AMP PUBLIC POWER PARTNERS™

October 15, 2024

Michael S. Regan
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue NW
Washington, D.C. 20460

Re: Comments of America Municipal Power, Inc. on Regulation of Stationary Combustion Turbines in Upcoming Rulemakings under the Clean Air Act

Dear EPA Administrator Regan and Agency Staff:

The Environmental Protection Agency (EPA or Agency) is developing new rules to regulate carbon dioxide (CO_2) emissions from the entire existing fleet of natural gas stationary combustion turbines[1] under section 111(d) of the Clean Air Act (CAA). As a result, the EPA has indicated that it will be establishing emission guidelines requiring states to adopt, implement, and enforce performance standards for limiting CO_2 emissions from all existing peaking, intermediate-load, and baseload combustion turbines. This regulatory initiative to set CO_2 performance standards for all existing combustion turbines will be part of a broader, coordinated effort by the EPA to also regulate nitrogen oxides (NOx) emissions from new and modified combustion turbines under CAA section 111(b), as well as hazardous air pollutants (HAPs) from new, modified, and existing combustion turbines under CAA section 112.

Pursuant to Executive Order 13132, which directs the EPA to consult with state and local governmental agencies (including not-for-profit public power systems), the EPA is seeking policy, regulatory, and technical input on the design and implementation of emission control measures applicable to natural gas combustion turbines, in a coordinated manner under these three upcoming CAA regulatory initiatives. The focus of the Agency's consultation is to gather from state and local governmental agencies and authorities any

[1] Reference to natural gas combustion turbines or combustion turbines in these comments also includes reference to those combustion turbines that may be combusting fuel oil or other fossil-fueled derivatives, either separately from, or in combination with, natural gas.

information on matters relevant to the development of a coordinated and effective framework for regulating CO_2 emissions from existing combustion turbines, and NOx and HAP emissions from new, modified, and existing combustion turbines.

In response to the Agency's request, American Municipal Power, Inc. (AMP) is submitting the following written comments that provide a set of high-level policy principles and key technical considerations intended to inform and guide the EPA's development of CO_2 performance standards for existing natural gas combustion turbines, along with how those CO_2 control requirements should be coordinated with any future performance standards that the EPA may also develop for limiting combustion turbines emissions of NOx emissions under section 111(b) and HAP emissions under section 112. These comments begin with an overview of AMP and its perspectives regarding regulation of the electric power sector (including public power systems) in a coordinated and effective manner under these three CAA rulemakings.

OVERVIEW OF AMP'S PERSPECTIVE AND APPROACH

AMP is the nonprofit wholesale power supplier and services provider for more than 130 Members in the states of Indiana, Kentucky, Maryland, Michigan, Ohio, Pennsylvania, Virginia, West Virginia, as well as the Delaware Municipal Electric Corporation, a joint action agency with nine Delaware municipal members. AMP's Members collectively serve approximately 650,000 residential, commercial, and industrial customers and have a system peak energy demand of more than 3,400 megawatts (MW). AMP's core mission is to be public power's leader in wholesale energy supply and value-added member services. AMP offers its Member municipal electric systems the benefits of scale, expertise, and leadership in providing and managing energy services. AMP serves as a joint action organization, representing Members with a broad spectrum of unique views and we recognize that some of our Members may be filing separate comments.

In recognition of our unique position representing the interest of both customers and owners and operators of electric generating assets in Illinois, Kentucky, Michigan, Ohio, Pennsylvania, and West Virginia, AMP offers the following comments outlining general policy principles and important technical considerations regarding the upcoming regulatory initiatives. These comments are intended to provide important points of reference to inform and guide EPA's development of CO_2 performance standards for existing natural gas combustion turbines and the coordination of those CO_2 control requirements with other upcoming rules for regulating HAPs and NOx emissions under the CAA.

These comments reflect AMP's core values of promoting reliability, flexibility, affordability, and feasibility. As reflected in the guiding principles below, EPA's forthcoming rules regulating natural gas combustion turbines under the three imminent CAA regulatory initiatives should be designed in a manner that:

- *Ensures electric grid reliability* by avoiding premature mandatory shutdown of existing natural gas generation and thereby not requiring the retirement of existing, dispatchable generation until replacement generating capacity can be built and brought online with at least the same accredited capacity and other reliability attributes as the retiring capacity;

- *Establishes a workable regulatory framework that maximizes compliance flexibility* for implementation of emissions control requirements over reasonable time horizons through flexible, emissions averaging or market-based mechanisms to the maximum extent permissible, and provides states with sufficient time and broad discretion in the development of state plans for implementing the emissions control requirements in a flexible, cost-effective manner that is tailored to state and local priorities to the maximum extent permissible;

- *Keeps a reliable supply of electricity affordable to the retail customers and businesses* that AMP and its members serve by adopting reasonably achievable emissions control requirements that do not impose exorbitant control costs incommensurate with environmental gains and avoids stranded costs resulting from the forced premature retirement of existing electric generating facilities; and

- *Develops reasonably achievable performance standards* for reducing CO_2 and other air emissions that are based on technically and economically feasible emissions control technologies.

TECHNICAL COMMENTS IN DEVELOPING UPCOMING RULEMAKINGS TO REGULATE NATURAL GAS COMBUSTION TURBINES

AMP provides the following technical comments intended to inform and guide the EPA in the development of achievable performance standards and other requirements under the CAA for the implementation of emissions controls that limit CO_2, conventional air pollutants such as NOx, and HAPs such as formaldehyde. In so doing, the following comments address specific policy, regulatory, and technical issues that the EPA identified and discussed in its meeting with state and local governmental officials on August 15, 2024. In addition, the comments address other important considerations that the Agency should carefully consider as it moves forward in the development of these three related regulatory programs under the CAA.

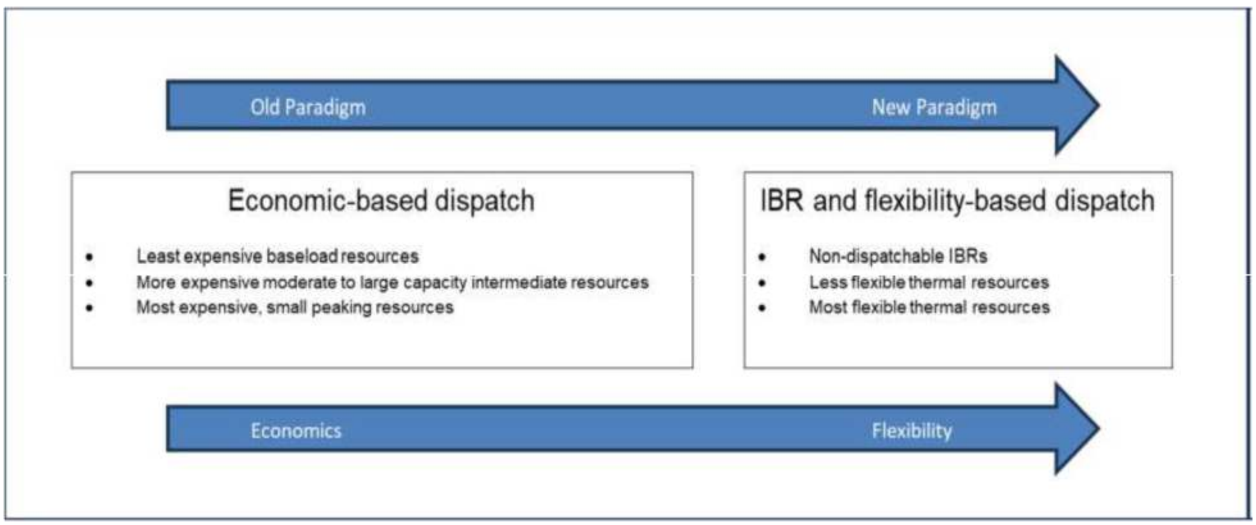
I. The Agency Should Recognize the Critical Role of Both Existing and New Natural Gas Generation in the Three Upcoming Regulations

Natural gas combustion turbines are critically important for ensuring electric grid reliability as electric utilities retire their existing coal-fired electric generating units (EGUs) and transition to low- and non-emitting generation. Existing natural gas generation is therefore already playing a crucial role in the replacement of dispatchable EGU generating capacity with the significant declines in coal-fired generation in recent years.

This trend will only continue to occur and intensify in both the near- and long-term. As a result, both existing and new natural gas generation will play an increasingly critical role in maintaining electric grid reliability as increasing amounts of renewable energy generation are interconnected, providing necessary capacity and essential reliability services, as well as helping to preserve customer affordability. The fast-ramping capability of natural gas combustion turbines supports the reliable integration of variable and intermittent renewable generating resources. Furthermore, existing and new natural gas combustion turbines — if regulated through reasonably achievable emission control measures and flexible implementation mechanisms to the maximum permissible under the CAA — can play an important role in not just ensuring electric grid reliability, but also helping to contain electricity costs and thereby preserve customer affordability. By contrast, overly stringent and inflexible emission control requirements can force the premature retirement of existing combustion turbine generating units and create significant barriers to building new, dispatchable low-emitting electric generating capacity needed to replace existing coal-fired EGU capacity and meet major increases in electricity demand in many areas of the country.

The EPA should recognize that as existing coal-fired generating capacity retires, existing and new combustion turbines (including baseload combined cycle plants) will take on increased importance for ensuring electric grid reliability. In effect, natural gas generation will play an important role in providing dispatchable generation and replacing the ancillary services required to ensure electric grid reliability in an efficient and cost-effective manner. Both existing and new natural gas-fired turbines (including baseload combined cycle plants) are therefore needed to supplement growing demand and support the increasingly complex operation of the modern grid as additional large amounts of intermittent, variable, and limited duration resources (such as wind, solar, and storage) come online.

The EPA's design framework for the regulation of existing and new natural gas generation should reflect, and be compatible with, the operational duties and functions that natural gas combustion turbines (including baseload combined cycle plants) must perform now and in the future to ensure electric grid reliability. AMP and the rest of the electric sector are observing a significant shift in how generation assets are utilized as the resource mix changes from primarily thermal based to one comprised predominantly of Inverter Based Resources (IBRs), such as solar photovoltaic systems, wind turbines, and battery energy storage systems. This transition is resulting in a move from an "economic-based dispatch" paradigm to an "IBRs and flexible resources" paradigm. One important concept emerging from this transition is that operation of generating resources is no longer entirely driven by cost, but also by how operationally flexible those remaining dispatchable resources are when supporting IBRs.



Energy resources that are the most operationally flexible will be the most critical to reliability as these assets will be increasingly relied upon to manage the potentially large fluctuations of IBRs during periods of generation shortfall due to weather, seasonal changes, forced outages, and other issues. These operational challenges and other related issues were discussed in a new report from the Information and Innovation Foundation's Center for Clean Energy Innovation "Why Wind and Solar Need Natural Gas: A Realistic Approach to Variability."[2] This report cautions that as wind and solar increase

[2] "Why Wind and Solar Need Natural Gas: A Realistic Approach to Variability". Gaster, R. September 2024. Center for Clean Energy Innovation. Center for Clean Energy Innovation | ITIF

penetration into the electric supply, simply having adequate electricity supply will become increasingly challenging due to the high degree of variability of these renewable resources.[3] Short-term storage provides some support to minimize daily variability, but cannot meet longer duration needs on the scale of weeks to months,[4] which will require continued operation of natural gas-fired power plants for the reasons discussed below:

"*It is perhaps ironic that the fastest and most efficient transition to VRE* [variable renewable energy sources] *(and associated reductions in emission) will probably require the increased use of gas at scale far into the future. Its function will change from mid-scale and peaking dispatchable power to insurance and backup of VRE supply. Gas is ideally suited to the increased volatility introduced by VRE since it can be started and ramped up from zero to full capacity in a matter of minutes, and turned off again equally quickly. That's why even very high decarbonization scenarios from the National Renewable Energy Laboratory (NREL) still require significant gas capacity for power production.*"[5]

A recent presentation by Paul Suskie, the Executive Vice President and General Counsel from the Southern Power Pool (SPP) highlights the variability issue with respect to renewable generation. The slide depicts a 14-gigawatt (GW) ramp down of wind generation over four hours before ramping up later in the day. While batteries and storage may be able to accommodate such shifts in future decades, only the deployment of multiday dispatchable fossil resources like natural gas combustion turbines are able to ensure load continues to be served.

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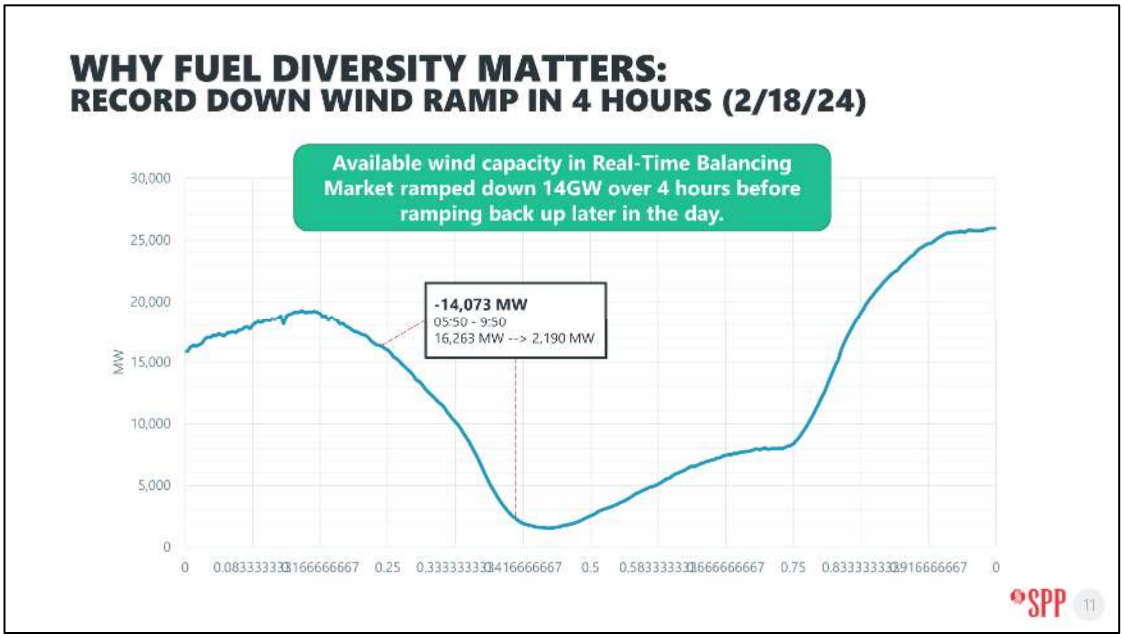
[3] Ibid. pg. 2
[4] Ibid. pg. 2
[5] "Why Wind and Solar Need Natural Gas: A Realistic Approach to Variability". Gaster, R. September 2024. Center for Clean Energy Innovation. [Center for Clean Energy Innovation | ITIF](). Pg. 4



In developing these new CAA rules for regulating both existing and new combustion turbines, the EPA should be mindful to avoid impacting the capability of reliable dispatchable resources to spin up quickly to ensure adequate electricity supply on short notice (simple cycle combustion turbines) and load-following assets that are able to shift output to ensure reliability in response to IBRs coming on and off the grid (combined cycle combustion turbines). AMP encourages the EPA to avoid establishing an inflexible regulatory framework based on an old model of load levels and annual average capacity factors while ignoring the reality of current and future plant operations. That inflexible regulatory framework could impair the ability of simple and combined cycle combustion turbines to perform their critical support and reliability functions effectively and efficiently.

II. Ensure the Reliability and Resiliency of the Electric Grid

It is critically important to maintain an adequate supply of dispatchable thermal capacity in order for the power sector to meet an ever-growing demand for electricity across the country. There are several trends in the power sector that raise major concerns regarding the power sector's continued ability to assure resource adequacy and the reliability of the bulk power grid.

One trend is that the power sector is retiring large amounts of dispatchable coal-fired generating capacity without constructing and bringing online an adequate supply of replacement generation with the same accredited capacity and other reliability attributes as the retiring generating capacity. For example, the U.S. coal fleet totals slightly more than 180,000 MW of electric generating capacity with EIA projecting as much as 80,000 MW of that capacity retiring by 2030.[6] Furthermore, the EPA's projections under the final CO_2 Power Plant Rule show that the coal-fired EGUs could disappear almost completely by 2035 because of EPA regulations and federal and state clean energy policies. This is not solely a concern of generators, but also the organizations responsible for maintaining the reliability and resilience of the nation's electric grid. Due to the rapid decline in dispatchable coal-fired generation, there have been numerous warnings from NERC, FERC commissioners, and grid operators about a resulting grid reliability crisis. These warnings have been highlighted in reports by electricity officials as far back as 2018, but the problem has grown more serious (and the warnings more strident) as coal retirements continue.[7]

A second important trend is the significant increase in electricity demand across many regions of the country. After remaining almost flat over the past decade, electricity demand is now increasing rapidly due to data centers to support the internet and artificial intelligence; the manufacturing of solar panels, electric car batteries, computer chips and other such products; the electrification of the transportation sector; and the powering of new energy facilities such as green hydrogen plants. As recently as May 8, 2024, PJM Interconnection (PJM) released a statement evidencing concerns about the EPA's newly issued CO_2 Power Plant Rule for regulating CO_2 emissions from existing coal-fired generation and new natural gas generation. PJM is seeing "vastly increased demand as a result of new data center load, electrification of vehicles and increased electric heating load," while also noting that this increasing demand "cannot be met simply through renewables given their intermittent nature."[8] Other grid operators, balancing authorities, and other organizations responsible for managing the electric grid are echoing similar concerns and challenges as they work to ensure the reliability and resiliency of the bulk power grid over the near- and long-term.

The EPA's promulgation of the CO_2 performance standards for new and reconstructed natural gas combustion turbines (adopted last May) has created significant new risks and costs for developers considering construction of new, highly efficient gas-fired combined cycle plants. Faced with increased costs of construction and potential inability to operate in

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[6] U.S. Energy Information Administration, Annual Energy Outlook 2023, Fig. 6. [Narrative 2023 - U.S. Energy Information Administration (EIA)]
[7] See e.g., NERC's 2018 "Long-Term Reliability Assessment."
[8] PJM Statement on the Newly Issued EPA Greenhouse Gas and Related Regulations. May 8, 2024

compliance with unrealistic timeframes and emission control requirements in the final CO_2 Power Plant Rule, it is likely that a number of new combined cycle projects that had been under consideration will not move forward. The chilling effect on new construction and the resulting lack of new dispatchable replacement generating resources will result in increasing capacity costs, decreased system reliability, and heavier reliance on the existing generating fleet. Not only was this an outcome predicted by grid operators and many within the electric power industry, but AMP is seeing some of these impacts already in the forward capacity markets.

The current electric reliability risks will be significantly exacerbated if the EPA adopts inflexible and overly stringent control requirements that have the effect of forcing the shutdown or curtailment of existing natural gas combustion turbines. These heightened risks will result from the fact that these forced shutdowns and retirements of dispatchable generating resources would occur at this critical time when the power sector is unable to shoulder risks and costs that the EPA created for constructing new baseload natural gas-fired resources. It will also occur at a time when the power sector is becoming increasingly dependent on its remaining dispatchable resources, which will most likely be insufficient to meet this growing demand in electricity across many regions of the country.

Using PJM as an example, the recent base residual auction (capacity auction) for the 2025/2026 delivery year resulted in record-high price increases for consumers in 13 states and the District of Columbia to ensure the adequacy and reliability of power supply, with an estimated cost of $14.7 billion.[9] PJM President and CEO Manu Asthana stated: "The significantly higher prices in this auction confirm our concerns that the supply/demand balance is tightening across the RTO. The market is sending a price signal that should incent investment in resources."[10] One issue with respect to the recent market price signal is delay between the signal and generation coming online. While PJM recently took action to speed up interconnection study times, it can still take several years to complete this process independent of other regulatory requirements and permitting timelines.

According to the Lawrence Berkeley National Laboratory, at the end of 2023, almost 2,600 GW of generation projects were sitting in interconnection queues nationally. That is

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[9] "PJM market design flaws add billions to latest capacity auction costs: market monitor." E. Howland. Sep. 24, 2024. Utility Dive. PJM market design flaws add billions to latest capacity auction costs: market monitor | Utility Dive

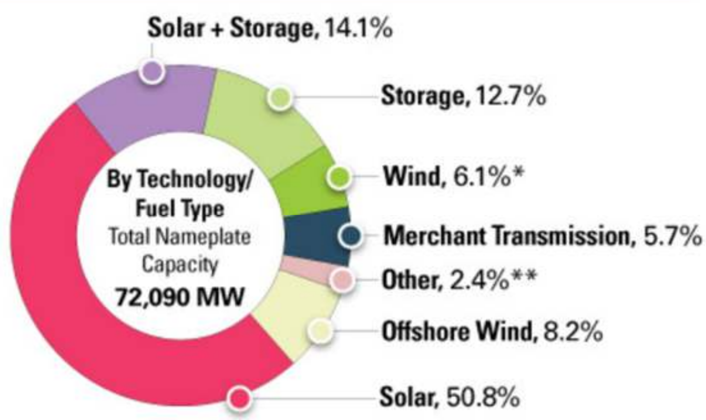
[10] "PJM Capacity Auction Procures Sufficient Resources To Meet RTO Reliability Requirement." PJM Inside Lines. Jul. 30, 2024. PJM Capacity Auction Procures Sufficient Resources To Meet RTO Reliability Requirement | PJM Inside Lines

more than double the approximately 1,170 GW of existing generation currently on the grid. Of the 2,600 GW of projects in the queue, only 3 percent are fossil fuels, and 97 percent are intermittent renewables or storage.[11] Berkeley Lab notes that much of this proposed capacity will never be connected to the grid. According to Berkeley Lab, “only 14 percent of capacity requesting interconnection from 2000-2018 reached commercial operations by the end of 2023.”[12]

Another related issue is that — as noted above — most of the new generation in the interconnection queue is renewable. Renewable energy resources like solar have obvious CO_2 emissions benefits and current federal policy in the IRA encourages solar (and other renewable) power development with tax credits. This disproportionate emphasis on new renewable development is illustrated below in the graphic on energy resources pending in the interconnection queue for the PJM system.

Projects To Clear PJM Interconnection Process in 2024 and 2025

By State	Number of Projects	Total Nameplate Capacity (in MW)
DE	5	1,184
IL	82	13,798
IN	69	13,475
KY	39	4,125
MD	6	1,288
MI	8	887
NC	25	1,775
NJ	25	1,528
OH	72	8,613
PA	108	5,055
VA	162	19,012
WV	15	1,350
Total	616	72,090



*Includes one combined Wind & Solar facility of 199 MW
**Other: Natural Gas (1,647 MW, 2.3%) and Hydro (51 MW, 0.1 %)

From Interconnection Reform Is Working, but Will New Generation Actually Get Built? | PJM Inside Lines

Intermittent resources, such as renewables, are impacted by seasonal changes and weather patterns resulting in an inability to effectively address the immediate and

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[11] Lawrence Berkeley National Laboratory. *Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection*. April 2024.

[12] *Id*. Five years ago, the interconnection queues contained only 733 GW, a little more than one-quarter of the current total. Berkeley Lab notes that clean energy incentives have driven interconnection queue additions with over 1,200 GW of capacity, overwhelmingly renewables and storage, entering the queues since the passage of the Inflation Reduction Act in 2022. *Id*. These major increases in interconnection request have made it extremely difficult for grid operators to review, assess, and approve these interconnection requests in a timely manner.

anticipated PJM capacity challenges. Generation resources in PJM have to be accredited through an effective load carrying capability (ELCC) analysis that simulates the expected hourly output of resources to quantify the resource adequacy value of an ELCC class (group of similar resources) based on historical data and analysis by PJM staff.[13] This ELCC process is important because it differentiates among various generating resources based on expected output rather than facility or nameplate ratings. For example, a natural gas combustion turbine unit rated at 100 MW has a class rating of 68 percent whereas a fixed-tilt solar farm rated at 100 MW has a class rating of 8 percent.[14]

Even with tax credits putting a thumb on the scales in favor of renewable generation, the price signal sent during the recent base residual auction will be largely unanswered. Solar projects encompass more than 50 percent of the generation projects that are expected to clear the PJM interconnection queue in the 2024-2025 period; solar and other renewable generation were minor contributors to the auction overall. And this assumes approved projects will be constructed quickly to address capacity shortfalls and other reliability concerns. Unfortunately, "PJM has cleared nearly 40,000 MW of generation projects through our interconnection process that are not moving to construction at a pace needed to replace retiring generators while serving increasing electricity demand."[15] With EPA regulatory requirements that are forcing the premature retirement of existing coal-fired baseload generation and that are slowing, if not blocking, the construction of new natural gas combustion turbines due to unrealistic new CO_2 emission control requirements, overly stringent emission standards for existing natural gas turbines may exacerbate the ongoing impacts to grid reliability, further impede the transition to renewable generation, inhibit economic development and negatively impact the reliability and affordability of power.

[13] PJM - ELCC
[14] 2026-27-bra-elcc-class-ratings.ashx (pjm.com)
[15] "Interconnection Reform Is Working, but Will New Generation Actually Get Built?" McGlynn, P. Apr. 23, 2024. PJM Inside Lines. Interconnection Reform Is Working, but Will New Generation Actually Get Built? | PJM Inside Lines

Table 6. Offered and Cleared MWs by Type for RPM and Committed FRR for Previous BRAs

	Offered and Cleared UCAP							
	2022/23		2023/24		2024/25		2025/26 (Reflects ELCC Accreditation)	
Type	Offered	Cleared	Offered	Cleared	Offered	Cleared	Offered	Cleared
Coal	45,754	39,230	37,164	31,811	35,114	31,532	30,081	30,081
Distillate Oil (No.2)	3,178	2,897	2,894	2,855	2,776	2,674	2,408	2,408
Gas	85,562	79,329	85,217	81,643	85,469	83,258	66,354	66,354
Nuclear	31,944	26,140	31,960	31,960	31,835	31,629	30,549	30,549
Oil	2,674	2,527	2,350	2,269	2,493	2,220	578	578
Solar	2,633	2,096	2,945	2,935	4,234	4,232	1,337	1,337
Water	6,917	6,749	6,375	6,375	6,137	6,137	5,365	5,361
Wind	2,595	1,839	1,608	1,416	1,396	1,396	2,618	1,676
Battery/Hybrid	-	-	16	16	36	36	14	14
Other	1,205	1,168	1,185	1,185	1,153	1,153	911	911
Demand Response	10,604	8,903	10,652	8,631	10,334	8,180	6,363	6,342
Aggregate Resource	484	386	511	511	503	503	327	273
Total (without EE)	**193,551**	**171,263**	**182,875**	**171,605**	**181,481**	**172,951**	**146,905**	**145,883**
Energy Efficiency	5,057	4,811	5,471	5,471	8,417	7,669	1,460	1,460
Total (with EE)	198,608	176,073	188,346	177,076	189,898	180,620	148,364	147,343

*The table shows the UCAP MW quantities that offered and cleared in the BRA of each DY plus the UCAP MW committed to FRR Capacity Plans. Notes: Offered and Cleared MW quantities include Annual, Summer-Period, and Winter-Period Capacity Performance sell offers. Other consist of: Kerosene, Other Gas, Other Liquid, Other Solid, Wood. *Starting in 2020/2021, Generation, DR, and EE offered and cleared values include Annual, Summer-Period, and Winter-Period Capacity Performance*

From https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2025-2026/2025-2026-base-residual-auction-report.ashx

These concerns were most recently confirmed and further underscored in an amici curiae brief that four grid operators — MISO, PJM, SPP, and ERCOT — filed in support of the court challenges of the final CO_2 Power Plant Rule by 27 states and several national trade associations, and various electric utilities. Among other things, the grid operators expressed concerns that:

- "the compliance timelines and related provisions of the [CO_2 Power Plant] Rule are not workable and are destined to trigger an acceleration in the pace of premature retirements of EGUs that possess critical reliability attributes at the very time when such generation is needed to support ever-increasing electricity demand because of the growth of the digital economy and the need to ensure adequate back-up generation to support an increasing amount of intermittent renewable generation;"

- "premature retirements of generating units that provide critical reliability attributes [due to the CO_2 Power Plant Rule and other recent EPA rules] can have significant, negative consequences on reliability;"

- "such inevitable and foreseeable premature retirement decisions resulting from the [CO_2 Power Plant] Rule's timelines will substantially strain each of the Joint ISOs/RTOs' ability to maintain the reliability of the electric power grid to meet the needs of the citizenry and the country's economy;"

- "the collective [EPA] rules will have a chilling impact on the investment required to retain and maintain existing units that are needed to provide key reliability attributes and grid services before the Final [CO_2 Power Plant] Rule's compliance date;" and

- "impact of the Final [CO_2 Power Plant] Rule must also be considered in conjunction with the numerous other proposed, pending, or existing environmental regulations that impact grid reliability and resource adequacy — all of which are resulting in a decline in reserve margin and premature retirement of dispatchable baseload resources (i.e., resources most currently in the form of coal and natural gas)."[16]

In light of these mounting electric grid reliability risks, it is critically important for the EPA to adopt performance standards that do not result in the direct or indirect shutdown of existing generation capacity. In the case of the upcoming rulemaking to control CO_2 emissions from existing natural gas combustion turbines under the CAA section 111(d), the EPA should use its broad authority to adopt measures that are designed to increase compliance flexibilities, help maintain resource adequacy, and reinforce electric grid reliability. As a general matter, these provisions should include the following types of compliance flexibility measures to assure electric grid reliability:

- *Flexible variance procedures* for setting less stringent CO_2 performance standards and extending compliance deadlines than those mandated in the upcoming EPA regulations based on the "remaining useful life and other factors" (RULOF) in order to assure electric grid reliability;

- *An extension of compliance deadlines* for existing affected combustion turbines in cases where the owners or operators of the units encounter unanticipated technical or administrative delays beyond their control (such as unavoidable permitting delays or supply chain constraints, lengthy environmental assessments, just to name a few);

[16] Amici Curiae Brief of Midcontinent Independent System Operator, Inc., PJM Interconnection L.L.C., Southwest Power Pool, Inc., and Electric Reliability Council of Texas, Inc., in Support of Petitioners, D.C. Circuit Court of Appeals Consolidated Case No. 24-1120, filed on September 13, 2024.

- *Short-term reliability assurance mechanisms* to address acute energy emergencies, such as those electric grid emergencies associated with extreme weather events when electric demand increases or there are unexpected transmission and generation outages; and

- *Long-term reliability assurance mechanisms* that will allow existing affected units to operate beyond any established compliance deadlines in order to assure resource adequacy and reliability.

III. Respect State Primacy to the Maximum Extent Permissible

The CAA establishes a different regulating framework for the establishment and implementation of performance standards under each of the three upcoming CAA rulemakings for limiting emissions from combustion turbines. Although having somewhat different regulatory frameworks, the upcoming CAA rules should be developed and implemented in a manner that provides the greatest deference to states permissible under the statute. This difference is necessary to enable states to have the ability to achieve emission control objectives in a flexible and cost-effective manner while ensuring a reliable supply of affordable electricity.

Of the three upcoming CAA regulatory initiatives, the new program for controlling CO_2 emissions from existing combustion turbines under CAA section 111(d) affords the EPA with the greatest authority to provide deference to states. The EPA should use this authority to the maximum extent permissible by establishing a robust federal state partnership in the establishment, implementation, and enforcement of the new CO_2 performance standards applicable to existing combustion turbines. Such a joint federal state partnership can best be achieved by the EPA adopting general emission guidelines that give states the responsibility and authority of developing, implementing, and enforcing CO_2 performance standards for each affected combustion turbine in accordance with the emission guidelines. In so doing, those guidelines should not dictate what the performance standards states must adopt or otherwise tell a state how to regulate existing affected combustion turbines within its jurisdiction under section 111(d) of the CAA.

Rather, states should have wide latitude in setting CO_2 performance standards for individual existing combustion turbines within their jurisdiction, as expressly authorized by both the statute and EPA's implementing regulations.[17] Most importantly, EPA emissions guidelines should recognize states' authority to adjust the stringency of the performance

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[17] *See* Section 111(d)(1) of the CAA; 40 C.F.R. 60.24.

standards or extend the compliance deadlines based on the remaining useful life of the particular plant or other site-specific factors through the RULOF variance procedures noted above. These site-specific factors under the RULOF variance include the unreasonable cost of control resulting from plant age, location, or basic design process, physical impossibility of installing the necessary control equipment, or other factors associated with the facility that make application of a less stringent standard or final compliance time more reasonable.[18] In addition, as noted above in AMP's guiding principles to ensure electric grid reliability, the emission guidelines should establish effective regulatory mechanisms specifically designed to provide increased compliance flexibilities and help maintain resource adequacy and electric grid reliability.

States also can play an important role in ensuring the establishment and implementation of performance standards in a flexible and cost-effective manner with respect to the other two CAA regulatory programs being developed by EPA. For example, CAA section 111(c) provides states the authority to develop "a procedure for implementing performance standards" for new and modified affected sources within the state. Similar authority is provided to states to implement and enforce performance standards that the EPA may establish for limiting HAP emissions under CAA section 112. The Agency should explore available opportunities to statutorily allow states to play an important role in the implementation and enforcement of the standards for limiting NOx and HAP emissions in a manner that addresses reliability and other state specific concerns.

In addition, deference to states can be provided by consulting with state and local governmental authorities (including public power systems) in the development of reasonably achievable emissions control requirements that seek to avoid the premature shutdown of necessary existing combustion turbine generating capacity. Similarly, the EPA should strive to develop implementation framework mechanisms in the final rules that allow the Agency to adjust the stringency and timing of these performance standards based on reliability concerns or other implementation or compliance challenges raised by states, grid operators, or other local authorities.

IV. Establish a Workable and Effective Framework for Subcategorization of the Combustion Turbine Source Category

One important step of the regulatory process under each of the upcoming CAA rulemakings is for the EPA to subcategorize affected units falling within the EGU

[18] 40 C.F.R. §60.24(f).

combustion turbine source category. In so doing, the EPA has broad authority to "distinguish among classes, types, and sizes" of sources in establishing the appropriate subcategories of sources subject to performance standards for CO_2 and conventional air pollutants under CAA section 111 as well as HAPs under CAA section 112.[19] The EPA should use this authority to establish a workable and effective framework for regulating emissions under each CAA regulatory program.

The importance of the EPA establishing a workable and effective subcategorization framework cannot be overstated. The existing fleet of natural gas turbines is diverse, from a size, technology, efficiency, emissions, and operations perspective, which makes developing an effective and workable regulatory scheme a challenging but necessary task. This diversity requires the Agency to establish a subcategorization framework that does not create perverse incentives to either retire early existing combustion turbines or operate those units at reduced load levels (well below their design levels) in order to avoid onerous and overly stringent performance standards that would require the installation of costly and technically unproven control measures if the turbines were operated at higher annual capacity factors.

In addition, as noted above, natural gas-fired turbines (including combined cycle plants) are needed to supplement ever growing demand and manage the increasing complexity of the modern grid as additional large amounts of intermittent, variable, and limited duration resources (such as wind, solar, and storage) come online. For this reason, the EPA should not develop a regulatory framework for all types of existing and new natural gas combustion turbines that is based on load levels (*e.g.*, peaking, intermediate load, and baseload) and annual capacity factors. Instead, the design framework for the regulation of existing natural gas generation should reflect, and be compatible with, the operational duties and functions that natural gas combustion turbines must perform to ensure electric grid reliability. Those duties and functions require the operation of natural gas-fired combustion turbines (including combined cycle plants) as load-following units with the capability of rapidly starting and ramping up the units.

In the case of regulating CO_2 emissions from existing combustion turbines under CAA section 111(d), that regulatory framework should not mandate the installation and

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[19] *See* Section 111(b)(2) of the CAA (providing that the EPA "Administrator may distinguish among classes, types, and sizes within categories" in setting performance standards for NOx and CO_2 emissions under section 111); Section 112(d)(1) of the CAA (providing that the EPA "Administrator may distinguish among classes, types, and sizes within categories" in setting performance standards for HAP emissions based on maximum achievable control technology under section 112).

operation of carbon capture and sequestration (CCS) and other such add-on technologies for reducing CO_2 emissions from the flue gas that are fundamentally incompatible with the operational duties of load-following natural combustion turbines (including combined cycle combustion turbines). Rather, the CCS technologies are best employed when electric generating facilities (typically coal-fired EGUs) are operated at steady state with high levels of CO_2 in the flue gas stream.

One key objective of the EPA should be to establish a framework that seeks to retain the necessary existing generating capacity to preserve reliability. As owners and operators of existing coal-fired EGUs elect to retire their coal-fired units throughout the 2030s, the existing source guidelines for natural gas combustion turbine units should recognize the important role that both existing and new natural gas units can and must play in replacing the reliability attributes leaving the system and incentivizing multiday dispatchable generation capacity.

In light of these important considerations, the EPA should develop subcategories specifically tailored to the needs of existing and new natural gas combustion turbine units, including the development of subcategories based on unit size, expected operation, reliability considerations, economic dispatch and others important operating and design characteristics of existing combustion turbines. In the case of existing combustion turbines, the EPA should enable electric utilities to make decisions on the continued operation of their existing turbine units that reflect the age, useful life, and changing usage patterns of some of these units, including older simple cycle units.

V. Set Achievable Standards for Controlling CO_2 Emissions from Existing Combustion Turbines Based on Adequately Demonstrated and Cost-Effective Technologies and Measures Under CAA Section 111(d)

The statute directs the EPA to identify the "best system of emissions reduction" ("BSER") that has been shown to be "adequately demonstrated" for existing sources in the regulated source category and that will result in "emission limitations" that are "achievable" by existing sources within the regulated source category.[20] Based on this statutory directive, the EPA's BSER determination under CAA section 111(d) therefore should be based on reasonable and cost-effective control measures for reducing CO_2 emissions from existing combustion turbines, and not on control measures that are novel,

[20] Section 111(a)(1) of the CAA.

undemonstrated, or extraordinarily costly.

The EPA should eliminate both CCS and firing with clean hydrogen in any amounts as control measures for setting performance standards for limiting CO_2 emissions from existing combustion turbines under CAA section 111(d). Neither CCS nor firing of clean hydrogen is a demonstrated technology, much less one that is adequately demonstrated and economically feasible. Rather, the EPA should set CO_2 performance standards for existing combustion turbines that are based on efficient operation that accounts for technical, economic, and other practical limitations that do not require major overhauls and reconstruction of combustion turbines.

A. Technical Basis for Eliminating CCS as Feasible Control Technology

As noted above, CAA section 111 directs the EPA to base its BSER determinations on reasonable and cost-effective control measures for liming CO_2 emissions from existing combustion turbines, and not on control technologies that are novel, undemonstrated, and cost prohibitive. Based on the application of these clear criteria, CCS is therefore not a viable CO_2 control measure for existing combustion turbines because CCS is not commercially available, operationally compatible, nor economically feasible. These clear limitations on the application of CCS are especially the case with respect to low-load (peaking) and intermediate-load combustion turbines for which CCS technologies are neither technically achievable nor practical to operate.

Furthermore, CCS also is clearly neither an available nor cost-effective control technology for existing baseload natural gas combustion turbines that may need to operate as grid-following resources, shifting output to meet growing electricity demand as intermittent resources and short-duration energy storage become more prevalent and load cycling becomes more frequent. Major barriers to the deployment of CCS on existing baseload combustion turbines include the following technical limitations and constraints:

- CCS is not fully demonstrated nor commercially available for controlling CO_2 emissions from natural gas combustion turbines (in fact CCS has never been applied to the entire flue gas stream of a natural gas combustion turbine unit);
- To the extent available, CCS simply cannot achieve on a continuous basis high capture rates of 90% from the flue gas, as the EPA is now claiming for new and reconstructed baseload stationary combustion turbines in the final CO_2 Power Plant Rule;

- Many existing combustion turbines are located in areas that are simply not suitable to geological sequestration, thereby making it impossible to inject and sequester the CO_2 in locations near the facility site; and

- The construction and use of CO_2 pipelines is neither economic nor realistically practical to transport the captured CO_2 from many, if not most, existing combustion turbines to other locations (which are frequently great distances away) that are suitable geological sequestration.

For these reasons, the EPA should eliminate CCS as a feasible technology that is appropriate to set CO_2 performance standards for any and all types and sizes of existing combustion turbines.

B. Technical Basis for Eliminating Hydrogen Co-Firing as Feasible Control Option

Co-firing with clean hydrogen in any amount should also be rejected as a possible CO_2 control option for existing combustion turbines based on the same reasons that the EPA has entirely removed hydrogen co-firing as a feasible BSER control technology under the final CO_2 Power Plant Rule. Just as the EPA determined in the case of new and reconstructed natural gas combustion turbines, sufficient quantities of clean hydrogen cannot be produced and transported to affected turbine units at reasonable costs to support a decision that hydrogen co-firing qualifies as a BSER technology for existing natural gas combustion turbines.

An adequately demonstrated system that meets the BSER requirements in section 111 must have *an operational history with actual performance data* showing more than a mere possibility of technical feasibility. Importantly, to apply the BSER to the source category, the EPA must show that the technology is dependable, effective, and affordable for individual sources, based on actual operating experience. Given these requirements, reliance of clean hydrogen as adequately demonstrated control measure is clearly not evident and lacks an adequate technical foundation and is therefore speculative.

Based on real-world experience with natural gas and other cleaner fuels, it is unreasonable to conclude that co-firing with clean hydrogen is a dependable, effective and affordable control measure for existing combustion turbines. Any attempt to do so by the EPA would have to be based on an assumed, unrealistic buildout of a new, large-scale energy infrastructure for producing and transporting clean hydrogen. This build-out would likely include the establishment of a national system of hydrogen production using low- or no-carbon generation to power electrolysis along with the development of hydrogen pipelines and storage hubs that would be necessary to supply huge quantities of affordable clean hydrogen for powering existing combustion turbines. At this time, no such energy infrastructure currently exists. Nor is there any credible documentation indicating how it could ever be developed within the very short time horizons required for existing combustion turbines complying with new performance standards based on hydrogen co-firing. Furthermore, even if the timely build-out of an entirely new hydrogen infrastructure was possible (which is not the case), major questions exist as to whether sufficient supplies of clean hydrogen at affordable costs would be available to power combustion turbines on such a large scale nationwide.

For these reasons, the EPA should eliminate co-firing clean hydrogen in any amount as a feasible technology that is appropriate to set CO_2 performance standards for any and all types and sizes of existing combustion turbines.

C. Technical Basis for Setting CO_2 Performance Standards Based on Energy Efficiency Improvements

The elimination of CCS and hydrogen as viable control measures means that the EPA will need to evaluate energy efficiency improvements as the primary emission control option for making its BSER determinations. In so doing, the Agency will need to account for the technical, economic, and other practical limitations of implementing efficiency improvements that require major overhaul and reconstruction of existing combustion turbines. The consideration of these factors is particularly important in the case of peaking combustion turbines that may be smaller in size and with limited, but critical, utilization. Imposing overly stringent performance standards that effectively requires major overhauls and reconstructions of those smaller combustion turbines may not be technically or economically feasible due to turbine design, lack of support by original equipment manufacturers, or other physical constraints and consequently would unnecessarily force the premature retirement of those turbines.

As an example, the suggestion of efficiency gains by converting simple cycle turbines into combined cycle plants misunderstands the important and distinct roles they play in the electric system. As a general matter, simple cycle turbines are utilized for their ability to start and inject power to the grid within minutes of being called to do so whereas more efficient combined cycle plants require several hours to start up safely. Requiring the conversion of simple cycle turbines to combined cycle plants therefore ignores the intended purpose of those turbines and simultaneously has negative impacts on grid reliability through the loss of fast starting dispatchable generation essential for supporting increased penetration of intermittent renewable generation.

For these reasons, the EPA should consider carefully the size, annual production levels, and operating profile of each class of existing combustion turbines when setting the appropriate CO_2 performance standard for those combustion turbines based on the application of available energy efficiency improvements.

VI. Set Achievable Standards for Controlling NOx and HAP Emissions from Available and Cost-Effective Control Technologies

In the briefing materials for the federal consultation process, the EPA requested information on the performance and cost of new and additional control technologies as well as methods to upgrade existing control technologies for reducing NOx emissions from new and modified combustion turbines under CAA section 111(b) and HAP emissions from new, modified, and existing combustion turbines under CAA 112. While still examining these technical and cost issues, AMP offers the following technical considerations that the EPA should evaluate in setting these performance standards for combustion turbines.

Selective Catalytic Reduction (SCR) control systems for limiting NOx emissions are appropriate in only those cases when combustion turbines are operated as baseload or intermediate load levels with few startups and shutdowns. By contrast, permitting authorities tend not to impose SCR controls on peaking combustion turbines with frequent startups and shutdowns when the SCR cannot operate due to the ineffectiveness of NOx SCR control systems. Instead, the EPA should regulate peaking combustion that operate dry ultra-low NOx burners and wet controls that can reduce high flame temperatures and thereby limit the NOx formations when fuels are combusted at higher temperatures. It would be counterproductive to establish performance standards for these peaking and cycling units with frequent startups and shutdowns based on utilization of SCRs due to the inherent operational incompatibility.

The Agency also needs to consider fully the test data and other technical information being developed for setting performance standards for formaldehyde, acid gases and metallic HAPs for both new and existing combustion turbines. It should be noted that many testing program results used by the EPA to support the necessity and presence of formaldehyde in the exhaust of combustion turbines, were at or very close to the minimum detection levels of the laboratory or reference method, and in general, were far less than half a pound per hour (or 0.2 tons per year).[21]

Among other concerns, the EPA should consider that for any individual combustion turbine, emission controls for a gaseous pollutant like formaldehyde can be costly and would need to be assessed on a site-by-site basis. As an example, oxidation catalysts may be an effective control measure to reduce gaseous organic emissions from combustion turbines. In order to determine whether installing such controls is feasible and cost-effective, an owner would need to perform backpressure and airflow studies along with a number of other engineering considerations. Initial internal estimates for front-end engineering design, fabrication, and installation could approach a million dollars per turbine. Even conservatively estimating total costs at $1 million for installation of an oxidation catalyst, requiring owners and operators of gas turbines to incur a cost of $5 million per ton of formaldehyde removed is clearly unreasonable.

The gas turbines operated by AMP and AMP Members are owned by municipal electric systems across our geographic footprint. All costs associated with the installation, operation, and maintenance of these turbines is borne by the customers of those municipal electric systems, including residential, commercial, and industrial customers. This means that the cost of installing emissions controls on AMP and AMP Member gas turbines (if installation is even feasible for existing units) are passed along directly to customers in the form of higher charges on their electric bills. Further, many of these gas-fired combustion turbines are already operated as Low Mass Emissions (LME) units under 40 CFR 75.19 and generally operate less than 200 hours per year. If the EPA does move forward with emissions control measures, AMP recommends exemptions for units operated as LME and limited use.

VII. Colocated Battery Energy Storage Systems

Providing incentives for electric utilities to use (but not mandating the application of) colocated battery storage systems will not impact the pollutant emissions of affected combustion turbines. Generally, performance standards established under 111 are applied to the source (i.e., the affected combustion turbine unit) rather than the combined emissions of two generating units. Unless the EPA is attempting to redefine the source (which is not permissible under the CAA), it is not clear how such collocation would work as an emissions reduction strategy. The original CPP "building blocks" mandated

[21] Stationary Combustion Turbines: National Emission Standards for Hazardous Air Pollutants (NESHAP) | US EPA

something similar with owners/operators using renewable energy projects for compliance demonstrations, a strategy ultimately rejected by the Supreme Court.

While several valuable environmental and operational benefits may result from using colocated battery storage systems on a voluntary, case-specific basis, there also are offsetting, complicating factors that can limit the effectiveness of colocated battery systems.

A. Battery Size and Duration

The critically important factor is the size and duration of the battery energy storage system. Determining the optimal power and energy capacity to pair with turbines is a highly complex matter that is dependent on specific use cases, operational design constraints of each combustion turbine, and system needs for each electric utility system — which may change over time. An inadequately sized battery storage system may not sufficiently reduce the turbine cycling, thus limiting CO_2 and NOx emission reductions that could be achieved on both a short-term and longer-term basis. Any regulatory mandate to integrate battery energy storage systems with combustion turbines would therefore need to address this confluence of complicating matters on a unit-by-unit basis for each utility system.

B. System Complexity

Integrating battery storage systems with combustion turbines adds complexity to system operations. This complexity necessitates additional measures for maintaining adequate system strength, managing variability and uncertainty, and ensuring sufficient frequency response.[22] Achieving optimal coordination between turbines and batteries is challenging, especially under a technology-based performance standard.[23] The EPA

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[22] This integration requires sophisticated control systems to manage the interaction between the battery storage and the turbine. For example, ensuring seamless operation and synchronization of the unit be technically demanding and poses significant challenges. *See* Article entitled *On-Grid Batteries for Large Scale Storage: Challenges and Opportunities for Policy and Technology*, available here.

[23] This technical limitation is also evidenced in other aspects of managing the electric grid. For example, the suggestion of efficiency gains by converting simple cycle turbines into combined cycle plants misunderstands the important and distinct roles they play in the electric system. Generally, simple cycle turbines are utilized for their ability to start and inject power to the grid within minutes of being called to do so whereas more efficient combined cycle plants require several hours to start up safely. Converting simple cycle turbines to combined cycle plants ignores the intended purpose of those turbines and simultaneously has negative impacts grid reliability through the loss of fast starting dispatchable generation essential for supporting increased penetration of renewable generation.

should avoid establishing prescriptive standards that dictate how this coordination occurs if this strategy is chosen as an emissions reduction strategy.

C. Energy Sources for Charging Batteries

Another important factor is the energy source(s) used for charging the colocated battery energy storage systems. If the electricity used to charge the battery systems collocated at the combustion turbine units is not from renewable sources, the opportunity to reduce CO_2 and NOx emissions may be substantially diminished. For example, no emissions reductions would be achieved if the charging source for the batteries was the onsite natural gas combustion turbine. Furthermore, this could even result in increased emissions if the charging sources were from the power grid with significant amounts of electricity coming from coal-fired electric generating units.

D. CAA Regulatory Constraints

Finally, the EPA may run the risk of violating clear CAA requirements if the new performance standards would require specific energy sources (such as non-emitting renewable or nuclear generating resources) to charge the batteries in order to limit CO_2 and NOx emissions from affected combustion turbines. Requiring such specific clean-energy sources to charge the colocated batteries could violate the prohibition against setting performance standards based on control measures that operate beyond the fence-line of a facility. In addition, it could violate the CAA prohibition against requiring reduced utilization of the affected combustion turbines and generation shifting within the electricity grid.[24]

Similarly, CAA section 111 bars the EPA from adopting performance standards that mandate the use of specific technologies and control measures, such as the use of battery storage systems charged by clean energy resources. The statute, by contrast, requires the

[24] Setting performance standards based on such “outside-the-fence” control measures is contrary to the CAA, as interpreted by the Supreme Court in West Virginia v. EPA, in which Court struck down the EPA’s “outside-the-fence” approach under the Clean Power Plan, which included a cap-and-trade system that would result in a shift of electricity production from coal-fired plants to other sources with lower CO_2 emissions. The Supreme Court concluded that such action exceeded EPA’s power under Section 111(d) to establish the BSER control measures that has been “adequately demonstrated” and that such generation shifting from coal to other sources constituted a “major question” of great economic significance. 142 S. Ct. 2587 (2022)

EPA to establish technology neutral performance standards that allows affected source operators to use any control measures for meeting those performance standards.[25]

VIII. Avoid Stranded Investments

The EPA should craft federal CAA regulations that seek to avoid stranded investments to the maximum extent practicable under each of the three CAA regulatory programs. To further this objective, the EPA should not adopt performance standards that are technically or economically infeasible to achieve and, consequently would unnecessarily force the shutdown of existing natural gas combustion turbines. The failure to do so could result in stranded investment resulting from the direct or indirect forced premature shutdown of existing turbine generating capacity. In addition, it could exacerbate current and projected electric reliability concerns by forcing retirement of additional multiday dispatchable generating capacity at a time when resource adequacy of the electric grid already is a major, growing concern. For these reasons, it is critically important that the EPA adopt reasonable performance standards that set achievable control levels that are not cost prohibitive and not force the premature shutdown of existing natural gas combustion turbines.

All public power utilities share a common defining characteristic to provide their customers within their communities with cost-based electricity without earning profits from the sale of electricity to investors or shareholders. Rather, as not-for-profit organizations, public power utilities strive to achieve this overarching objective by generating their own electricity or by purchasing power from other electric power generators, including larger public power utilities that are called joint action agencies formed to collectively serve smaller communities. Furthermore, in fulfilling this important objective for its communities, public power utilities are transparent, and their boards are directly accountable to the community's citizens. Public power utilities, by their nature, involve citizens in their decision-making.

In addition, many public power utilities own or operate generating assets with limited capacity and narrow margins. Financing for new projects, including regulatory mandates, often comes from bonds and loans that rely on unit-operating revenue as collateral. When a unit is not operating, it is not able to provide power to a municipality; nor can it generate income to allow that city to purchase power from other providers. Further, many cities have

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[25] *See* Section 111(b)(5) of the CAA (providing that "nothing in this section shall be construed to require . . . [an affected source] to install or operate any particular technological system of continuous emission reduction to comply with any new source standard of performance").

limited emergency funds to cover the purchase of power on a long-term basis without income from their assets.

Because of AMP's structure as a nonprofit wholesale provider, the importance of avoiding stranded investments is of critical importance. Unlike for-profit investor-owned electric utilities, AMP and its public power members cannot recoup investments in power plants financed on the basis of baseload dispatch if these units are forced to retire or potentially become load-following units. Failure to allow public power owners to recognize the full economic life of these assets would be financially harmful to the local communities and their customers that AMP and its Members serve.

CONCLUSION

AMP submits the preceding comments that provide guiding principles and technical considerations that are intended to assist the EPA's development of performance standards for limiting CO_2, NOx, and HAP emissions affected natural gas combustion turbines under the upcoming three coordinated CAA rulemakings. These comments identify the issues of great concern to AMP (and its Members) and seek to outline suggested approaches for enhancing the effectiveness and workability of those control requirements. Furthermore, we stand ready and are available to provide further assistance and support in the Agency's efforts to develop meaningful, effective, and balanced CAA regulations.

Respectfully Submitted,

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