UNITED STATES OF AMERICA

BEFORE THE

U.S. ENVIRONMENTAL PROTECTION AGENCY

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	EPA-HQ-OAR-2023-0072

JOINT COMMENTS OF ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.; MIDCONTINENT INDEPENDENT SYSTEM OPERATOR, INC.; PJM INTERCONNECTION, L.L.C.; AND SOUTHWEST POWER POOL, INC.

Introduction and Summary

Electric Reliability Council of Texas, Inc. ("ERCOT"), Midcontinent Independent System Operator, Inc. ("MISO"), PJM Interconnection, L.L.C. ("PJM"), and Southwest Power Pool, Inc. ("SPP") (collectively, "Joint ISOs/RTOs"), jointly submit these comments in response to the Environmental Protection Agency's ("EPA") proposed rule in the above-referenced docket ("Rule" or "Proposed Rule").[1] As described below, the Joint ISOs/RTOs are concerned that the substance of the Proposed Rule as presently configured, as well as its timing, have the potential to materially and adversely impact electric reliability. Moreover, the Proposed Rule, when combined with other EPA rules and other policy actions, could well exacerbate the disturbing trend and growing risk wherein the pace of retirements of generation with attributes needed to ensure grid reliability is rapidly exceeding the commercialization of new resources capable of providing those reliability attributes.

I. Overview of Joint ISOs/RTOs' Concerns

The Joint ISOs/RTOs have long been at the forefront of renewable energy integration, but have seen an increasing trend of retirements of dispatchable generation, which provides critical attributes that are needed to support the reliable operation of the grid. Although each region is working to facilitate a substantial increase in renewable generation, the challenges and risks to grid reliability associated with a diminishing amount of dispatchable generating capacity could be severely exacerbated if the Proposed Rule is adopted.

We recognize that through the creation of various sub-categories, the EPA has attempted to stagger the impact of the rule to avoid an *en masse* retirement of needed dispatchable generation.

[1] Individual RTOs and ISOs reserve the right to submit separate, supplemental comments on this rule.

However, key requirements in the Proposed Rule are premised on EPA's assumption that either (1) the development of new technologies will allow new, low-greenhouse gas (GHG) resources to substitute for the resources presently providing these necessary reliability attributes or grid services or (2) the retrofitting of fossil-based resources with either carbon capture and storage (CCS) or hydrogen co-firing to control carbon dioxide (CO_2) emissions will be economically feasible within the timeframes specified for compliance in the Proposed Rule. Although the Joint ISOs/RTOs have been and will continue to be supportive of new technologies, we believe that the Proposed Rule's Best System of Emissions Reduction (BSER) determination overstates the commercial viability of CCS and hydrogen co-firing today and ignores the cost and practicalities of developing new supporting infrastructure within the time frames projected. Without firm proof of the commercial and operational viability of these technologies, proceeding with these requirements could place the reliability of the electric grid in jeopardy. In short, hope is not an acceptable strategy.

These concerns are not limited to the future years in which the Proposed Rule would require these new technologies to be employed. The Joint ISOs/RTOs are equally concerned that the Rule (and the cumulative effect of all of the recent electric industry-related EPA actions and rulemakings) could have a chilling effect in the near-term on the investment needed to maintain dispatchable generating units until these new technologies develop. The ISOs/RTOs are already seeing retirements of generators that are concerning as they appear to be driven by a reluctance of investors to make the commitments needed to keep these capital-intensive resources operating. As the penetration of renewable resources continues to increase, the grid will need to rely even more on generation capable of providing critical reliability attributes. With continued and potentially accelerated retirements of dispatchable generation, supply of these reliability attributes will dwindle to concerning levels.

We appreciate previous efforts by the EPA to address reliability concerns raised by the Joint ISOs/RTOs through commitments to enforcement discretion (in the case of the MATS Rule) or the adjustment of compliance dates. However, these solutions do not ensure that resource owners will make sufficient investments in resource maintenance in the years preceding the effective date of the Rule, as those investments are based in part on the forecast of the viability of a given set of units. As a result, the Proposed Rule can have negative impacts on electric grid reliability even before the effective date of this rule.

Accordingly, the Joint ISOs/RTOs urge the EPA to further examine and address these reliability impacts before finalizing any Rule in this area. Joint ISOs/RTOs submit these comments to explain the challenges associated with the Proposed Rule and underscore the need for actions to address reliability concerns within any future final rule. These comments are organized as follows

A. Overarching Reliability Concerns
B. Shortcomings in EPA's Reliability Analysis Assumptions
C. Comments Regarding Revised New Source Performance Standards (NSPS) for GHG Emissions from New Fossil Fuel-Fired Stationary Combustion Turbine EGUs
D. Comments Regarding Emission Guidelines for GHG Emissions from Existing Fossil Fuel-Fired Steam Generating EGUs
E. Comments Regarding Emission Guidelines for GHG Emissions from Existing Stationary Combustion Turbines

F. Need to Incorporate Timely Reviews of Technology Advancement and Unit Retirements in the Final Rule
G. Request for Specific EPA Authorization for Interstate Allowance Trading Among Affected Units
H. Request to Revise the Definition of "System Emergency"

II. Joint ISOs/RTOs' Proposed Modifications Should the Rule Go Forward

The Joint ISOs/RTOs appreciate the dialogue in which EPA has engaged with us in the past, and we wish to maintain our constructive working relationship with the EPA. As noted above, we believe the EPA must conduct further analyses and address reliability impacts before finalizing any Rule in this area. However, should the EPA nevertheless decide to adopt a rule, the Joint ISOs/RTOs propose several additional features that would help to partially mitigate, albeit not eliminate, these reliability impacts going forward. At a high level, these additional features include:

- Specification of a new sub-category for existing units, providing a time-limited means for ISOs/RTOs to designate classes of units that are needed to maintain local or region-wide reliability until alternatives (which may be new transmission or new generation or storage resources) are available to address the identified reliability need;[2]

- Building into the Rule a process to monitor and adjust the Rule's compliance schedule as applied to existing gas and coal units based on an examination as to whether the CCS and hydrogen co-firing infrastructure is developing at a sufficient pace to allow implementation in the time frame contemplated by the Proposed Rule. Such an ongoing review built into the Rule itself can help to balance of the pace of retirements of dispatchable generation needed to provide critical grid services with the new additions providing such grid services;

- Providing specific recognition in the Rule of the availability of allowance trading on a regional, if not national level to allow for greater flexibility and incentivize early and effective 'over-compliance' by those units that are capable of so doing;

- Updating the definition of 'System Emergency' to reduce uncertainty around when a unit may be called upon for reliability.

Additional details would certainly need to be addressed regarding these proposals. The specific reforms outlined herein have been developed to work within the structure of the Proposed Rule and the applicable law. Given the breadth of the impact of any risks to electric reliability, the Joint ISOs/RTOs would urge EPA to collaborate with the ISOs/RTOs, stakeholders, and states to develop the details of these measures, if the EPA proceeds with the Proposed Rule. The Joint ISOs/RTOs look forward to continued dialogue and analytical work with the EPA on the reliability impacts of the Proposed Rule and, if appropriate, the proposed modifications outlined above.

[2] As further described in these Comments, this could also be accomplished through the creation of a presumptive, automated reliability process through use of the remaining useful life and other factors (RULOF) provisions included in 40 C.F.R. § 40.60.24a(e).

Background

The Joint ISOs/RTOs are charged with maintaining the reliability of the bulk power system that provides electric service to over **154** million Americans. The geographic reach of the Joint ISOs/RTOs is broad, encompassing an area of approximately 2 million square miles, in all or parts of 30 states and the District of Columbia.

The Joint ISOs/RTOs carry out this reliability responsibility by:

- Dispatching generation and demand response resources in real time to meet the minute-by-minute demands of electricity customers;
- Operating real time and day ahead energy markets that ensure the most efficient dispatch of resources to meet demand in a given hour;
- Ensuring resource adequacy to meet projected future demands for electricity by operating wholesale markets and partnering with states;
- Planning the expansion of the transmission system to meet the reliability needs of customers; and
- Interconnecting new generation resources to the grid.

Each of the Joint ISOs/RTOs are independent of market participants and operate on a revenue-neutral basis. The Joint ISOs/RTOs are also technology-neutral, favoring neither fossil nor renewable generation, and treat all resources on a nondiscriminatory basis, as required by relevant laws.

Comments

A. *Overarching Reliability Concerns*

As a threshold matter, the Joint ISOs/RTOs are concerned that the Proposed Rule could result in material, adverse impacts to the reliability of the power grid. These reliability concerns primarily arise from the possibility that the significant technological advances in low-greenhouse gas (GHG) hydrogen production, transport and generation, as well as in carbon capture and storage (CCS) that are identified as BSER under the Proposed Rule may not occur as anticipated, or may not occur at the pace anticipated by the EPA. If the technology and associated infrastructure fail to timely materialize, then the future supply of compliant generation—given forced retirements of non-compliant generation—would be far below what is needed to serve power demand, increasing the likelihood of significant power shortages.

The EPA projects these technologies will prove economic over the compliance period as a result of subsidies built into the Inflation Reduction Act.[3] While technology development and commercialization of these technologies at a reasonable cost is not entirely out of the question, those technologies are not yet feasible on a large scale, and there are reasons to be skeptical that it will be widely available on the timeline anticipated by EPA. Low-GHG hydrogen and CCS require the development of vast new and costly infrastructure. CCS has only been implemented in two isolated

[3] Inflation Reduction Act of 2022

cases. Although the Joint ISOs/RTOs have no opposition to the development of these new technologies and, in some cases, have become platforms for their testing, the record is not sufficiently developed to determine that these technologies support a BSER finding at this time.

The Joint ISOs/RTOs are concerned that the proposed rule would greatly exacerbate an ongoing loss of critical, dispatchable generating capacity that is needed to ensure grid reliability. Over recent years, Joint ISOs/RTOs have each observed an increasing level of dispatchable generation retirements without the comparable addition of new technologies that would provide the same level of grid support.[4] Although each of the Joint ISOs/RTOs is seeing a rapid growth in renewable and energy storage resources interconnecting to the grid, given the intermittent and energy-limited nature of those resources, their capacity (or accredited) value is substantially discounted from the capacity (or accredited) value of thermal generation today. In addition, these new resources connecting to the grid are primarily inverter-based, and have distinctly different characteristics than synchronous machines.[5] Although providing valuable carbon-free electricity, these new resources do not, at present, provide the same levels of essential reliability services – or attributes – as their thermal counterparts. New technologies and industry practices are developing to enable the integration of significant inverter-based generation that provide needed essential reliability services, but the Joint ISO/RTOs are concerned about a scenario in which, similar to that stated above, needed technologies are not widely commercialized in time to balance out large amounts of retirements. The ISO/RTO-specific appendices to these Comments detail experiences, studies, and concerns by region.[4]

Finally, the Joint ISOs/RTOs are also concerned about the chilling impact of the Proposed Rule on investment required to retain and maintain existing units that are needed to provide key attributes and grid services *before* the compliance date required by the rule. Investments are based, in part, on the expected revenues associated with continuing operation of the unit. Unit owners may decide to retire units early rather than incur additional expense and risk. Alternatively, should the units remain operational, with the expectation of retirement at a future date certain, then unit owners may forgo required maintenance in the interim because of the lower return on the investment from doing so. The failure to properly maintain generating units can lead to a higher incidence of forced outages of these units, diminishing the dispatchable generation supply in the interim.

As a result, the Joint ISOs/RTOs believe that the record is insufficient for the EPA to conclude that the Proposed Rule will not adversely impact reliability. The EPA should therefore reconsider moving forward with the Proposed Rule in its present form.

However, if the EPA is inclined to move forward with the Proposed Rule, the Joint ISOs/RTOs would urge the EPA to at least include several additional features in the rule to help mitigate, although not eliminate, these reliability impacts. These features include:

- Specification of a new sub-category for existing units, providing a time-limited means for ISOs/RTOs to designate classes of units that are needed to maintain local or region-wide

[4] See ISO/RTO specific Appendices (1-4) for information applicable to each ISO/RTO.

[5] See NERC Introduction to Inverter-Based Resources on the Bulk Power System.

reliability until alternatives, which may be new transmission or new generation or storage resources, are available to address the specific identified reliability need[6];

- Building into the Rule a process to monitor and adjust the compliance schedule as applied to existing gas and coal units based on an examination as to whether the CCS and hydrogen co-firing infrastructure is developing at a sufficient pace to allow implementation in the time frame contemplated by the Proposed Rule. Such an ongoing review built into the Rule itself will ensure a better balance of the pace of retirements of dispatchable generation needed to provide critical grid services with the new additions providing such grid services;

- Providing specific recognition in the Rule of the availability of allowance trading on a regional, if not national, level to allow for greater flexibility and incentivize early and effective "over-compliance" by those units that are capable of doing so;

- Updating the definition of "System Emergency" to reduce uncertainty around when a unit may be called upon for reliability.

These comments will describe the reliability concerns highlighted above and then address the specific rule features proposed by the Joint ISOs/RTOs.

B. ***Shortcomings in EPA's Reliability Analysis Assumptions***

EPA's Resource Adequacy Analysis Technical Support Document[7] does not address the range of reliability issues that the proposed Rule could trigger, but, rather by its own terms, is solely focused on resource adequacy. While EPA distances itself from potential impacts to the grid, EPA acknowledges that resource adequacy on its own is "not sufficient" for determining grid reliability:

> *"While such potential impacts would not be a direct result of these rules but rather of the compliance choices source owners and operators may pursue, we have analyzed whether the projected effects of the rules would in this regard pose a risk to resource adequacy, a key planning metric that is necessary (but not sufficient) for grid reliability*."[8]

The Joint ISOs/RTOs' reliability duties extend beyond resource adequacy and include the provision of essential reliability services that are critical to the grid.[9] Power-industry-defined reliability attributes include inertia, primary frequency response, reactive power support, system stability, system strength, frequency regulation, ramping, flexibility, dispatchability, black start capability, fuel and energy assurance, and extreme weather performance. The Joint ISOs/RTOs urge EPA to work with the Joint ISOs/RTOs in assessing the proposal's impact on reliability, incorporating additional metrics around essential reliability services and attributes.

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[6] This could also be accomplished through the creation of a presumptive, automated reliability process via remaining useful life and other factors (RULOF) provisions included in Code of Federal Regulations Title 40. Protection of Environment § 40.60.24a(e).

[7] Resource Adequacy Analysis TSD, page 2.

[8] Resource Adequacy Analysis TSD, page 3

[9] Energy Transition in PJM: Frameworks for Analysis.

EPA's underlying assumptions for the Resource Adequacy Analysis are dependent on modeling the 2022 Inflation Reduction Act (IRA) in the base case. In the Joint ISOs/RTOs' view, the base-case modeling masks the impact of the proposed Rule by assuming that the retirements have occurred independent of the Proposed Rule. Because the base case shows significant coal and nuclear retirements, renewable and storage additions, and a significant decline in energy generated from natural gas while natural gas capacity significantly increases, the resulting comparison to the modeled proposal shows little impact to the system. This ignores the cumulative impact of the various EPA rules and their intertwined nature, leaving an incomplete picture of the impact of the GHG rule on unit retirement decisions and resource adequacy. This analysis also does not consider the impacts to minimum resource adequacy requirements caused by a changing resource mix. In other words, replacement of dispatchable generation by generation that is, by its nature, not as dispatchable will, among other items, drive requirements for larger amounts of generation (nameplate capacity) in order to maintain an equivalent amount of reliability.

To explore the ability to rely on modeled projections of the impact of the IRA on the grid as a basis for adequately projecting grid reliability, the Joint ISOs/RTOs added EPA modeling projections[10] to a recent third party comparison of numerous models that all attempted to model grid impacts of the IRA by Bistline, et al. (2023) "Emissions and Energy Impacts of the Inflation Reduction Act"[11] and found a continuation of the "substantial variation" noted by the authors, in projected capacity and generation (as illustrated in Figure 1 below). The authors point out the difficulty in modeling the IRA:

> "*Models attempt to capture many economic factors that could influence technology adoption, but several implementation challenges are difficult to model, including the scale-up of supply chains and materials, siting and permitting, infrastructure expansion, network effects, non-cost barriers to consumer uptake of incentives, and the economic incidence of subsidies*."[12]

The authors add that:

> *"Additional analysis is important for understanding potential impacts of partial coverage of IRA provisions and IRA implementation uncertainties, as well as uncertainties about external factors*,

[10] Analysis of the Proposed Greenhouse Gas Standards and Guidelines: Power Sector Modeling

[11] Data for Bistline, et al. (2023) "Emissions and Energy Impacts of the Inflation Reduction Act",

[12] "Emissions and Energy Impacts of the Inflation Reduction Act," *Science*, June 30, 2023, Vol 380, Issue 6652, Page 1327.

including inflationary trends, domestic macroeconomic environment, and global drivers."

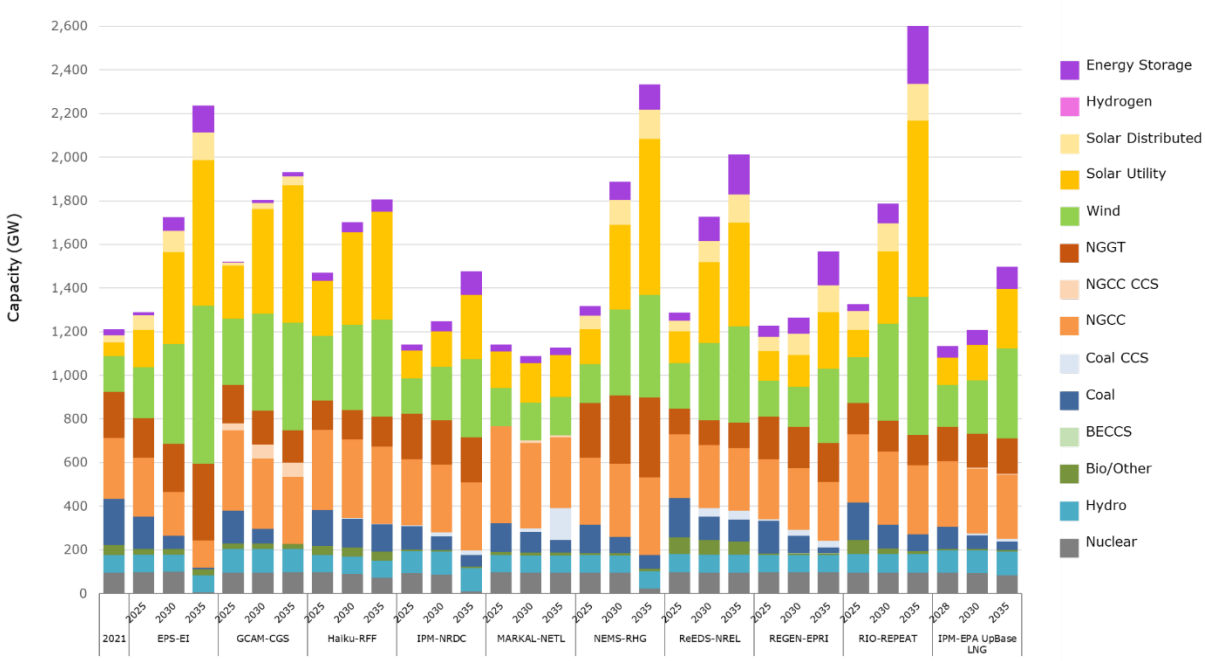

Figure 1: Projected Capacity when Modeling the Inflation Reduction Act.

(Figure from the Bistline analysis supplemented by the Joint ISOs/RTOs to include the projected capacity from the *IPM-EPA Updated Baseline with LNG Update* released on July 7.[13])

As mentioned above, EPA should undertake additional analysis that reflects supply chain constraints, real world siting and permitting expense and timelines, requisite infrastructure expansion and the maintenance of essential grid reliability attributes in order to provide a full assessment of the Rule's potential reliability impacts. The Joint ISOs/RTOs, each of whom administer interconnection queues for new resources, have information that would be informative to that analysis.

C. ***Comments Regarding Revised New Source Performance Standards (NSPS) for GHG Emissions from New Fossil Fuel-Fired Stationary Combustion Turbine EGUs.***

The Joint ISOs/RTOs are concerned that the BSER findings for new fossil fuel-fired stationary combustion turbines lead to assumptions about new generation capacity construction that simply are infeasible and uneconomic at the levels proposed. EPA's and others' modeling shows little to no generation applying the BSER control technologies (CCS and co-firing low GHG Hydrogen) in the future,[14] pointing to, among other factors, the current and less-than-beneficial economics of those technologies in the future (see Figure 1 above). As such, we recommend EPA conduct the BSER determination again, focusing, for example, on levels of co-firing that could be ***economically and practically achievable*** in the timeframe cited. For example, if BSER were determined to be co-firing 30% hydrogen, this would

[13] Data for Bistline, et al. (2023) "Emissions and Energy Impacts of the Inflation Reduction Act."
[14] See Appendix 1 for modeled capacity projections of coal with CCS, natural gas with CCS and hydrogen.

increase the potential of being achievable in some locations under today's combustion technology, hydrogen production and national pipeline infrastructure. On the flip side, co-firing with hydrogen at 96% or installing CCS on a mass scale would undoubtedly require the development of a vast new infrastructure that could take many years to develop. As a result, in this example, a BSER based on more realistic levels for hydrogen co-firing might serve to promote the hydrogen industry and associated infrastructure in a more feasible fashion, while potentially mitigating the large upfront cost and system retrofits needed to co-fire at the much higher levels found in the Proposed Rule, which could help reduce the obstacles to new generation construction. Such a more graduated approach would also recognize that EPA retains the ability to review the NSPS at least every eight years and adjust the BSER accordingly as technology, economics, and the bulk power system evolves. By the same token, adoption of the Joint ISOs/RTOs' proposal on interstate emissions trading would allow unit owners to potentially comply with the Rule while recognizing that the availability of infrastructure to transport and produce hydrogen, and the infrastructure necessary to transport and store carbon dioxide from CCS, varies across the nation. This proposal is discussed in further detail in Section VII below.

D. ***Comments Regarding Emission Guidelines for GHG Emissions from Existing Fossil Fuel-Fired Steam Generating EGUs***.

Subject to the reliability concerns identified above, the Joint ISOs/RTOs offer the following recommendations for the EPA's consideration.

1. Combining Certain of the Proposed Rule's Subcategories

The Joint ISOs/RTOs recommend the subcategories for existing fossil fuel-fired steam generating EGUs be modified to improve flexibility and help mitigate reliability concerns. We recommend EPA modify the proposed subcategories for existing coal units. The current proposal is:

(A) Long-term existing coal-fired steam generating units, consisting of coal-fired steam generating units that have not adopted enforceable commitments to cease operations by January 1, 2040.

(B) Medium-term existing coal-fired steam generating units, consisting of coal-fired steam generating units that have elected to commit to permanently cease operations by a date after December 31, 2031, and before January 1, 2040, and that are not near-term units.

(C) Near-term existing coal-fired steam generating units, consisting of coal-fired steam generating units that have elected to commit to permanently cease operations by a date after December 31, 2031, and before January 1, 2035, and elected to commit to adopt an annual capacity factor limit of 20 percent.

(D) Imminent-term existing coal-fired steam generating units, consisting of coal-fired steam generating units that have elected to commit to permanently cease operations by a date before January 1, 2032.

In order to promote the economic, in-market, near-term retention of resources necessary to the reliability of the grid, the Joint ISOs/RTOs propose that the above subcategories (C) and (D) be combined into one subcategory entitled *Near-term existing coal-fired steam generating units*, which consist of coal-fired steam generating units that have elected to commit to permanently cease operations by a date before January 1, 2035. These units would not have any limitation on their capacity factor and would apply what EPA has branded 'routine methods of operation' as BSER.

By the same token, the separate subcategory of units that commit to adopt an annual capacity factor of 20% ignores the fact that such a capacity factor limitation almost certainly renders these units uneconomic in the marketplace. In short, category (C) is not an economically viable category as few unit owners, particularly in states that have adopted retail choice and operate in competitive wholesale market areas, will be able to recover their going forward costs under such a limitation. This would contribute to the retirement risk concern that the Joint ISOs/RTOs have illustrated throughout these comments.

2. Creation of a New Reliability-Based Sub-Category

The Joint ISOs/RTOs propose the adoption of an additional sub-category that would accommodate units deemed needed for reliability, whether natural gas or coal. This subcategory would be populated with specific units or locations as identified by the ISO/RTO where unit retirement would cause significant reliability challenges until other longer-term solutions, such as transmission, demand response, or new generation resources, would obviate the need for those units. The ISO/RTO would identify these units or locations to EPA and a unit's placement in this sub-category would allow the non-compliant units to continue to operate beyond the date of compliance with the rule until the alternative solution can be placed into service.

As a threshold matter, each ISO/RTO would provide a public explanation of the methodology it would use to determine which units, or classes of units, qualify for inclusion in this subcategory and the process for identification of such units. The ISO/RTO would then conduct a unit or location-specific reliability analysis for each of these units. The analysis would establish the defined period past the initial retirement date that the unit is needed to maintain grid reliability while measures are implemented to address reliability issues caused by the affected unit's retirement. Within the bounds of respecting the confidential nature of certain commercially sensitive information, the ISO/RTO would publish its analysis for review and feedback from industry stakeholders. Completion of that analysis would then trigger an identification of those units or classes of units in a given location to the EPA. EPA would give deference to the ISO/RTO determination. Units ultimately identified as needed for reliability would not be subject to compliance until the date after which the unit is needed for reliability.

A similar process is already in place for the designation of units as eligible for Reliability Must Run (RMR) agreements. The Joint ISOs/RTOs' proposal is to incorporate into the Final Rule the means by which this existing RMR process would be linked to the new process in the Proposed Rule so that the two can complement rather than conflict with one another.

To be clear, the reliability sub-category is not a panacea. It still would leave generation owners with considerable uncertainty as they assess the long-term future of market participation. However, if exercised sufficiently in advance, with clear and transparent checks to prevent its over-use, the sub-category designation could be a useful tool to preserving those unit(s), either locationally or by class, so

as to avoid their premature retirement before alternative commercial technologies have developed and can be deployed economically and practically to address reliability.

Another circumstance which would justify a unit being placed into this subcategory exists where a unit commits to implementing a control technology, but for reasons beyond its control, is unable to do so. While the EPA may have the authority to enter into an agreement to extend the compliance date, the Joint ISOs/RTOs recommend a process be incorporated into the rule itself that addresses the risk to the unit for continued operation, and the risk to reliability. The goal would be to avoid a situation in which the unit owner would need to comply or else a Department of Energy Section 202(c) emergency order would be required to continue the unit's operation, and to instead create a clear process where the reliability requirements are incorporated into the Rule.

The Joint ISOs/RTOs believe the creation of such a subcategory in the Rule is entirely consistent with the EPA's existing authority under Section 111 of the Clean Air Act. That Section provides significant discretion to EPA to establish subcategories based on source type, class, or size.[15]

3. Use of Remaining Useful Life and Other Factors (RULOF) Authority

A complementary approach to the above creation of a reliability sub-category would be for EPA to establish a presumptive, automated reliability process under which the ISO/RTO would certify that a unit is needed for reliability for a certain period, and then each affected state could then incorporate that certification in its plan, as contemplated by CAA 111(d):

> *"Regulations of the Administrator under this paragraph shall permit the State in applying a standard of performance to any particular source under a plan submitted under this paragraph to take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies."*

The ISO/RTO determination in this case would be anchored in an analysis of the remaining useful life of a unit needed for grid reliability and forces which may drive its premature retirement. Use of this flexibility is not new. EPA currently considers a formal reliability assessment from ISOs/RTOs in implementing conditions of the Coal Combustion Residuals rule.[16] This process will allow the required unit to continue to operate for the required period of time, applying routine methods of operation, to address grid reliability.

E. *Comments Regarding Emission Guidelines for GHG Emissions from Existing Stationary Combustion Turbines*

Certain individual ISOs/RTOs have conducted studies on integrating increasingly higher penetrations of renewable resources into the grid. These studies have found that as the resource mix continues to evolve, it is crucial for reliability purposes to maintain certain levels of resources with attributes such as quick start-up and ramping capabilities, synchronous connection to the grid, and

[15] Background on Establishing New Source Performance Standards (NSPS) Under the Clean Air Act,
[16] Final Decision: Denial of Alternative Closure Deadline for General James M. Gavin Plant, Cheshire, Ohio, page 85.

ability to operate for both short and long periods of time.[17] Currently, natural gas-fired combustion turbines are a major source of these needed reliability attributes. Someday, other types of resources such as long-duration battery storage may become commercially and economically viable enough to provide these critically needed attributes at grid scale for long durations. But unless or until that happens, it will be critical to ensure a sufficient amount of dispatchable generation remains available to offset the intermittent nature of renewables on grid reliability. Additionally, there may also be a need to build dispatchable resources such as new natural gas combustion turbines in the coming years to ensure that grid reliability is not jeopardized as emerging technologies with needed reliability attributes continue to mature towards grid-scale viability. As such, the Joint ISOs/RTOs wish to ensure that the Final Rule not serve as an impediment to the operation of these resources to the extent they provide critical grid services. With the increasing amounts of renewables and storage, we expect the dispatchable fossil fleet to run fewer hours, but until wide commercialization of alternatives such as long duration storage and grid-forming inverters come into alignment with the pace of retirements, the Rule should not, through strictures on capacity factors, drive the premature retirement of units that provide such critical grid services.

EPA projects that 37 GW of gas capacity will be in the greater than 300 MW and greater than 50 percent annual capacity factor subcategory for existing stationary combustion turbines on a nationwide basis in 2035.[18] Recent analysis by BTU Analytics estimates 73 GW potentially impacted by the proposal.[19] Should this significant portion of capacity nation-wide be required to either co-fire hydrogen, install carbon capture and sequestration, or reduce capacity factors to 50% or below, this would have significant implications to a grid that is otherwise increasingly dependent on this resource in the near term. For regions with a relatively small quantity of no- or low-carbon emitting resources, these requirements may also have the unintended impact of increasing emissions if required energy is met by units with higher emission rates.

F. ***Need to Incorporate Timely Reviews of Technology Advancement and Unit Retirements in the Final Rule***

As noted above, the compliance deadlines set forth in the Rule are premised on the timely development of new technology as a result of the IRA. The compliance deadlines also assume that the pace of new resources can keep up with if not surpass the rate of retirement of generation providing the key attributes needed to keep the grid in balance.

If these optimistic assumptions come to pass, the Final Rule may not have a significant adverse impact on reliability; however, if they do not, the reliability challenges remain and become more critical with each passing year. For these reasons, the Joint ISOs/RTOs urge that the Final Rule specify a process for evaluating on a regularly scheduled basis, the assumptions that informed the compliance schedule and, if necessary, delay the implementation date of the rule based on the pace of technology development as well as the pace of retirements compared with the rate of new generation

[17] "The integration of renewable resources increases the need for balancing resources to meet forecasted ramping requirements." Energy Transition in PJM: Emerging Characteristics of a Decarbonizing Grid, Page 2.
[18] Proposed Rule, 33,361
[19] U.S. EPA Climate Rule Could Affect Twice as Much Gas- Fired Capacity as Agency Projects.

development. The Joint ISOs/RTOs recognize that EPA is already required to conduct a review of New Source Performance Standards at least every eight years.[20] However, because of the breadth of the Proposed Rule and the intertwined nature of these assumptions with the compliance deadlines, this review should occur more frequently than once every eight years. Moreover, the analysis of generator retirements and additions should be focused on longer-term reliability impacts, and should therefore supplement, not replace, the use of the reliability sub-category for specific units or locations as outlined above.

Notwithstanding certain stakeholder concerns regarding the finality of the original BSER determination, this review would be focused on the compliance calendar. Such a periodic review with the potential for course-correction is entirely consistent with the principles underlying the EPA's existing eight-year review process and can easily be accomplished within the four corners of the Clean Air Act. The Joint ISOs/RTOs urge adoption of this feature and its specific inclusion in the Final Rule.

G. ***Request for Specific EPA Authorization for Interstate Allowance Trading Among Affected Units***

In the Final Rule, the EPA should expressly provide for allowance trading as a means of compliance. As the Preamble to the GHG Rule recognizes, allowance trading has proven successful in similar environmental programs dating back to the SO_2 rule in the 1990s, providing flexibility and bringing down the overall cost of compliance.[21] Moreover, since the GHG rule is premised on the development and deployment of new technologies, a large-scale allowance trading program would provide incentives for the development and deployment of these technologies as allowance trading provides a means for those unit owners who can 'over-comply' with the rule to monetize the value of that over-compliance while providing flexible options for other unit owners who face more costly compliance.

The Proposed Rule recognizes the benefits of allowance trading, but takes no position and provides limited direction on this subject, especially as to the potential for interstate trading.[22] On the other hand, the Preamble seeks comment as to whether the proposed subcategories obviate the need and benefit of allowance trading as part of a compliance strategy.[23]

The Joint ISOs/RTOs do not agree with EPA's tentative conclusion that the specific subcategories for existing coal-fired steam generating units and existing gas combustion turbines "provide for much of the same operational flexibility as would be provided through trading." We remain equally concerned with EPA's tentative conclusion that allowance trading as a compliance strategy:

> "*would not be appropriate to allow affected EGUs in certain subcategories—imminent-term and near-term coal-fired steam generating units and natural gas and oil-fired steam generating units—to comply with their standards of performance through trading*."[24]

[20] 42 USC § 7411(b)(1)(B)
[21] Proposed Rule, 33,393
[22] Proposed Rule, 33,393-33,396
[23] Proposed Rule, 33,393
[24] Proposed Rule, 33,393

As noted in these Comments, the Joint ISOs/RTOs believe that the Rule may force the premature retirement of those imminent and near-term dispatchable units prior to the commercialization of replacement generation with similar attributes or capabilities to provide grid services. Yet, by touting the staggered compliance dates contained in the sub-categories for these units as potentially obviating the need for allowance trading, the Proposed Rule assumes that units will necessarily operate right up to their permitted date for their particular sub-category before retiring. However, in today's environment this assumption is no longer valid. The Joint ISOs/RTOs note there are a host of factors that can drive earlier retirement, including market economics, the cost of maintaining the unit, the difficulty in retaining qualified staff for a unit facing a known retirement date, as well the fact that investors will be inclined to take their resources elsewhere rather than continuing to invest capital in a unit with a limited life. In many cases these may be the very units that the ISO/RTO will need to maintain system reliability and critical grid services in this interim period.[25] For these reasons, the EPA's conclusion that the subcategory staggered compliance dates obviate the need for allowance trading is not supported.

Moreover, as the goal should be to control overall sector emissions rather than dictate the controls at each particular unit, the Joint ISOs/RTOs do not find merit in the Preamble's statement that:

> *"An emission trading program that included affected EGUs that have BSERs and resulting standards of performance based on limited expected emission reduction potential---or, in the case of affected EGUs for which states have invoked RULOF, less stringent standards of performance—may introduce the risk of undermining the intended stringency of the BSER for other facilities*."[26]

By the same token, the fact that units may "fall in or out of a trading program from year to year" as a result of the 50% capacity factor that triggers standards of performance, does not "preclude their inclusion in any such program as a practical matter."[27] Rather, allowance trading and the ability to bank allowances can allow units that are on the margin, but are needed by the ISO/RTO, to operate without fear that running above a 50% capacity factor could trigger costly standards of performance. The Joint ISOs/RTOs need the flexibility to call on such units when needed for reliability. Allowance trading will provide added flexibility while a "hard trigger" that pushes a unit into standards of performance in a given year sets up an unnecessary conflict between the GHG rule and the Joint ISOs/RTOs' ability to ensure that the units ISOs and RTOs call upon to ensure reliability will be able to respond.

Although nothing in the Proposed Rule prevents states from proposing allowance trading in their SIPs, an effective allowance trading market requires a common product (*i.e.*, an allowance) that is both liquid and tradable across state lines. As a result, although the Joint ISOs/RTOs endorse the EPA's preliminary conclusion to allow states to propose such programs, the GHG rule does not provide sufficient guidance on how effective interstate trading could be utilized as a compliance strategy.[28] The Joint ISOs/RTOs believe that the considerations that go into choosing a rate-based or mass-based trading system are equally applicable if not even more relevant for interstate trading programs. But

[25] To date, RTOs and ISOs have utilized Reliability Must Run Agreements as one tool to maintain those plants during this period. However, that out-of-market solution should be the exception rather than the Rule.
[26] Proposed Rule, 33,394
[27] Proposed Rule, 33,394
[28] Proposed Rule, 33,396

given their interstate nature, the Final Rule needs to provide guidance as to how a proposed interstate trading market can meet EPA's requirements so as to serve as an effective compliance strategy.

On the other hand, the Joint ISOs/RTOs recognize that some states may not prefer to allow units under their jurisdiction to participate in an allowance trading program. These states may want to ensure strict emissions compliance so as to meet individual state goals, which, in some cases, could be stricter than the GHG rule. Accordingly, the Joint ISOs/RTOs propose that the EPA establish clear guidance on the use of allowance trading as an acceptable compliance strategy while making clear that the decision of a particular state to utilize allowance trading as a compliance strategy through their SIP is entirely *voluntary* within that state. In this way, state environmental policies that go beyond the GHG rule could be honored while allowance trading programs could still develop on a national level for those states seeking to opt into such a program.

At the very least, allowance trading would be appropriate among existing units, some of which could over-comply through technology and monetize that over-compliance through trading of allowances to units with higher compliance costs. However, to maximize the benefits of trading and further incentivize new technologies, that trading should not be limited to existing units but should instead allow trading between existing and new units as well. The Joint ISOs/RTOs see nothing in Sections 111(b) and 111(d) that constrains EPA from allowing trading between existing and new units as a compliance strategy.

H. *Request to Revise the Definition of "System Emergency"*

The Joint ISOs/RTOs generally concur with the definition of "system emergency" detailed in the Proposed Rule with one exception: The Joint ISOs/RTOs recommend that definition of "system emergency" be revised by striking the term "abnormal" as shown below:

> *"Any ~~abnormal~~ system condition that the RTO, Independent System Operators (ISO) or control area Administrator determines requires immediate automatic or manual action to prevent or limit loss of transmission facilities or generators that could adversely affect the reliability of the power system and therefore call for maximum generation resources to operate in the affected area, or for the specific affected EGU to operate to avert loss of load."*

The system operator is required to call system emergencies only during defined events as specified in its Tariffs or rules and in NERC's Reliability Standard EOP-011-01.[29] The Joint ISOs/RTOs submit that the use of the word "abnormal" is unnecessary because the definition already requires that the grid operator must determine the generator is necessary to operate to ensure grid reliability. To avoid creating confusion about whether a given grid condition may be considered "abnormal," and because the protocol for declaring system emergencies is transparent and well-defined, the word "abnormal" should be stricken.

CONCLUSION

[29] NERC Reliability Standard EOP-011-01

The Joint ISOs/RTOs note that this short Comment Period and the lack of dialogue on these specific issues leading up to the Proposed Rule have made it difficult for the Joint ISOs/RTOs to undertake the full analysis of reliability impacts that a Rule of this magnitude should include. It is for this reason that the Joint ISOs/RTOs urge that the EPA refrain from adopting the Final Rule for a sufficient but finite time to allow for a more thorough exploration of the reliability impacts of the proposed Rule and its impact on investment decisions, and to discuss these conclusions with the ISOs/RTOs.

Should the EPA nevertheless wish to proceed on its accelerated timeline, the Joint ISOs/RTOs urge consideration of including in the Final Rule the tools outlined herein to allow for mitigation of some of these impacts.

In either instance, the Joint ISOs/RTOs look forward to continuing their constructive dialogue with the EPA as it proceeds to the next step in this process. We appreciate our past work with EPA and stand ready to work constructively to address the reliability issues surrounding the Proposed Rule as well.

Respectfully submitted,

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Dated: August 8, 2023

cc: Joseph Goffman, Principal Deputy Assistant Administrator

Christian Fellner, Sector Policies and Programs Division, OAQPS

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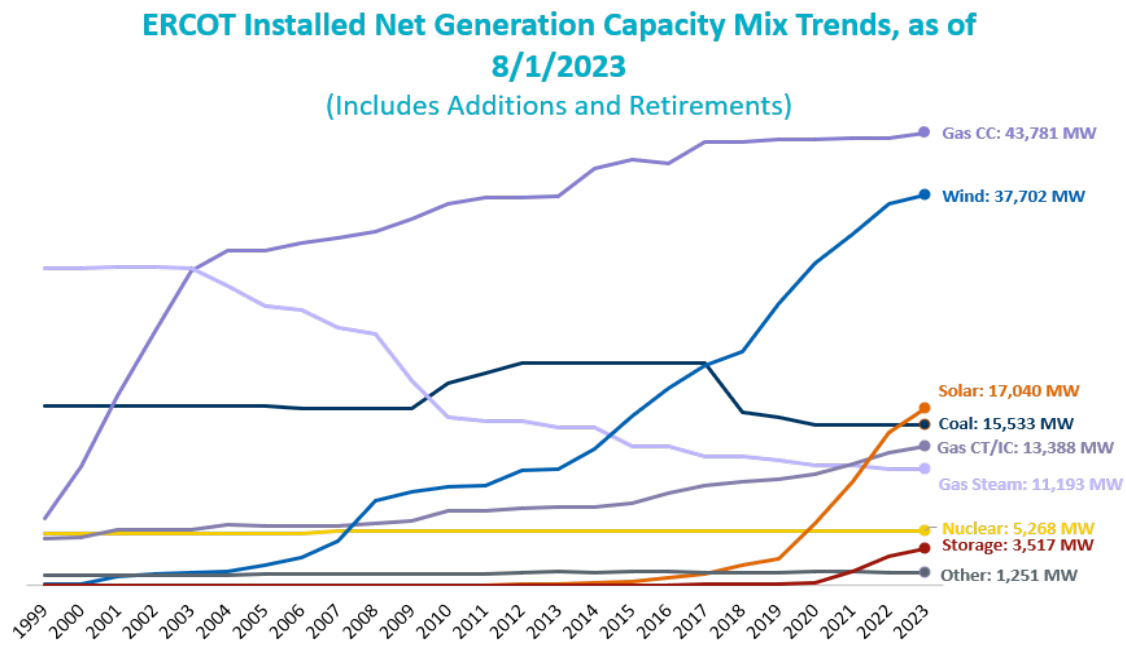
APPENDIX 1

ERCOT



Notes: Capacity totals are based on the Installed Capacity Ratings for generating units. "Other" comprises of Biomass, Hydro, and Diesel.
- Planned generation projects are added to installed capacity after approval for synchronization to ERCOT Grid.
- Totals include Private-Use Network generators that export to the ERCOT grid, Distribution Generation Resources (DGRs), Settlement-Only Distribution Generators (SODGs), Unavailable Switchable Capacity, Extended Outage Units, and Mothballed Units.

APPENDIX 2

MISO

MISO's Response to the Reliability Imperative

The Reliability Imperative is the term MISO uses to describe the shared responsibility that MISO, its members, and states have to address the urgent and complex challenges to electric system reliability in the MISO region. MISO's response to the Reliability Imperative consists of a host of interconnected initiatives that address the region's challenges in a comprehensive and prioritized fashion. These initiatives are described in a "living" report located on MISO's public website here: https://www.misoenergy.org/about/miso-strategy-and-value-proposition/miso-reliability-imperative/

The following is an excerpt from the Reliability Imperative report:

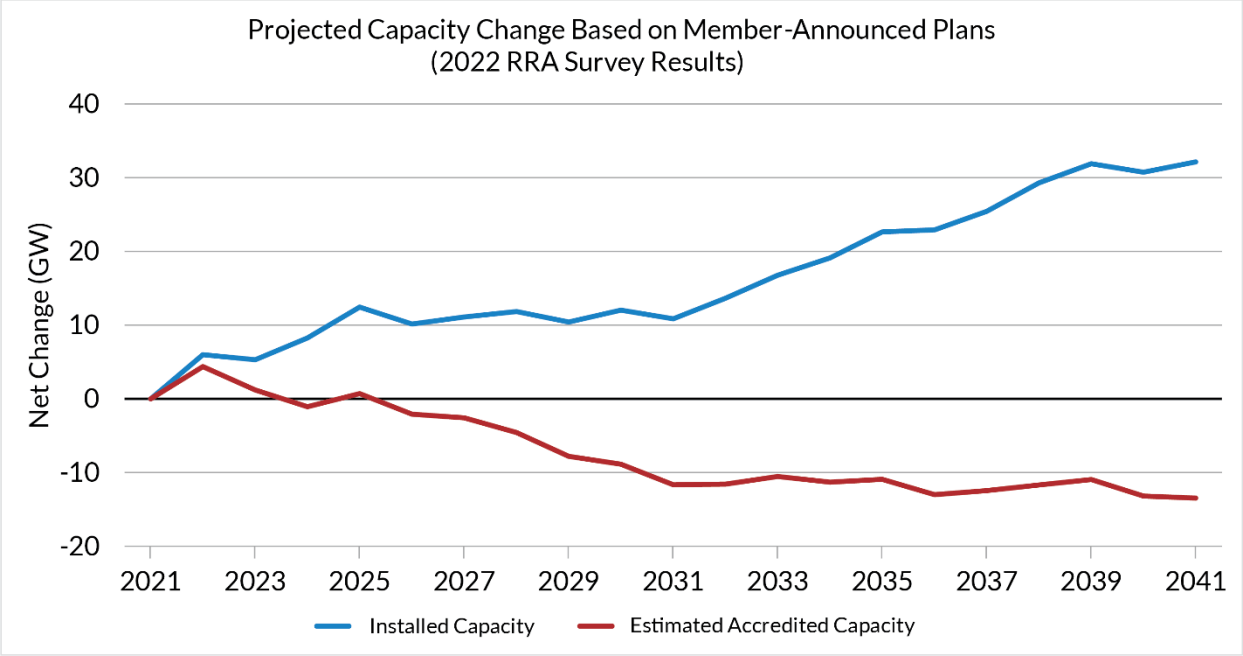
Many MISO members and states have set ambitious goals to partially or fully decarbonize their fleets of generating resources by future target dates. To be sure, utilities, states, and MISO must consider what the system will look like and how it will operate at the eventual "end state" of the decarbonization efforts that are playing out across the region. However, we must first ensure that the system remains reliable and affordable *during the transition* to that end state—and the rapid transition of the region's fleet of generating resources is giving rise to a host of urgent and complex reliability challenges. These challenges include:

- The region's level of "accredited" generation capacity is declining because the new resources that are being built—primarily wind and solar—have lower accreditation values than the conventional thermal resources that are retiring. The resulting lower reserve margins mean the region has fewer reserve resources to call on in emergencies or other tight grid conditions.
- Aging conventional resources that remain in service can be more prone to outages, potentially rendering them unavailable when they are needed most.
- Wind and solar resources are not always available during times of need due to their intermittent, weather-dependent nature.
- Due to the region's projected increasing reliance on solar generation, the system's need for controllable resources that can rapidly ramp up their output when solar becomes unavailable could triple by 2031 and quadruple by 2041 compared to current levels.
- Some fast-ramping resources may be critically needed going forward to back up intermittent renewables, but because they may not run very often, there may be little economic incentive for utilities and states to build new resources of this type, or to keep existing resources with these attributes in service.
- The region is becoming increasingly reliant on Load Modifying Resources that MISO can currently only access by engaging its emergency operating procedures.
- Distribution-level and behind-the-meter resources are becoming more prevalent, yet MISO does not yet have visibility into how these resources may affect the larger grid system.

MISO's Regional Resource Assessment (RRA): The RRA is a recurring study based on the plans and goals that MISO members have publicly announced for their generation resources. The RRA aggregates these plans and goals and uses them to develop an indicative view of how the region's resource mix might evolve going forward. The RRA is located on MISO's public website here: https://www.misoenergy.org/planning/policy-studies/RRA/#t=10&p=0&s=FileName&sd=desc

The key insights from the 2022 RRA are as follows:

KEY INSIGHT 1: The 2022 snapshot of MISO member plans indicates an increase in the overall amount of installed capacity, but a decline in accredited capacity compared to current levels.



KEY INSIGHT 2: The RRA modeling indicates a continued near-term capacity risk, highlighting the urgent need for coordinated resource planning and additional investment.

KEY INSIGHT 3: Wind and solar generation are projected to serve 60% of MISO's annual load by 2041, which would reduce emissions by nearly 80% relative to 2005 levels but also sharply increase the complexity of reliably operating and planning the system.

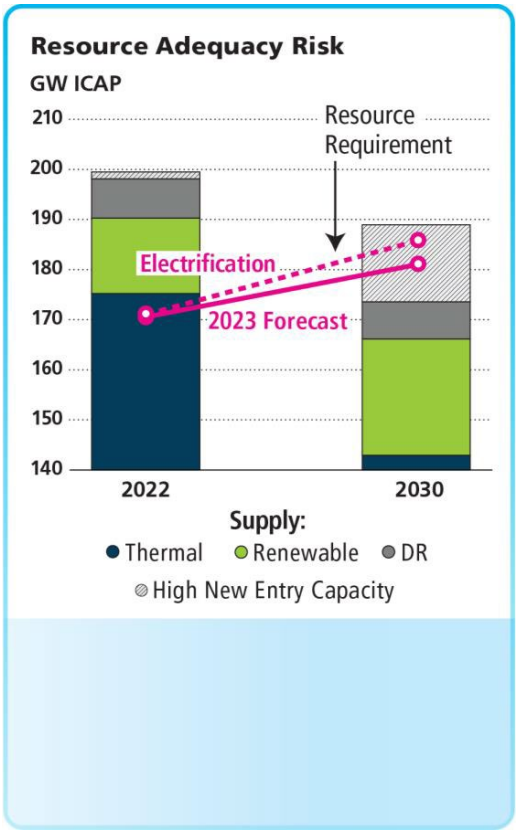
KEY INSIGHT 4: As the solar generation fleet grows, the system will have a much greater need for controllable ramp-up capability. Maximum short-duration up-ramps increase by three times by 2031 and four times by 2041 compared to current levels.

KEY INSIGHT 5: The capacity contribution of solar generation is forecast to decline rapidly as more solar capacity is added to the system, impacting the region's overall capacity outlook. The contribution of wind generation remains relatively stable as more wind capacity is added.

APPENDIX 3

PJM

PJM is undertaking efforts aimed at maintaining reliability during the energy transition. Ensuring a Reliable Energy Transition details PJM's efforts to identify challenges and solutions to maintaining reliability as the bulk power grid evolves into a system deriving most of its energy from low-carbon resources. Near- and medium-term challenges have been identified in a series of reports PJM has released, entitled *Energy Transition in PJM*. The most recent edition, Resource Retirements, Replacements and Risks, indicates that it is possible that the current pace of new entry would be insufficient to keep up with expected retirements and demand growth by 2030. The report describes 40 GW of dispatchable generation at-risk for retirement by 2030, approximately 21% of PJM's installed capacity.



These potential retirements coupled with low new resource entry risks reducing capacity reserve margins below required levels near the latter part of this decade, largely due to policy driven retirements, and prior to accounting for the impacts of the Proposed Rule (see Table 1 below). The Proposed Rule puts an additional 15 GW of coal at-risk in PJM, pushing at-risk generation to 29% of installed capacity. An additional 22% of PJM's installed capacity, the most-efficient, dispatchable gas-fired generation will be forced to undertake expensive control options or significantly reduce operations under the Proposed Rule. Recent analysis by S&P Global[30] on the Proposed Rule finds that the cost to retrofit CCS on coal units will drive most to retire, creating a firm capacity gap and heightening the need for replacement capacity with the appropriate characteristics and capabilities.

[30] "EPA's proposed power plant rule to accelerate coal retirements —but what about gas?", P. Luckow & M. Lester, Aug 2, 2023, S&P Global Commodity Insights (subscription)

Table 1. Reserve Margin Projections Under Study Scenarios

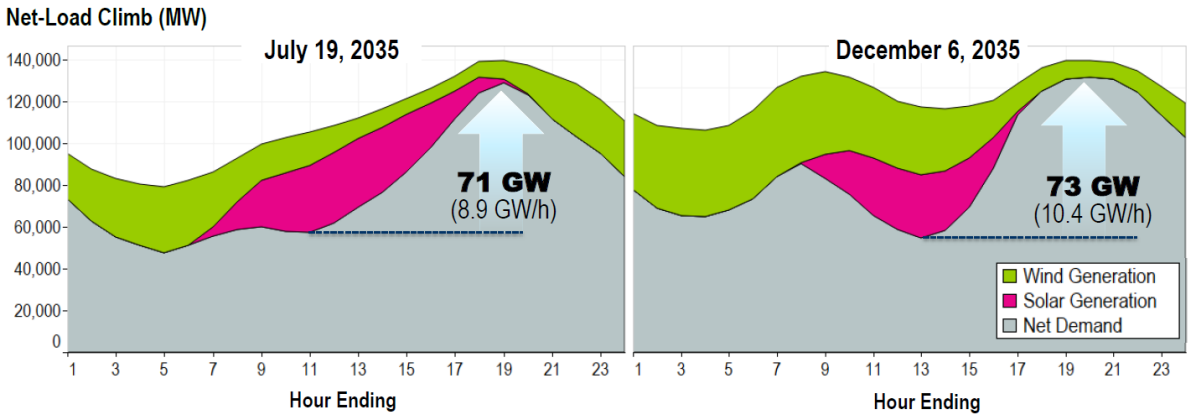
Reserve Margin	2023	2024	2025	2026	2027	2028	2029	2030
Low New Entry								
2023 Load Forecast	23%	19%	17%	15%	11%	8%	8%	5%
Electrification	22%	18%	16%	13%	10%	7%	6%	3%
High New Entry								
2023 Load Forecast	26%	23%	21%	19%	17%	16%	17%	15%
Electrification	25%	22%	20%	18%	15%	14%	14%	12%

PJM's first report in the Energy Transition in PJM series: Frameworks for Analysis [31] found, among other things, that:

> *Until a different technology can provide a reliable substitute at scale, an adequate supply of thermal resources will be needed to maintain grid stability. PJM and stakeholders must ensure that the market structure provides the right incentives to maintain an adequate supply of these services.*

PJM's second report in the Energy Transition in PJM series: Emerging Characteristics of a Decarbonizing Grid documented the need for additional ramping capability as intermittent resources increase (See Figure below).[32] This important operational flexibility is provided by mainly by thermal resources, but will be complemented by storage resources as they grow in duration and total capacity. This also reinforces the need to maintain thermal resources until substitutes are available at scale.

Figure 17. Total Climb From Beginning to End of the Ramping Period for Selected Summer and Winter Days



PJM also continues to monitor and anticipate the need for essential reliability services, and encourage the development of new technologies with the capabilities to provide those services. This builds on previous studies[33], including those cited above.

[31] Energy Transition in PJM: Frameworks for Analysis
[32] Energy Transition in PJM: Emerging Characteristics of a Decarbonizing Grid
[33] Reliability in PJM: Today and Tomorrow

From a regional transmission planning perspective, PJM's Grid of the Future report details continuing efforts to enhance planning processes to address key trends driving future grid expansion.[34]

PJM and its stakeholders are working to retain the needed resources; however, maintaining reliability is a shared responsibility, which points to the importance of incorporating all aspects of reliability when regulating thermal resources. Grid reliability needs to consider policies that are increasing, or are expected to increase, electrification and dependency on the electric grid. Policies that accelerate building[35], vehicle[36] and industrial[37] electrification are increasing load growth at the same time current EPA regulations and proposals are targeting resources needed to maintain reliability.

NERC's latest Long Term Reliability Assessment[38] also addressed concerns regarding regulatory and policy related retirements, containing the following recommendations:

> State and provincial regulators and independent system operators (ISO)/regional transmission operators (RTO) should have mechanisms they can employ to prevent the retirement of generators that they determine are needed for reliability, including the management of energy shortfall risks.
>
> Regulatory and policy-setting organizations should use their full suite of tools to manage the pace of retirements and ensure that replacement infrastructure can be timely developed and placed in service. If needed, the Department of Energy should use its 202(c) authority as called upon by electric system operators.

PJM also reviewed the modeling EPA conducted for the Proposed Rule, which reinforced our concerns regarding EPA basing their assessment of reliability impacts on projections of modeled outcomes of the Inflation Reduction Act, in particular meeting the significant new builds of renewables and energy storage and the resultant energy projections (see Figures below). This modeling of the IRA build out reflects an assumption common in modeling that "investors and lenders take advantage of subsidies in an optimized world in which economic incentives are the sole drivers of change."[39] IPM documentation states: "IPM's objective function is to minimize the total, discounted net present value of the costs of meeting demand, power operation constraints, and environmental regulations over the entire planning horizon."[40] Additionally, that "the tax credits for new renewable technology investments provided under the Inflation Reduction Act of 2022 are implemented in EPA Platform v6 as a reduction to capital costs."[41] EPA acknowledges that "additional effects of the IRA beyond those modeled in this RIA could result in a change in projected system compliance costs and emissions outcomes."[42]

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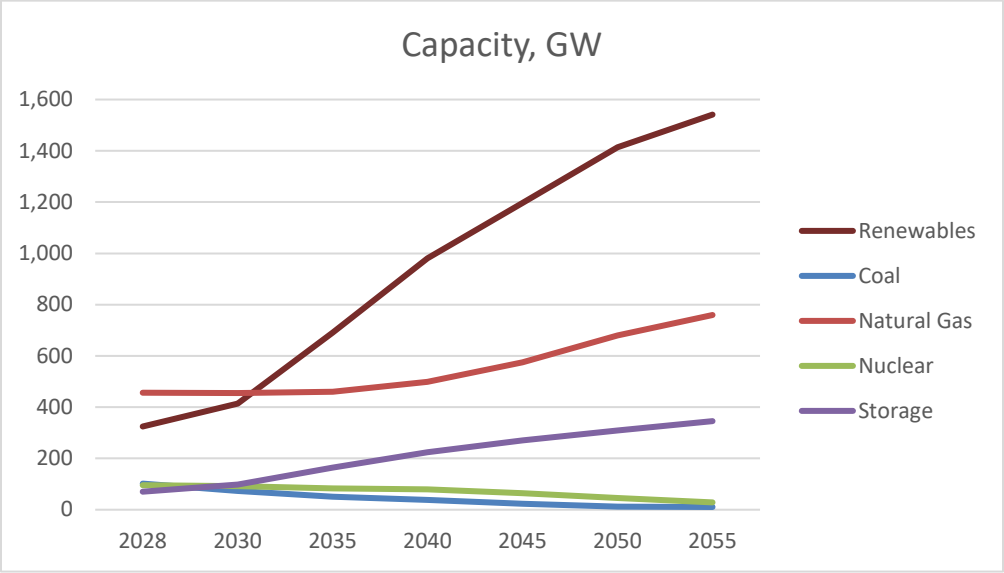
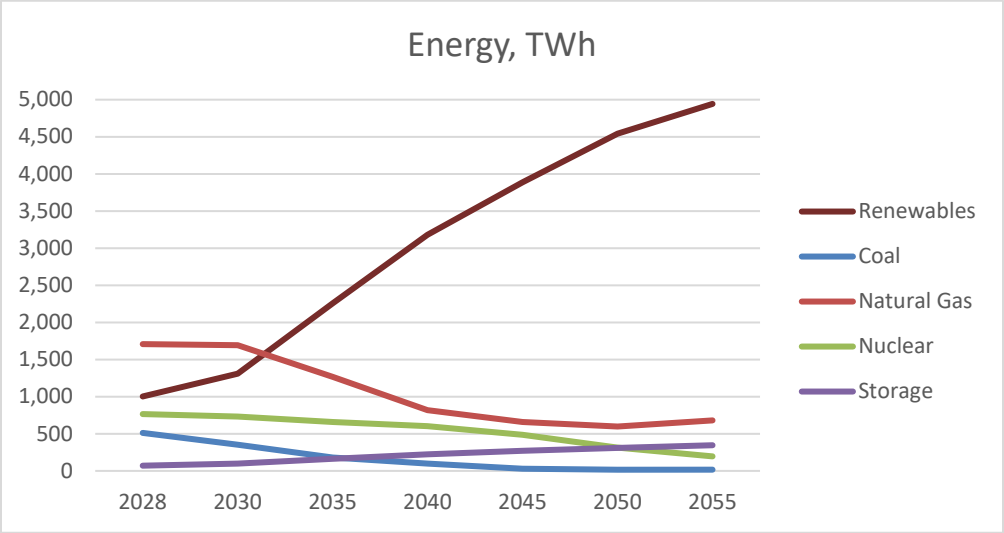
[34] Grid of the Future: PJM's Regional Planning Perspective
[35] Federal Building Performance Standard
[36] Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles
[37] DOE Industrial Decarbonization Roadmap.
[38] NERC, 2022 Long Term Reliability Assessment, December 2022,
[39] Growing Pains: The Renewable Transition in Adolescence, M. Cembalest, March 28, 2023, p.11.
[40] EPA Platform v6 – Post IRA 2022 Reference Case, Chapter 2: Modeling Framework.
[41] EPA Platform v6 – Post IRA 2022 Reference Case, Chapter 4: Generating Resources.
[42] EPA Regulatory Impact Analysis.



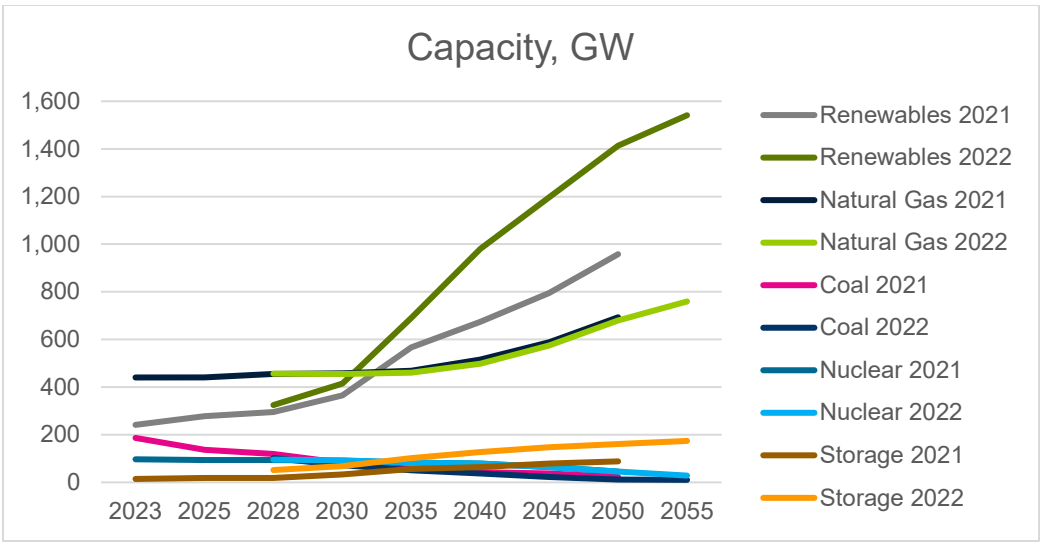
Total Capacity (Cumulative GW) from *IPM-EPA Updated Baseline with LNG Update*.[43]



Total Energy (Cumulative TWh) from *IPM-EPA Updated Baseline with LNG Update*.[44]

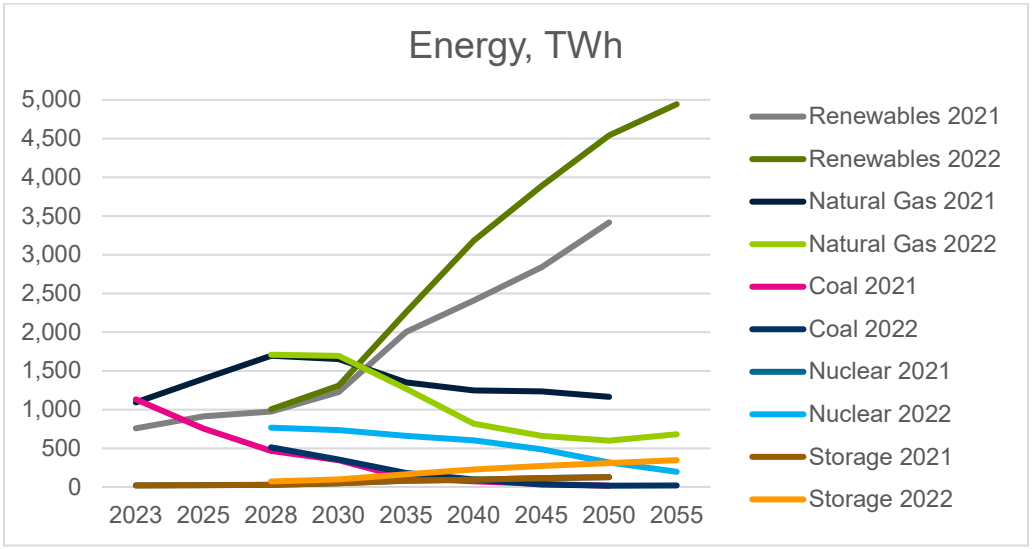
The Figure below shows a comparison of projected generation capacity results from EPA modeling the IRA using EPA's Power Sector Modeling Platform v6 based on IPM Summer 2021 Reference Case versus the 2022 Post-IRA Reference Case. This is helpful in showing how the modeling effort

[43] EPA Updated Baseline with LNG Update, July 7, 2023.
[44] Same citation as above



Comparison of Good Neighbor Rule + IRA[45] to GHG NSPS Updated Baseline with LNG Update

progressed, as well as providing a starting point in 2023 rather than 2028, enabling the visualization of the projected impacts from a point closer to today. The comparison shows a significant change (increase) in renewable capacity, as well as a noticeable change (increase) in storage capacity between the models, while not showing similar changes in coal, natural gas or nuclear capacity between models. Similarly, comparing the projected energy output results of the two models (in Figure below) shows a significant change (increase) in renewable energy, a noticeable change (increase) in storage energy, and a significant change (decrease) in natural gas energy, while not showing any change in coal or nuclear. This again points to the inherent difficulties in modeling the IRA and subsequently basing reliability assessments of the Proposed Rule on those projected results.



Comparison of Good Neighbor Rule + IRA[46] to GHG NSPS Updated Baseline with LNG Update

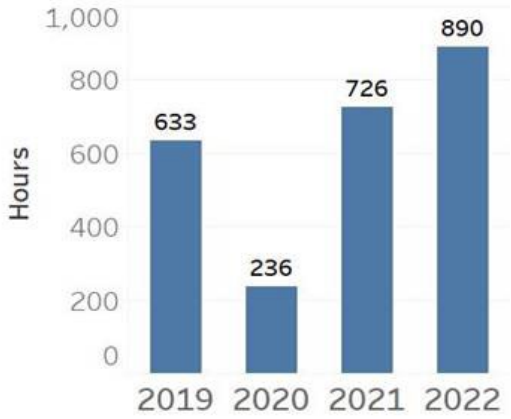
[45] Sensitivity Final Rule + IRA.
[46] Sensitivity Final Rule + IRA.

APPENDIX 4

SPP

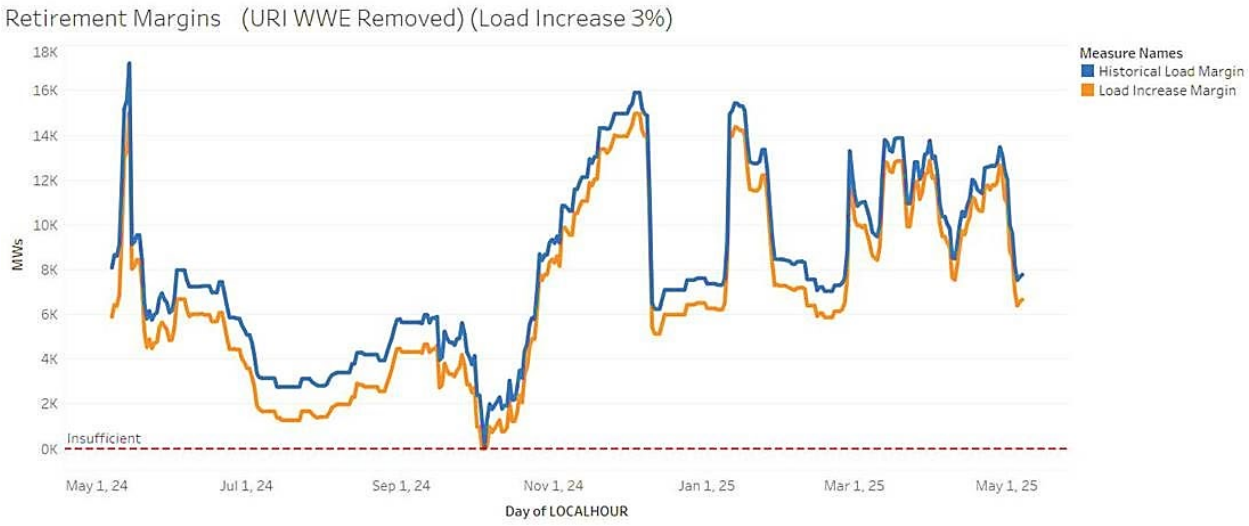
SPP has adapted its market design, operations processes, and transmission planning practices to keep pace with the changing resource fleet thus far. However, since 2014, SPP has experienced the retirement of over 7,600 MW of thermal resources. SPP saw over 2,796 MWs of thermal generation retire from 2019 to 2022, and SPP has already seen an additional 809 MW retire thus far in 2023. As the thermal fleet shrinks without comparable replacement in fuel-assured, ramp-able capacity, the remaining fleet carries the additional burden the recently retired resources provided. This additional stress has led to more planned and forced outage rates, particularly with an aging fleet of such resources. Some resources are being forced to take maintenance outages during summer and winter conditions.

These retirements have also contributed to declining reserve margins. SPP has recently seen an increase in levels of system alerts as the remaining thermal fleet is increasingly stressed by managing typical load fluctuations. As illustrated below, from 2019 to 2022, SPP experienced over 2,475 hours of system alerts, including 33 hours of Energy Emergency Alerts. In 2022, SPP experienced 257 more alert hours than it did in 2019, which amounts to almost eleven days.



The graph below illustrates that SPP has determined that with a mere 3% increase of historical gross load, the region's conventional resources serving net load (gross load minus wind and solar output)[47] have no margin for additional retirements.

[47] Impacts from Winter Storm Uri were not included in this analysis.



Please note loads are projected to be higher than 3% on average due to general load growth, electrification, electric vehicle charging, hydrolyzers, crypto-mining, data centers, and micro-grids (when they are grid-served). In an effort to facilitate an orderly transition that ensures the reliability levels the region has enjoyed for decades, it is imperative resources do not accelerate retirement until there are adequate replacements.

SPP establishes a Planning Reserve Margin ("PRM") requirement designed to ensure that SPP will have sufficient capacity to serve peak demand obligations. The current PRM requirement of 15% was determined in accordance with SPP's tariff, which directs SPP to conduct an LOLE study and set a PRM value to maintain a loss of load value equal to or less than one day in ten years. That PRM requirement is subject to change and may need to be increased in future years as the transition to a less-dispatchable resource mix continues.

SPP planning staff has analyzed projected capacity levels as reported by its LREs and has issued a five-year outlook for the SPP Balancing Authority Area.[48] The current reported PRM for the 2023 summer season is 20.1%, which is above the current PRM requirement of 15%. However, the combined impacts of decreasing resource capacity and increasing demand by current projections would lead to a significant decrease in the PRM over the next five years. As reflected in the graph below, the projected margin will barely exceed the current PRM requirement by 2026. If the projection were to hold true, it will fall below the requirement in 2027, and it will continue to drop to 9.7% by 2028. Of course, the current 15% PRM requirement and any future established PRM requirements must be maintained by the Load Responsible Entities in SPP. However, such requirements and penalties for not maintaining the required PRM cannot override a mandate from this Proposed Rule. Once the reserve margin has fallen below

[48] *See* the 2023 SPP June Resource Adequacy Report at: https://www.spp.org/documents/69529/2023%20spp%20june%20resource%20adequacy%20report.pdf

the 15% PRM requirement, SPP would no longer be able to meet the industry standard for loss of load of one day in ten years.