

Urgent Needs to Reliably Facilitate the Energy Transition

Recommendations for the Department of Energy

October 18, 2023

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Executive Summary

The nature and structure of electric energy service delivery to consumers is evolving rapidly due to many factors, including policy goals to decarbonize the electric grid, digitization of the grid, and grid technology advancements. Reliable delivery of those services is being challenged, however, by a plethora of causes, including but not limited to ineffective and slow transmission and resource planning, failed interconnection processes, supply chain bottlenecks, aging infrastructure, and a significant transformation in the mix of supply and demand resources. In many cases, the retirement of fossil fuel resources is outpacing the slower installation of renewable energy and other dispatchable, emissions-free resources. This pacing mismatch narrows operating reliability margins, highlighting the need for more careful coordination and a more orderly transition to ensure adequate resource availability to balance demand with supply. Maintaining reliability in the future – both near and long-term – requires careful consideration of regulatory policy and planning. Although many industry conversations are happening today, they have not led to the timely and bold action needed to assure the level of reliability necessary to decarbonize our grid rapidly going forward. This brief is intended to create a sense of urgency for action. Decisions that are being made today are driving imminent outcomes and important actions that must be taken soon to assure we are not too late to transition reliably into our energy future.

Call to action

- **Issue #1 – Certain reliability attributes of retiring resources are lost and can contribute to reliability challenges if not adequately replaced.** Reliability attributes include but are not limited to inertia, primary frequency response (PFR), reactive power capability, ramping, regulation, energy assured resources, and black start capability. Different resources and technologies provide different sets of reliability attributes.

Possible DOE Role: The Department of Energy (DOE) can assist in activities such as identifying the differing assets that provide reliability attributes, the cost of those technologies, and methods for facilitating their timely development and deployment.

Recommended Action: Leverage existing tools, and develop additional tools and scenario analyses beyond what is used currently. This action item would include developing a common set of tools, terms, methodologies, and studies that should be considered given the energy transition, to assess reliability with more accuracy and precision in lieu of new changing technologies, demand requirements, and emerging threats such as extreme weather. It might also include a description of how resource adequacy risk is assessed, and a standard set of reliability studies and reports, so that industry decision makers have common information when making decisions. Another relevant action could be defining needed reliability attributes (e.g., inertia, fuel security, etc.) as well as potential proof of concept tools from the DOE. These common tools, processes, and additional reliability standards would also allow for better coordination across industry participants. Consistent modeling of scenario analyses should include high-risk operating conditions such as extreme weather conditions or zero import capability cases, and should consider various resource mixes. Improvements may also be possible to forecasting data, tools, and methods, to develop better models as part of scenario analysis. High levels of uncertainty related to electrification loads – how much, where, and when – exist currently, and additional modeling tools would enable greater understanding and predictability.

- **Issue #2 – Retiring resources are outpacing new resources, which could lead to a deficiency when balancing capacity and energy load needs.** Replacement power is not coming online as quickly as larger retiring resources. One key factor is clogged interconnection queues, which delay deployment timelines. When considering impacts of the resource replacement transition, one needs to consider effective capacity, which is the ability for a resource to perform when needed (“resource accreditation”). Effective capacity differs from the resource’s nameplate capacity; this value might change with the location of the resource, the time of day, season of the year, weather, inherent capacity factor, or myriad other factors. Coordinating the pace of retirements with the addition of new generation requires policy action: in determining how much new generation is required to maintain an adequate energy availability, planners need to incorporate the accreditation value of those resources to assure pervasive system reliability.

Possible DOE Role: DOE can help to develop differing accreditation models as well as tools for evaluating resource-specific accreditations.

- **Issue #3 - Planning processes at the local, regional and inter-regional levels are not adequately coordinated to process and in some cases, accelerate needed new transmission and interconnection projects.** Alignment and coordination at the local, regional and inter-regional levels are needed to address the tight coordination required to integrate renewables and DERs safely and reliably, to ensure that the grid resource mix can contribute effectively to reliability needs across and between regions and interconnections, and to support the energy transition to a carbon neutral grid. Enabling this coordination includes accounting for quickly changing grid edge resources and increasing load due to many factors including transportation electrification, which also introduces higher uncertainty as to how much, where and when load is being added. It also includes new analytical tools and policies to reverse existing stagnated siting approval processes as infrastructure needs are outpacing process timing.

Possible DOE Role: Help to coordinate local, regional and inter-regional planning processes related to new transmission and interconnection processes.

Recommended Action: To address the need for expediency in infrastructure planning and implementation, offer infrastructure planning assistance more broadly and at the highest levels to support crucial legislative and other conversations and to propose and define roles and responsibilities including a “fast path” for transmission planners. FERC Orders 1000 and 2023 already offer a path forward with respect to regional and inter-regional planning; however, this recommendation extends to the local and state levels to mitigate any conflicts stemming from jurisdictional boundaries. It is meant to offer a path forward that decision makers can adopt to consider the entire process, from the planning and study phase through the siting and implementation phases. In addition, DOE could offer a moderation role. A possible outcome of this recommendation would be tighter coordination around transmission needs, building timelines, consistent with previous DOE recommendation on identifying transmission corridors, and alignment on risk assessments and goals.

- **Issue #4 – The lack of tight collaboration and communication across federal and state agencies and regulators and other critical policymakers and stakeholders, such as Rural Electric Cooperatives, fails to create an atmosphere necessary to vet grid reliability solutions rapidly.** Numerous parties must be brought to the table to develop processes and policies that ensure grid reliability.

Possible DOE Role: DOE could pay for the meeting of state regulators – who have jurisdiction over the generators in their states – and the appropriate grid planners and policymakers. They could facilitate discussions with the goal of identifying legitimate, material reliability concerns associated with the energy

transition, and proposing appropriate, cost-effective solutions. Such discussions would also include opportunities to educate various parties on technical issues and needs. One example is the multi-stakeholder coordination and integration needed to implement the processes established by FERC, under its DER market implementation Order 2222, which despite many efforts to date, and has largely not accomplished this goal. The Federal-State Task Force on Transmission provides another example of one such forum already under way. The Electricity Advisory Committee (EAC or Committee) encourages the DOE (to the extent possible) to facilitate recommendations that come out of that task force.

Recommended Actions: Host communication workshops – at least quarterly – on communication paths. Workshops would emphasize closing the gap with the needed information exchanges necessary to facilitate the energy transition cost-effectively while remaining reliable as defined by NERC.

- **Issue #5 –The industry lacks communication standards and technology to meet today’s need for global secure data access and sharing needed for real-time situational awareness.**¹ Such standards and technology are essential given grid-connected DER growth rates. Many entities, including state/federal regulators, local utilities, third-party providers of energy services, and regional entities may need to access the same information.

Possible DOE Role: Initially determine what information is needed by whom, and for what purpose, and then determine the secure data access requirements.

Recommended Actions: Codify and propose mandatory interoperability and performance standards for new technologies. The EAC recognizes that recommended guidelines exist. This recommendation acknowledges that some states have already required broad adoption of these standards. Although many new clean energy technologies have standards, opportunities exist to further this adoption across broader regions to better support the reliability of the grid during the energy transition. In addition, the DOE should help develop capability requirements (ability to perform) for the new technologies such as those outlined in IEEE Standard 2800-2022.

While the Electricity Advisory Committee, with its diverse group of stakeholders, recognizes that many topics could be included in this brief, the Committee focuses on the issues that can have the most meaningful near-term impacts on reliability. The EAC recognizes that some of the largest challenges facing the electric industry emerge from fractured jurisdictional boundaries between the electric and natural gas industries and between the state and federal jurisdictional authorities, and we have respected those boundaries in this brief. However, the EAC urges the Department of Energy (DOE) to take the timely, necessary steps to help assure our energy security within those boundaries and encourages DOE to develop a plan by January 31, 2024 to address the immediate needs and recommendations above.

Conclusion

The EAC recognizes that there are many efforts under way across the industry to address some of the needs addressed in this brief. We have provided many recommendations over the last several years focused on addressing some of these issues. This brief is meant to create a sense of urgency for action. The EAC urges DOE to lead, convene, organize, educate, and provide oversight as appropriate to achieve the Office of Electricity’s Mission and Vision² ensuring that electricity reliability is maintained throughout the energy transition. Decisions that are being

¹ A complementary DOE Grid Resilience for National Security Subcommittee work product(s) is in development focused on migration strategies for evolving and emerging security (cyber and physical) and supply chain risks.

² <https://www.energy.gov/oe/about-office-electricity>



made today are driving imminent outcomes and actions that must be taken by DOE in coordination with others in short order to assure we are not too late to transition reliably into our energy future.

Appendix A

1. North American Energy Reliability Corporation (NERC) Essential Reliability Services Working Group (ERSWG) and Distributed Energy Resources Task Force (DERTF) [https://www.nerc.com/comm/Other/Pages/Essential-Reliability-Services-Task-Force-\(ERSTF\).aspx](https://www.nerc.com/comm/Other/Pages/Essential-Reliability-Services-Task-Force-(ERSTF).aspx)
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3. PV Magazine – USA – *Grid-Forming Inverters Will Enable a High-Renewables Grid* (October 10, 2023) [Grid-forming inverters will enable a high-renewables grid – pv magazine USA \(pv-magazine-usa.com\)](https://www.pv-magazine-usa.com/grid-forming-inverters-will-enable-a-high-renewables-grid/)
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6. PJM Interconnection, LLC - *Energy Transition in PJM: Resource Retirements, Replacements & Risks* (February 24, 2023) <https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx>
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8. New York Independent System Operator (NYISO) - *A Balanced Approach to a Clean and Reliable Grid* (August 14, 2023) [Power Trends - NYISO](https://www.nyiso.com/publications/power-trends)
9. PJM Interconnection, LLC - *Energy Transition in PJM: Emerging Characteristics of a Decarbonizing Grid* (May 17, 2022 | October 28, 2022) [20220517-energy-transition-in-pjm-emerging-characteristics-of-a-decarbonizing-grid-white-paper-final.ashx](https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-emerging-characteristics-of-a-decarbonizing-grid-white-paper-final.ashx)
10. PJM Interconnection, LLC – *Grid of the Future: PJM's Regional Planning Perspective* (May 10, 2022 | June 23, 2022) [20220510-grid-of-the-future-pjms-regional-planning-perspective.ashx](https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-emerging-characteristics-of-a-decarbonizing-grid-white-paper-final.ashx)

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