7R-V9LQ.

[75] *See* R. Scott Farrow et al., *Pollution Trading in Water Quality Limited Areas: Use of Benefits Assessment and Cost-Effective Trading Ratios*, 81 LAND ECON. 191 (2005); Nicholas Z. Muller & Robert Mendelsohn, *Efficient Pollution Regulation: Getting the Prices Right*, 99 AM. ECON. REV. 1714 (2009); Nicholas Z. Muller, *The Design of Optimal Climate Policy with Air Pollution Co-Benefits*, 34 RES. & ENERGY ECON. 696 (2012); Werner Antweiler, *Emission Trading for Air Pollution Hot Spots: Getting the Permit Market Right*, 19 ENV'T ECON. & POLICY STUDIES 35 (2017); Meredith Fowlie & Nicholas Muller, *Market-Based Emissions Regulation When Damages Vary Across Sources: What Are the Gains from Differentiation?*, 6 J. OF THE ASS'N OF ENV'T AND RES. ECONOMISTS 593 (2019) [hereinafter Fowlie & Muller (2019)].

[76] EPA's Clean Air Interstate Rule and Cross-State Air Pollution Rule are two examples. *See* Fowlie & Muller (2019), *supra* note 75, at n. 9; David A. Weisbach, *Regulatory Trading*, 90 UNIV. OF CHI. L. REV. 1095, 1128 (2023).

their pollution.[77] This mechanism has the potential to address harmful pollution sources in a highly targeted manner.[78]

V. EPA has the legal authority to include market-based mechanisms as part of a BSER or these mechanisms can be used for implementation and compliance (Question 2a).

EPA requests comment on whether market-based mechanisms have a role in establishing emission guidelines. Inclusion of market-based mechanisms in the BSER can help EPA achieve either a rule of comparable emission reductions at lower compliance costs or a rule requiring greater emission reductions for the same overall compliance costs as a less ambitious rule that lacks market-based mechanisms. This section explains why even following the Supreme Court's *West Virginia v. EPA* decision that placed limitations on EPA's selection of a "best system of emission reduction," EPA still retains authority to use market-based mechanisms in its regulations under certain conditions. For example, EPA still retains authority to consider the cost-savings of market-based mechanisms in its selection of an achievable system of emission reduction. Even if EPA does not exercise this authority in a future proposal, market-based mechanisms can still be used for compliance.

A. EPA can use market-based mechanisms as a component of a BSER to reduce costs.

As discussed above, under Section 111 of the Clean Air Act, EPA must identify a "best system of emission reduction" or BSER, and the emission reductions achievable through use of the BSER guides the stringency of the regulatory program. In *West Virginia v. EPA*, the Supreme Court continued to recognize that EPA has the authority under Section 111 of the Clean Air Act to reduce GHG emissions that cause climate change,[79] but the Court took issue with EPA's choice of BSER in an Obama-era regulation called the Clean Power Plan. The Court found that the 2015 Clean Power Plan's inclusion of "generation shifting"— shifting electricity generation from coal-fired plants to natural-gas-fired plants, and from fossil-fuel-fired plants to renewables—as part of the BSER was unlawful.[80]

West Virginia narrowed EPA's authority for determining the BSER, but the Court declined to foreclose the possibility that EPA could set the BSER based on averaging, trading, or other "outside-the-fenceline" mechanisms that avoided the Clean Power Plan's specific choices. The Court explicitly provided that it was not ruling more broadly on "whether the statutory phrase 'system of emission reduction' refers exclusively to measures that improve the pollution performance of individual sources, such that all other actions are ineligible to qualify as the

[77] One particular implementation of the allowance trading ratio approach is to assign a trading factor to each obligated entity, set according to the amount of harm its emissions cause. Werner Antweiler, *Emission Trading for Air Pollution Hot Spots: Getting the Permit Market Right*, ENV'T ECON. & POL'Y STUDIES 19, 35–58 (2017).
[78] However, making this particular mechanism effective requires significant reduction in uncertainties associated with the harm that polluting sources cause to communities, as well as an understanding of the costs of available abatement options. Fowlie & Muller (2019), *supra* note 75, at 607, 609. The strictness of the overall cap on GHG emissions may also play a role in determining the effectiveness of an allowance ratio based trading mechanism. *See* Nicholas Z. Muller, *The Design of Optimal Climate Policy with Air Pollution Co-Benefits*, 34 RES. & ENERGY ECON. 696, 698, 703 (2012).
[79] *See* West Virginia v. Env't Prot. Agency, 597 U.S. 697 (2022).
[80] *See id*.

BSER."[81] In fact, the Court explicitly distinguished the Clean Power Plan from the Clean Air Mercury Rule, a 2005 power plant rule issued under Section 111(d)[82] that included a cap-and-trade mechanism as part of the BSER.[83]

The daylight between the Court's descriptions of the Clean Power Plan and the Clean Air Mercury Rule—specifically how each rule set an emissions cap—suggests how EPA may be able to include market-based mechanisms as a *component* of the BSER under certain conditions. The Court emphasized that in the Clean Air Mercury Rule, "EPA set the cap based on the application of particular controls, and regulated sources could have complied by installing them."[84] In the Clean Air Mercury Rule itself, EPA explained that it "determined that *a cap-and-trade program based on control technology* available in the relevant timeframe *is the best system for reducing [mercury] emissions* from existing coal-fired [u]tility [u]nits" (emphasis added).[85] EPA anticipated that under the Clean Air Mercury Rule, some regulated sources would install the BSER to not only lower their own emissions, but to over-comply and sell the additional allowances to sources that would find it more expensive to install the control technology than to buy the allowances.[86]

The Court contrasted the Clean Air Mercury Rule's approach with the absence of "particular controls a coal plant operator can install and operate to attain the emission limits established by the Clean Power Plan."[87] In this comparison, the distinguishing feature appears to be how a cap is set rather than the use of market-based mechanisms—or more specifically that the cap is set based on emission reductions achievable by source-specific controls that at least some regulated sources will apply to reduce their own emissions. Based on this distinction concerning how the cap is set, the Court thus groups the Clean Air Mercury Rule as "one more entry in an unbroken list of prior Section 111 rules that devised the enforceable emission[] limit by determining the best control mechanisms available for the source."[88]

While the U.S. Court of Appeals for the D.C. Circuit vacated the Clean Air Mercury Rule on other grounds,[89] that rule provides a model of how EPA could set a BSER based on "the combination of the cap-and-trade mechanism and the technology needed to achieve the chosen

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[81] *West Virginia*, 597 U.S. at 734.
[82] *See* 70 Fed. Reg. 28,616.
[83] 70 Fed. Reg. 28,616, 28,617 (noting that EPA "determined that a cap-and-trade program based on control technology available in the relevant timeframe *is the best system* for reducing Hg emissions from existing coal-fired Utility Units.") (emphasis added).
[84] *West Virginia*, 597 U.S. at 726. *See also* 70 Fed. Reg. 28616, 28620 (explaining that for the Clean Air Mercury Rule, "[e]he EPA also believes that in the context of a cap-and-trade program, the phrase "best system of emission reduction which (taking into account the cost of achieving such reduction and any non-air quality health and environmental impacts and energy requirements) the Administrator determines has been adequately demonstrated" refers to the combination of the cap-and-trade mechanism and the technology needed to achieve the chosen cap level.").
[85] 70 Fed. Reg. 28,616, 28,617.
[86] *See* 70 Fed. Reg. 28,616, 28,619 ("Under the cap-and-trade approach we are projecting that Hg reductions result from units that are most cost effective to control, which enables those units that are not cost effective to install controls to use other approaches for compliance including buying allowances, switching fuels, or making dispatch changes.").
[87] *West Virginia*, 597 U.S. at 726.
[88] *Id*.
[89] *See* New Jersey v. EPA, 517 F.3d 574 (D.C. Cir. 2008) (vacating the Clean Air Mercury Rule on other grounds).

cap level."[90] What *West Virginia* makes clear is that EPA cannot define a BSER as increasing the electricity production of cleaner-generating alternatives and lowering that of dirtier alternatives.[91] But it leaves room for a hypothetical BSER that includes emissions trading—as long as the cap is based on a technology or another system of emission reduction that a regulated source could use to operate more cleanly.

One explanation of how the Clean Air Mercury Rule incorporated a market-based approach into settings the BSER—and how such an approach may still pass muster with the Supreme Court—relies on the interpretation of EPA's statutory requirement to identify a BSER "taking into account the cost." In the Clean Air Mercury Rule, EPA designed its Section 111 performance standards to avoid what it then deemed to be unreasonable costs. For example, in setting the cap on mercury emissions during the first phase of the rule, EPA declined to require more stringent on-site controls that would indirectly reduce mercury emissions "because the incremental cost effectiveness of such a requirement would be extraordinarily high."[92] In the rule's second phase, EPA set the cap based on the level of mercury reductions that could be achieved by new mercury-specific control technologies that it anticipated would be available, but EPA still did not expect it would be cost-effective for every source to actually install such technologies. Even though EPA believed those new technologies would be adequately demonstrated by the second phase, EPA still expected sources to meet the cap through a combination of the new mercury-specific controls, other existing indirect technological controls, "dispatch changes," "coal switching," and the "buying" and "selling [of] excess allowances" through the market-based mechanisms.[93] In particular, EPA expected it would be "most cost effective" for the largest units to over-comply through various technological controls and then sell their excess allowances.[94]

In other words, in the Clean Air Mercury Rule, EPA may not have been inclined to set the cap at the corresponding level if every source would have actually been required to install those on-site controls. However, through consideration of states' likely use of the cap-and-trade mechanism, which "assures that those reductions will be achieved with the least cost,"[95] EPA was able to conclude that its cap was "cost-effective."[96]

In short, under the Clean Air Mercury Rule, many sources could have theoretically complied with the standard through application of on-site technologies, but EPA likely would have deemed the standard too expensive if sources did not also incorporate the cost reductions for use of emissions trading and averaging. By comparison, under the Clean Power Plan, many sources could never have complied exclusively through on-site controls like "heat rate improvements" but instead were required to engage in some kind of generation shifting. It was defining mandatory generation-shifting as part of the "best system" that the Supreme Court found objectionable; EPA should remain free to "take into account" the cost-savings afforded by a market-based mechanism

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[90] 70 Fed. Reg. 28,616, 28,620.

[91] *See, e.g.,* Andres Restrepo & Joanne Spalding, *Section 111 of the Clean Air Act and Beyond in the Aftermath of West Virginia v. EPA*, 24 VT. J. ENVT. L. 290, 298–299 (2003).

[92] 70 Fed. Reg. at 28,618 (rejecting more stringent FGD or SCR controls that, while designed to reduce SO_x and NO_x emissions, also reduce Hg emissions as a co-benefit).

[93] *Id.* at 28,619.

[94] *Id.*

[95] *Id.*

[96] *Id.* at 28,621 ("Cost-effectiveness of the Hg Cap in 2018…. EPA assume[s] that States would implement the Hg requirements through the Hg cap-and-trade program.").

when selecting a standard that could theoretically be achieved (at higher cost) through on-site controls.

There are number of reasons why EPA may choose to forgo including market-based mechanisms in the BSER itself, including unsettled questions of law. Also as EPA noted in the Proposed Rule, subcategorization may tailor performance standards to different types of units in a manner to balance costs and effectiveness in a manner that potentially leaves fewer benefits available from instituting trading.[97] EPA further notes that trading in combination with the subcategorization could undermine emission reductions if certain trading restrictions aren't in place.[98]

B. Even if EPA does not include market-based mechanisms as part of a BSER, these tools can still be used for compliance and implementation.

Even if EPA does not incorporate market-based mechanisms into the BSER, it can still allow them as a compliance mechanism. As noted earlier, Section 111 is not a mandate to install a particular technology; instead, it sets emission limits based on what emission reductions are achievable by a particular system. Regulated entities have flexibility in how they meet those limits[99]—including identifying alternative technologies or processes that may provide more inexpensive ways for their particular sources to meet the emission limits. They can also reduce generation from higher-polluting sources by shifting production to lower-emitting sources. EPA recognized its authority to include trading and averaging as compliance mechanisms in its Final Rule for Existing Coal and New Gas and a recent report from Policy Integrity further discusses this authority.[100]

As noted above, trading programs and other market-based mechanisms require design features to ensure equivalent GHG emission reductions and to avoid worsening pollution hotspots or other increases of harmful co-pollutants.

VI. EPA should move forward to regulate existing gas and coordinate with the entities chiefly responsible for grid reliability as they use their expanding set of tools (Question 5a).

The power sector is in the midst of a transition. Myriad climate policies at nearly all levels of government, including the landmark 2022 Inflation Reduction Act (IRA), have incentivized the

[97] *See* Proposed Rule at 33,393 ("The utility of trading under these emission guidelines may also be obviated somewhat by the subcategories that the EPA has proposed to establish for existing coal-fired steam generating units and existing gas combustion turbines.").

[98] *See id*. at 33,391 ("EPA also recognizes that the structure of the proposed subcategories and associated degrees of emission limitation, as well as the unique characteristics of the existing sources in the relevant source categories, will likely require that certain limitations or conditions be placed on the incorporation of averaging and trading in order to ensure that such standards are at least as stringent as the EPA's BSER")..

[99] The regulated entities would, however, be subject to any further constraints in state implementation plans for existing sources.

[100] DENA ADLER & ANDREW STAWASZ, INST. FOR POL'Y INTEGRITY, WITHIN ITS WHEELHOUSE: EPA'S NEW POWER PLANT REGULATIONS RELY ON TRADITIONAL APPROACHES LEFT AVAILABLE AFTER WEST VIRGINIA 10–11 (2024), https://perma.cc/2WU6-K2G4.

accelerated adoption of low- and zero-emission energy resources.[101] These policies have sped along sectoral shifts already underway due to changing market conditions, plummeting renewables prices, and the replacement of aging coal-fired power plants with cheaper, more efficient resources.[102] Meanwhile, the electric grid faces increasing vulnerability from climate change impacts that have become unavoidable,[103] in addition to projected future increases in electricity demand.[104] Both the structure and operation of the electric grid must shift to meet these challenges regardless of any power sector pollution reduction rules from EPA. Against this backdrop, EPA can still do its job to reduce pollution from power plants without sacrificing grid reliability. Consistent with this job, EPA should continue to coordinate with the entities primarily responsible for grid reliability and provide compliance flexibilities where necessary.

A recent Policy Integrity report, *Reducing Pollution Without Sacrificing Reliability: A Breakdown of the Respective Roles that FERC, EPA, and State Regulators Play to Support a Cleaner & More Reliable Electric Grid* (attached),[105] examines how Federal Energy Regulatory Commission (FERC), regional transmission operators (RTOs/ISOs), state regulators, and utilities can leverage a variety of existing tools to plan for grid reliability throughout the energy transition. The report also reviews the respective roles of FERC, RTOs/ISOs, other transmission operators, state public utility commissions, and state environmental regulators in governing the bulk power system. EPA's duty to reduce GHG emissions that endanger public health and FERC's duty to steward grid reliability will require them to coordinate and employ each other's respective expertise as they work with RTOs/ISOs, state regulators, and utilities to implement EPA rules. With appropriate coordination, grid planners and regulators can maintain grid reliability during and after implementation of important pollution-control policies such as EPA's GHG regulations for power plants.

The attached report suggests several critical measures that FERC should take to support the ongoing energy transition. Following EPA's completion of its Final Rule for New Gas and Existing Coal, FERC acted on two of these key measures. FERC finalized (1) a long-term regional transmission planning and cost allocation rule (Order 1920);[106] and (2) backstop siting

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[101] *See, e.g.*, John E T Bistline et al., *Power Sector Impacts of the Inflation Reduction Act of 2022*, 19 ENVIRON. RES. LETT. 1 (2024) (projecting "that IRA incentives accelerate the deployment of low-emitting capacity, increasing average annual additions by up to 3.2 times current levels through 2035").

[102] *See, e.g.*, METIN CELEBI ET AL., BULK SYSTEM RELIABILITY FOR TOMORROW'S GRID, BRATTLE GROUP & CENTER FOR APPLIED ENVIRONMENTAL LAW AND POLICY 2 (Dec. 20, 2023), https://perma.cc/UHY2-D66X [herein after 2023 Brattle Report].

[103] *See, e.g.*, U.S. DEPT. OF ENERGY, U.S. ENERGY SECTOR VULNERABILITIES TO CLIMATE CHANGE AND EXTREME WEATHER, 10-12, 22-25, 33-35 (July 2013), https://perma.cc/7GBE-XRMC. More recent studies confirm climate change has and will continue to increase the prevalence and magnitude of extreme weather events that endanger grid reliability. *See also* Intergovernmental Panel on Climate Change, *Chapter 11: Weather and Climate Extreme Events in a Changing Climate*, *in* Climate Change 2021: The Physical Science Basis, Contribution of Working Group I to the IPCC Sixth Assessment Report, https://perma.cc/7FLG-D9UQ.

[104] *See, e.g.*, John D. Wilson & Zach Zimmerman, *The Era of Flat Power Demand is Over*, Grid Strategies & Clean Grid Initiative (Dec. 2023), https://perma.cc/R4Z2-C9A7.

[105] DENA ADLER & JENNIFER DANIS, INST. FOR POL'Y INTEGRITY, REDUCING POLLUTION WITHOUT SACRIFICING RELIABILITY: A BREAKDOWN OF THE RESPECTIVE ROLES THAT FERC, EPA, AND STATE REGULATORS PLAY TO SUPPORT A CLEANER & MORE RELIABLE ELECTRIC GRID (2024), https://perma.cc/KFV3-N9VP.

[106] *Building for the Future Through Electric Regional Transmission Planning and Cost Allocation*, 187 FERC ¶ 61,068 (May 13, 2024).

rules for interstate transmission in national interest electric corridors (Order 1977).[107] Order 1920 is designed to bolster grid reliability through the ongoing energy transition, and in the face of extreme weather challenges. It will also be key for ensuring that consumers are paying for the most cost-effective transmission to achieve that reliability and resilience. Importantly, Order 1920 makes entirely clear that grid planners must incorporate laws like EPA's GHG regulations for power plants (and states' future implementation thereof) into baseline scenarios, along with several other supply-side and demand-side factors that will help ensure holistic planning for a reliable grid.

As the power system transitions and an ever-greater percentage of generation comes from renewables, a range of strategies can help ensure reliability. While some clean energy technologies, like wind and solar, are seasonal and intermittent, posing potential challenges for reliability, a comprehensive system-wide approach to planning can mitigate these challenges.[108] This approach involves considering the differences and interactions between various resource types, such as solar coupled with battery storage or demand-side management.[109] Additionally, expanding transmission infrastructure can further facilitate the transition to a cleaner electricity system by spreading out the impact of weather-dependent sources like wind and solar over a broader geographical area.

Numerous engineering and academic studies demonstrate the feasibility of high-renewable energy grids, and real-world examples exist of countries successfully integrating significant amounts of intermittent renewable energy without compromising reliability. For instance, in the top five wind power markets globally, customers' average annual duration of outages is less than in the United States, as shown by the fact that these five markets have lower System Average Interruption Duration Index (SAIDI) values than the United States (see Figures C & D). The SAIDI is the average total duration of outages (in hours) experienced by a customer in a year.[110]

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[107] *Applications for Permits to Site Interstate Electric Transmission Facilities*, 187 FERC ¶ 61,069 (May 13, 2024).

[108] *See generally* JENNIFER DANIS ET AL., TRANSMISSION PLANNING FOR THE ENERGY TRANSITION: RETHINKING MODELING APPROACHES (2023), https://perma.cc/MJ58-HCK8.

[109] *See, e.g.*, THE FUTURE OF RESOURCE ADEQUACY: SOLUTIONS FOR CLEAN, RELIABLE, ABD AFFORDABLE ELECTRICITY, DEPT. OF ENERGY 8–19 (Apr. 2024), https://perma.cc/WVQ4-T3SH.

[110] The index is computed based on the methodology in the DB16-20. *See Getting electricity : System average interruption duration index (SAIDI) (DB16-20 methodology)*, THE WORLD BANK, https://prosperitydata360.worldbank.org/en/indicator/WB+DB+55 (last visited May 28, 2024).

Figure C: Wind Energy Penetration in Leading Wind Markets in 2021

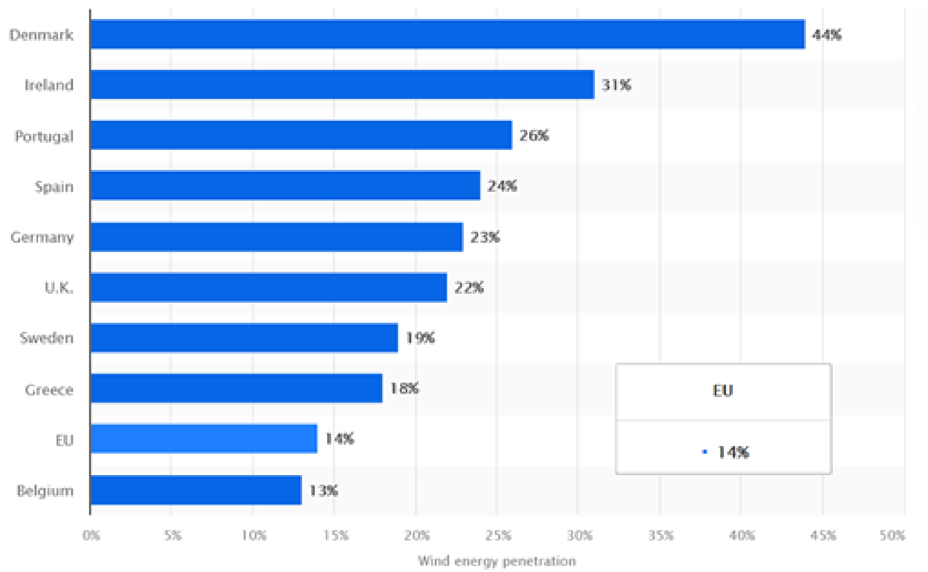
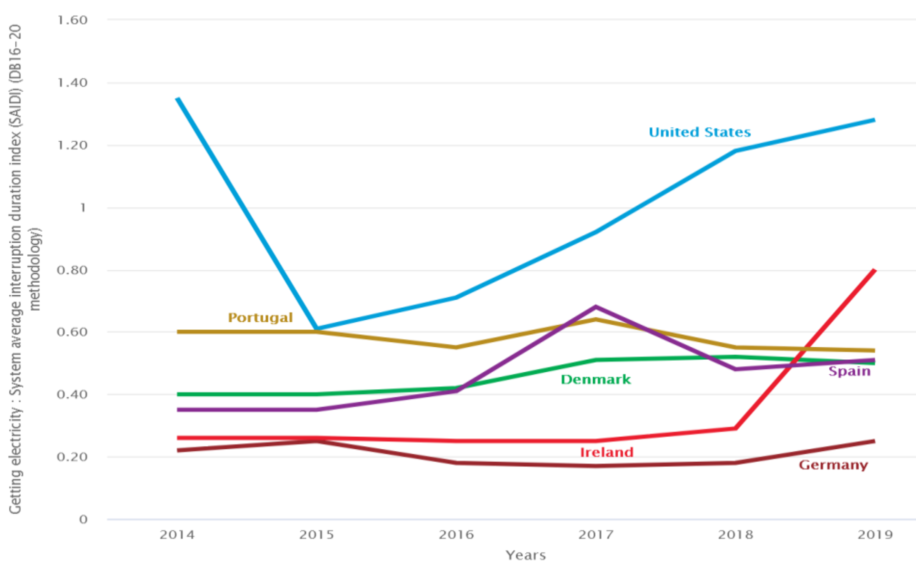


Figure D: System Average Interruption Duration Index (SAIDI) for the Top-5 Wind Power Markets and the U.S. Sources



Since EPA completed its Final Rule for New Gas and Existing Coal, DOE has also taken action to foster grid reliability and resilience. DOE announced ten proposed national interest electric corridors, informed by its 2023 National Transmission Needs Study, which can house reliability-bolstering transmission.[111] It also issued proposed guidance for unlocking federal funding

[111] Grid Deployment Office, *Initiation of Phase 2 of National Interest Electric Transmission Corridor (NIETC) Designation Process: Preliminary List of Potential NIETCs Issued Pursuant to Section 216(a) of the Federal Power Act*, U.S. DEP'T. OF ENERGY (May 8, 2024), https://perma.cc/65HB-6CMR.

streams to support grid expansion along those corridors.[112] Congress provided DOE with these additional authorities to ensure that our nation's grid remains reliable as aging resources and infrastructure rapidly shift to accommodate increasing demand,[113] withstand more frequent severe weather,[114] and support reduced power-system emissions.

Finally, state regulators, through FERC's newly minted Order 1920, now have a pathway for formal, significant engagement with regional transmission planners.[115] This Order will provide them an opportunity to weigh in on key grid planning inputs, like generation retirements, state and local laws "affecting the resource mix and demand," state and local decarbonization and electrification laws – essentially all factors bearing on energy supply and demand.[116] It creates an important pathway for increased communication between states and grid planners.

It will be critical for the state environmental regulators responsible for developing SIPs for EPA's Final Rule for Existing Coal and its upcoming rule governing existing gas-fired electric generation to coordinate with state utility and siting regulators (defined as "Relevant State Entities"[117] in Order 1920).

Conclusion

Consistent with its legal responsibilities and sound economics, EPA should move forward with regulating existing gas turbines under Section 111 of the Clean Air Act. EPA should design its future proposal to regulate the existing gas fleet as comprehensively as possible after considering relevant factors like cost and energy requirements. EPA and other agencies should pursue a variety of regulatory approaches to better ensure any hydrogen co-firing at existing gas-fired units will use only low-GHG hydrogen. EPA should also offer guidance to states on how best to design emissions trading and averaging programs with guardrails that prevent (1) increases in GHG emissions relative to a rule without such market-based mechanisms, and (2) increases in harmful co-pollutants in environmental justice communities. EPA should continue to coordinate with the entities primarily responsible for grid reliability, but should also recognize that it can move forward with pollution reduction while these other entities leverage their respective tools to address reliability.

Respectfully,
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[112] *See id*. at 42.
[113] *Biden-Harris Administration Announces Initial List of High-Priority Areas for Accelerated Transmission Expansion*, U.S. DEP'T. OF ENERGY (May 8, 2024), https://perma.cc/YKG7-QF6L.
[114] Robert Walton, *25 GW of New Solar to Boost Summer Grid Reliability, But Extreme Heat Poses Widespread Risks: NERC* (May 16, 2024), UTILITY DIVE, https://perma.cc/YT23-Y2RY.
[115] Order 1920 at ¶ 528-537.
[116] Order 1920 at ¶ 507-515.
[117] Order 1920 at ¶ 1355.

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Attached:

1) Dena Adler & Matthew Lifson, Inst. For Pol'y Integrity, Hydrogen Co-Firing and the EPA's Greenhouse Gas Limits for Power Plants (2024), https://policyintegrity.org/files/publications/Hydrogen_Report_v3.pdf.
2) Dena Adler & Andrew Stawasz, Inst. for Pol'y Integrity, Within Its Wheelhouse: EPA's New Power Plant Regulations Rely on Traditional Approaches Left Available After West Virginia (2024), https://policyintegrity.org/files/publications/EPA's_Long_History_of_Forward-Looking_Standards_Under_Section_111_of_the_Clean_Air_Act_Policy_Brief.pdf.
3) Dena Adler & Jennifer Danis, Inst. for Pol'y Integrity, Reducing Pollution Without Sacrificing Reliability: A Breakdown of the Respective Roles that FERC, EPA, and State Regulators Play to Support a Cleaner & More Reliable Electric Grid (2024), https://policyintegrity.org/files/publications/EPA_FERC_Report_v2.pdf.
4) Dena Adler & Andrew Stawasz, Inst. for Pol'y Integrity, Defining "Adequately Demonstrated": EPA's Long History of Forward-Looking Standards Under Section 111 of the Clean Air Act (2024), https://policyintegrity.org/files/publications/EPA's_Long_History_of_Forward-Looking_Standards_Under_Section_111_of_the_Clean_Air_Act_Policy_Brief.pdf.